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HUNGARY'S RENEWABLE ENERGY UTILISATION ACTION PLAN

**on trends in the use of renewable energy sources until
2020**

(data provision under Article 4 (3) of Directive 2009/28/EC)

December 2010

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HUNGARY'S RENEWABLE ENERGY UTILISATION ACTION PLAN FOR 2010–2020

Hungary's Renewable Energy Utilisation Action Plan (hereinafter referred to as the National Action Plan or NAP) has been drawn up in accordance with the format of the template published in Decision 2009/548/EC of the European Commission (hereinafter referred to as the template). The NAP is divided into chapters according to the template, and the numbering of the chapters follows those of the template. In order to ensure clear identification, the tables of the template have been numbered in an F/... format.

<i>Text written in italics inside borders represents the questions of the template.</i>

INTRODUCTION

“We must identify breakthrough points, future industries, which will enable us to vitalise the entire economy. We must identify the means to connect these breakthrough points and thereby weave a fabric of such points, which will serve as the driving force behind the most important economic playing fields: a health care industry based on local opportunities and highly labour-intensive enterprises, tourism, green economy, renewable energy, water-based economic development, the automotive industry, the knowledge industry, transit economy, the food industry, business services, R&D.”

Excerpt from the Programme of National Cooperation, May 2010

As the days of an economy based on cheap energy sources are coming to an end, and as a result of efforts aimed at reducing the driving forces behind climate change, the 21st century will see humanity return to the basics of life on Earth. The primary issues will be the quality of environmental compartments and natural resources: soil, water, air, the issue of energy, as well as access to these resources. Consequently, the success of a country with geopolitical and natural conditions like Hungary will largely depend on its ability to replace an economic model based on traditional energy sources with an alternative economic model. Another decisive issue will be its ability to reduce the external effects derived from the model it intends to replace (import dependency, security of supply, energy poverty) and convert them into positive ones, while endeavouring to strike a balance between the use of services provided by environmental compartments and systems and the fulfilment of developmental needs.

In a model laying down the foundations of a sustainable future, energy saving and energy efficiency, an increased use of renewable energy sources, and the priority of own resources will be of key importance. These logically consequent steps can, if integrated into a coherent economic model, provide adequate answers to such questions as how will we deal with the effects of global climate change on economic and social development, with non-sustainable growth, with the worldwide tendency of increasing energy demands or the unpredictable changes in the prices of fossil fuels? These changes urge the world, the EU Member States, and of course Hungary as well, to take action. The exhaustive examination of relationships and the

comprehensive evaluation of national resources and the assets of the green economy provide us with a framework for the new economic model we are establishing, of which the development of a green economy, as well as the National Renewable Energy Action Plan as an important milestone thereof, constitute an integral part. The totality of these constitutes the basis of a country operating according to the principles of resource-efficiency and sustainability.

In order to ensure that the above principles are applied, Hungary must draw up such system-oriented energy plans and have such a future outlook as to provide a solution for the current system's intractable inconsistencies, such as *security of supply*, *competitiveness* and *sustainability*. The realisation of our outlook and plans will provide the appropriate means for us to address our problems. From this perspective, the implementation of the green economic model and, more specifically, the development of new green industries, green industrial innovation and the practical application of the results of research and development will be key factors in national economic development. Our country, our economy and our society can, through the appropriate strategic decisions and measures, and *by turning our assets into an advantage*, be beneficiaries of the activities of these new energy sectors. If our assessment of the situation was accurate, if we identified the main problems correctly and if we have chosen the appropriate means to remedy them, i.e. if we choose the development of a green economy to find a solution, then this will be in accordance with the key strategic goals of the energy policies of Hungary and the EU, i.e. to optimise the joint implementation of the *security of supply*, *competitiveness* and *sustainability* as primary goals, while also taking into account long-term considerations.

As a Member State of the European Union (EU), the adopted common legislation and long-term strategic objectives set out several tasks for Hungary in this field. The EU's Renewable Energy Roadmap adopted on the basis of the EU energy and climate package specified a 20 percent share of renewable energy sources, including a 10 percent share in the case of transportation, as well as a 20 percent increase in energy efficiency and a reduction of greenhouse gas (GHG) emissions to 20 percent (of the 1990 level) as targets to be reached until 2020.

The creation of the national action plans required for reaching the EU targets is the responsibility of the Member States. The utilisation of renewable energy sources planned for the future necessitated the creation of the National Action Plan. The NAP has been drawn up in accordance with the Directive of the European Parliament and of the Council¹ (the RED) and in compliance with the format laid down in the Commission Decision on the related single template.²

The NAP draws upon Hungary's renewable energy strategy,³ but also supersedes and overwrites it, having regard to the significant changes that took place since the adoption of that strategy, the global economic recession and the new economic development priorities determined by the Government, which serve economic reconstruction.

¹ 2009/28/EC

² 2009/548/EC

³ Government Decision No 2148/2008 of 31 October 2008 on the 2008–2020 strategy for increasing the use of renewable energy sources in Hungary

It follows from the above, that Hungary does not solely and primarily consider the use of renewable energy sources an obligation,⁴ but rather as an exceptional opportunity to contribute to economic development. In this regard, the use of renewable energy sources is both a necessity and an opportunity for Hungary. On one hand, there is an essential need for finding solutions to the problems resulting from an overuse of fossil energy sources (climate change, dependency on imports, imbalances of the foreign trade balance, energy poverty, etc.), which will provide the maximum advantage from a social, economic and environmental point of view. On the other hand it provides an opportunity for the restructuring of the national economy, for extensive production and market reforms, and for the introduction of new, marketable domestic products, and ultimately for the creation of jobs.

In the framework of the restructuring, the development of a green economy represents, in accordance with the New Széchenyi Plan, one of the breakthrough directions for a “renewable Hungary.” Thus, the goal of the **NAP** is to contribute to the greatest possible extent to the relevant Government objectives relating to the national economy, such as job creation, the substitution of natural gas imports and the increase of competitiveness, through the application of renewable energy sources. This will guide the planning approach set by the NAP for the next ten years, which will be more ambitious than those of the previous years.

The RED of the European Parliament and of the Council specified a legally binding obligation for Hungary to ensure a 13 percent⁵ minimum share of renewable energy in gross final energy consumption by 2020. Taking into account the importance of green economy development to the national economy, its effects on employment (the creation of at least 150–200 thousand jobs, including 70 thousand in the energy sector), and its designated role in domestic value creation, **the present document sets out, in accordance with national interests, the achievement of a realistic target of 14.65 percent by 2020, exceeding the obligatory minimum target.** The Government's intention with this target is to emphasise once again, in accordance with the above, that it considers the production and utilisation of renewable energy sources one of the breakthrough directions for economic development.

The development of a green economy can only be successful if it is in alignment with the development of other sectors of the national economy, in particular agriculture and the industry. Green economy, with its considerable growth potential, represents one of the significant new sectors and breakthrough directions of the future for agriculture, the countryside and, in a broader sense, for the national economy, through the increasing use of renewable energy sources. Among renewable energy sources, the reasonable use of biomass originating from forestry and agriculture, the extensive use of biogas, the utilisation of geothermal and solar energy, the rational spreading of wind power plants, the spreading of small-scale hydropower plants, as well as bio-fuels and alternative fuels, represent the pillars of a green economy

⁴ Compliance with the national notification obligation under Article 4 of Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (hereinafter referred to as the Directive or RED).

⁵ In addition to the 2020 target, the RED also specifies the minimum progress to be achieved in relation to two-year periods.

based on renewable energy sources and of production, technology-supplying and manufacturing plants.

Laying down the foundations of the green industry and developing it according to changing market conditions will be necessary pre-requisites of the creation of green collar jobs. Therefore, in accordance with national interests and national economic goals, Hungary requires a national renewable energy action plan that provides the opportunity for, and aims at, exceeding the EU targets undertaken. The priorities of the NAP have been defined accordingly, encouraging the application of small to medium-sized production units that have a greater potential to create new jobs and are better adapted to local resources and needs, and the production of energy at the highest possible efficiency, as well as the utilisation of the environment in a way which is sustainable in the long term.

The Government intends to make use of all possible means during the implementation process in order to achieve a higher share of renewable energy sources than the abovementioned target. This can be made possible by the change of external conditions (technological progress, the decrease of investment costs, direct Community resources, etc.), through the review and necessary adaptation of the regulatory framework, the re-thinking of aid schemes and the simplification of authorisation procedures. Hungary must implement developments in the field of renewable energy in such a way that they provide the greatest possible economic, social and environmental benefit to all citizens.

The calculations on which the National Action Plan is founded were carried out on the basis of the Green-X model. This work phase was coordinated by the Hungarian Energy Office. The energy use path was drawn up on the basis of the forecasts of the Hungarian Economic Research Institute, while those in the field of transport are based on forecasts by the Institute for Transport Sciences Non-Profit Ltd.

The preparation of the NAP received professional assistance from the international consortium established by the EBRD. Its members possess considerable experience in the preparation of analyses related to the use of renewable energy, in policy-making and in the preparation of national action plans. The consortium is headed by the Dutch ECORYS, and its members are the German ECOFYS, the Energy Economics Group at the Vienna University of Technology, GKI Energy Research and Consulting Ltd. and the Hungarian Energy Club.

Social consultations regarding the Action Plan took place in multiple phases. In the first step, seven professional fora were organised during the drafting of the Action Plan, with the participation of 35 to 40 professional and civil organisations on each occasion. The second step consisted of the discussion of the topics in a preliminary social consultation with the involvement of 26 civil and social partners. Subsequently, the National Action Plan was published on the website of the Ministry of National Development for the purpose of conducting a social debate.

The present National Development Plan does not provide for specific public tasks, but several public tasks are affected by its measures. The details of the implementation and preparation of the individual public tasks included in the National Action Plan are, due to their complexity, not yet fully known; their detailed elaboration

will be a task for the upcoming period. Taking this into account, the NAP endeavours to provide the fullest possible picture about the measures through which the Government intends to encourage the achievement of these goals and to eliminate existing problems and hindrances (e.g. the removal of bureaucratic obstacles, legislative anomalies, financing difficulties, etc.). Accordingly, in drawing up the measures included in the NAP, we aimed at achieving an optimal balance between the two expectations: to give an overall indication of the planned measures, but also to provide sufficient freedom for a later, more detailed elaboration of the individual tasks.

Accordingly, the measures of the present National Action Plan concern the following public tasks:

- the drafting of a new act on sustainable energy management in 2011;
- restructuring of the implementation of existing aid schemes and making it more efficient and more simple;
- launching an independent energy support scheme (co-financed by the EU) between 2014 and 2020;
- a comprehensive adaptation of the mandatory off-take scheme for renewable electricity (hereinafter referred to as green electricity) (the relevant amendment of Act LXXXVI of 2007 on Electricity is currently being submitted for administrative consultations);
- examination of the possibilities for subsidising green heat;
- facilitating a more active participation in direct Community support and other support schemes;
- review of the incentives incorporated into energy regulations for buildings (in accordance with Directive 2010/31/EC);
- review of spatial plans, creation of regional energy concepts;
- establishment of green forms and programmes of financing (green bank);
- review and simplification of regulatory and authorisation systems and procedures;
- drafting of awareness-raising programmes and information campaigns (integrated information programmes);
- launching educational and training programmes based on renewable and alternative energy sources and energy efficiency;
- launching employment programmes in the field of renewable energy sources;
- launching development programmes for the purpose of developing the related industries;
- encouraging research and development and innovation incentive programmes;
- programmes and measures for spreading second generation bio- and alternative fuels;
- drafting of an agricultural energy programme;
- preparation of the administrative staff taking part in regulatory and authorisation procedures in relation to renewable energy and related fields.

The aim of the National Action Plan is to provide the greatest possible benefit to the entire society by drawing on Hungary's natural, economic, social, cultural and geopolitical assets. The main objective of the utilisation of renewable and alternative energy is to reduce dependency on gas and crude oil imports.

“Sources of alternative energy, in particular solar, geothermal and bioenergy, are also abundant ... success, however, will not only require material resources, but intellectual and emotional ones as well.”

Excerpt from the Programme of National Cooperation, May 2010

1. Considerations determining the goals of national renewable energy policy

The most important strategic objective of Hungarian renewable energy policy is to optimise the joint implementation of the security of supply, competitiveness and sustainability as primary national economic goals, while also taking into account long-term considerations. There can be various forms of interaction between the aforementioned three goals – in many cases their implementation may conflict with one another, but they may also strengthen each another. For this reason, the measures drawn up for the achievement of these goals must place special emphasis on joint effects, the resolution of conflicts between the goals and the achievement of the greatest possible degree of consistency.

The key areas of Hungarian renewable energy policy are the following:

- (a) Security of supply.** Hungary is highly dependent on energy source imports, and fulfils 80 percent of its domestic crude oil demand, and over 83 percent of its natural gas consumption from imports, primarily from former CIS countries (due to the limited hydrocarbon reserves of the country, the share of imports may increase further). Through the use of renewable energy sources, the dependency on imports can be reduced, as the use of renewable energy is planned to be realised from domestic sources.
- (b) Environmental sustainability and climate protection.** The use of renewable energy sources contributes to the reduction of CO₂ emissions. When selecting specific applications, environmental and nature conservation considerations have special priority. An important means of ensuring that environmental and nature conservation aspects are taken into account is to include them as criteria for the measures detailed in point 4.1, having regard in particular to the establishment of aid schemes.
- (c) Agriculture and rural development.** The use of biomass for energy purposes based on the favourable agro-ecological conditions of the country and taking into account sustainability criteria (especially the protection of biodiversity and soil quality), can contribute to the retention of agricultural jobs and to the creation of new ones. The use of organic matter from animal husbandry (biogas) for energy purposes can enable productive waste management, increasing the competitiveness of the sector. The use of by-products and other solid wastes from agriculture and forestry (e.g. by-products from plough lands, cuttings from orchards and vineyards) for local energy purposes, and their conversion into end-products, will result in additional income for farmers and producers, and can significantly reduce the need of communities for fossil energy sources.
- (d) Development of a green economy.** The rational use of renewable energy sources, in close coordination with energy conservation and energy efficiency programmes, may constitute the basis of the creation of a new (green) sector of the economy. New jobs will be created through the establishment and operation of investments, and in the related industries and horizontal sectors (e.g. equipment manufacture). The reduction of fossil energy source imports will lead

to an improvement of the balance of payments and foreign trade balance, and to an increase of the GDP and domestic added value. Since in most areas the use of renewable energy sources is more advantageous in terms of operational costs than the use of fossil energy sources, the competitiveness of market actors investing in this field will also improve in the long term.

- (e) Contribution to Community goals.** Hungary is committed to the achievement of the objectives set out in the RED. Surpluses in the green industry, environmental industry, agriculture, rural development, the SME sector and employment can be promoted through the utilisation of renewable energy sources. The guidelines provided by the European Union can serve as suitable means for achieving this.

When determining the renewable energy mix, the targets and the incentive measures constituting individual parts of the NAP, the following limiting factors must be taken into consideration among others:

- (a) Competitiveness and capacity:** when setting up the incentive schemes for renewable energy sources, the capacities of the market actors (the population and the market sector) and the budget must be taken into account.
- (b) Resource allocation and financing efficiency:** the available developmental and other resources, as well as financing resources must be allocated in such a way that they provide the greatest possible cumulative social benefit in the abovementioned key areas, while taking into account return on investments.
- (c) Competition rules:** aid and incentive measures must comply with the rules on state aid laid down in Articles 87 and 88 of the EC Treaty.
- (d) Controllability of the electricity system:** the Hungarian electricity system is only capable to a limited degree of receiving electricity generated in a non-controllable way (weather-dependent energy), which necessitates a re-thinking and upgrading of the system.
- (e) Distribution of income:** the regulations must facilitate an even distribution of income along the product chain (biomass producers – processors – energy generators, suppliers and consumers). The aim is to ensure that the greatest possible percentage of economic and financial profits from the use of renewable energy sources, especially in respect of biomass, are realised in the incomes of producers and micro-regional actors.

The goal of Hungarian renewable energy policy is, within the limits of our available options and taking into account limiting factors, to create an energy source mix which results in the greatest possible cumulative benefit to the national economy and to society in the abovementioned key areas.

2. Expected energy use forecast for 2020

The percentage value of the use of renewable energy sources must be calculated in relation to the total gross value of energy consumption. The aim of Chapter 2 is to determine the entire gross energy use path until 2020, taking into account the effects of the planned energy saving programmes.

The following energy consumption paths and energy amounts are determined in this chapter:

- **BAU path:** the energy consumption path that would arise without energy saving and energy efficiency measures;
- **reference path:** the energy consumption path that would arise from the BAU path with the implementation of the energy saving and efficiency measures adopted prior to 2009;
- **supplementary energy efficiency path:** the energy consumption path that will arise with the implementation of the National Energy Saving Programme planned for the following years;
- **sum total energy consumption:** the total amount of all energy sources used, including those used for purposes other than energy (e.g. petroleum products and derivatives used in the chemical industry);
- **total gross energy consumption:** the amount of energy used according to Article 2(f) of the RED (including losses incurred during transport and distribution).

2.1. Regression of GDP and energy demand, and national energy demands forecastable on the basis of past trends

The annual trends in GDP, which characterises Hungary's economic development, as well as the trends in total energy use (TPS) and electricity use are indicated in relation to past primary energy sources in *Figure 1*.

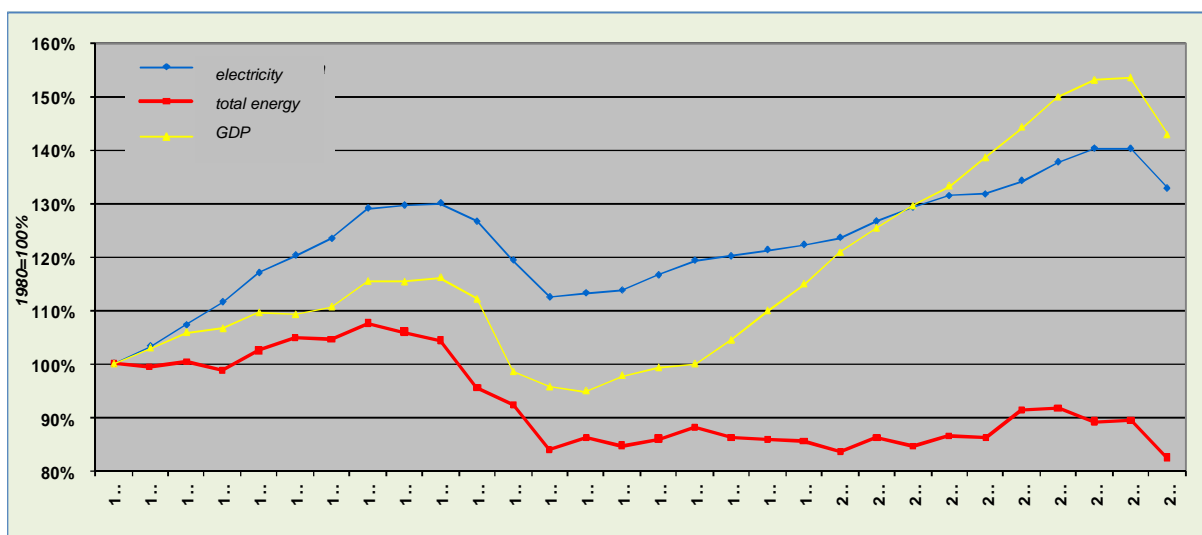


Figure: Changes in GDP, electricity and total energy consumption

As shown in Figure 1, energy consumption closely correlates to changes in GDP. Earlier, it was a general rule used in the relationship between energy paths and GDP

that a one percent increase in GDP was accompanied by a total energy demand increase of 0.5 percent. As regards electricity, in the period between 2002 and 2008 GDP increased by 27.5 percent, while electricity consumption increased by 13.7 percent.

Several domestic and foreign research workshops made forecasts to determine the sum total energy consumption path. Due to partially different approaches in methodology and calculations and base parameters, these predict different values (TPS data between 1100 and 1290 PJ). The determination of the energy consumption path depends on several external factors that are difficult to forecast (e.g. trends in petroleum prices, exchange rates, etc.), and therefore, specific values can only be forecast ten years in advance at a high standard deviation. Thus, during the determination of the energy path estimated for 2020, in the absence of a professional consensus, it is expedient to use the changes of a factor that changes in parallel with energy consumption as a basis. The expected trend in GDP is one such factor, which changes in parallel with energy consumption and determines its extent. Thus, we determined the expected energy path on the basis of GDP forecasts.

As regards the following decade, Hungary is primarily planning to realise economic development in less energy-intensive areas, but in parallel with the improvement of the standard of living, energy consumption would probably increase without energy saving measures. To support this with some comparative data, in the field of motorisation, motor vehicle coverage in 2009 was 301 vehicles for every 1000 persons, while the average in the EU 15 in the same period was 500 vehicles for every 1000 persons; energy consumption per capita in 2008 was 1.69 toe in Hungary, 2.56 toe in Germany and 3.19 toe in Austria. For the following ten years, a 0.3 to 0.31 percent increase in total energy source consumption can be forecast for every 1 percent increase in GDP.

In order to eliminate the distorting effects of the economic crisis it is reasonable to use a starting date before the crisis when determining the energy consumption path. The total energy source use (TPS) path was therefore determined by using a 2008 basis. Taking into account the stability reports of the Hungarian National Bank, an annual economic development of 3 percent can be expected in average for the period between 2008 and 2020.

Based on the above, the **BAU path** can be calculated on the basis of the following data:

- the average GDP increase between 2008 and 2020 will be 3 percent, i.e. a total of $1.03^{12} = 1.426$;
- the annual 3 percent GDP rise could be accompanied by a 0.9 percent increase in energy demand;
- the annual 0,91 percent energy source increment will amount to $1.0091^{12} = 1.115$;
- the expected total primary energy source use for 2008 was 1126 PJ;
- based on the above values, the BAU value for 2020 will be $1126 * 1.115 = 1255$ PJ (of which electricity will constitute 53 TWh).

Please note that the PRIMES model, which is accepted by the European Commission as authoritative, forecasts, from a 2007 basis, a very similar value (1263 PJ) to that calculated above.

For the determination of the reference path, the energy saving measures adopted prior to 2009 can be taken into account. The National Energy Efficiency Action Plan (NEEAP), which was adopted by Government Decision No 1076/2010 (III. 31.), contains those ongoing or planned energy efficiency measures, which, when implemented at an appropriate efficiency, will ensure, in accordance with the requirement laid down in Directive 2006/32/EK, an energy consumption decrease of one percent in relation to the five-year average of the final energy consumption of the energy-consuming sector not involved in CO₂ trading (non-ETS sector) in the period between 2002 and 2006 for the period between 2008 and 2016. The aim is to achieve, in accordance with the EU target, an energy saving of 57.4 PJ per year corresponding to the 9 percent to be realised in the non-ETS sector. Continuing the trend of 2008–2016, the energy saving to be achieved by 2020 is 80 PJ/year (compared to the 2008 basis), and thus, **the national primary energy demand for 2020 under the reference scenario can be forecast as 1175 PJ/year**. According to the reference scenario, the BAU energy demand of Hungary will decrease by 6.4 percent.

Hungary is committed to reducing CO₂ emissions, as well as to energy efficiency. The realisation of a 10 percent energy saving is a political and professional goal, for the achievement of which **several major energy saving programmes are planned to be launched** in the following years and over the decade. Of these, an exceptional programme with regard to its breadth and the scope of clients affected is the residential and public institution modernisation programme. As a cumulative effect of these **the amount of primary energy source use for the year 2020 will be approximately 1130 PJ** (1255 PJ – 10 percent). Please note that this amount is essentially identical to the amount of consumption in 2008 (1126 PJ). Through this, Hungary intends to demonstrate that through appropriate energy saving and energy efficiency programmes and **an energy-intelligent (green) economic policy**, it is possible to achieve economic growth and an increase in the standard of living along a low-carbon path, without increasing the consumption of energy sources.

2.2. Gross final energy consumption values expected for 2020

In accordance with the terminology, the “gross final energy requirement” under the RED does not include losses from energy transformation (including conversion losses in the electricity production of nuclear power plants). These losses are displayed for the period between 2005 and 2008 in *Table 1* below.

	2005	2006	2007	2008
Transformation and conversion losses (PJ)	234	233	258	262
Gross national energy use (PJ)	1153	1152	1125	1126
Ratio of losses in national energy demand (%)	20.3	20.2	22.9	23.2

Table 1: transformation losses between 2005 and 2008

Based on the ongoing or planned electrical power plant renovations, transformation losses are expected to fall to 19.4 percent by 2020.

Energy demand values for 2020 **without transformation and conversion losses** are as follows:

- BAU energy use: 1012 PJ/year
- energy use under the reference scenario: 947 PJ/year
- energy use under the scenario based on the supplementary energy efficiency measures: 911 PJ/year

The 911 PJ/year thus calculated still includes “material” energy use and energy use “not for energy purposes,” which must be deducted from the “gross final” energy use according to the EU methodology, as otherwise they would be included in the “heating – cooling” data.

Values of material energy source use and energy source use not for energy purposes were as follows in the period between 2005 and 2008:

2005: 85.2 PJ/year	2006: 92.4 PJ/year	2007: 92.1 PJ/year	2008: 82.4 PJ/year
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On average, a value of 88 PJ/year can be used as a basis, which must be deducted from the 910 PJ/year value. The **values of “gross final energy use”** calculated using the terminology under the RED, which can be taken into account as a basis of reference for renewable energy source use in 2020, **are as follows, as forecast for the year 2020:**

- BAU gross final energy use: 923 PJ/year
- gross final energy use under the reference scenario: 859 PJ/year
- gross final energy use under the scenario based on the supplementary energy efficiency measures: 823 PJ/year

For the determination of the 2020 energy demand, the trends in heating and cooling, and electricity use and transport are represented by the values in *Table 2* below.

	2005	2008	2009	2020		
				BAU gross final energy use PJ/year	Gross final energy use under the reference scenario PJ/year	Gross final energy use under the scenario based on the supplementary energy efficiency measures PJ/year
heating/cooling PJ/year	524.8	450	378.6	491	434	407
electricity use PJ/year (TWh/year)	151 (41.98 TWh/year)	158 (43.85 TWh/year)	149,4 (41,5 TWh/year)	191 (53 TWh/year)	189 (52.5 TWh/year)	185 (51.5 TWh/year)
transport* PJ/year	166	174	196	240	230	224
Gross final use PJ/year	834	782	724	923	859	823

* value calculated taking into account Article 3(4) of the RED

Table 2: Summary table of gross energy use under each scenario

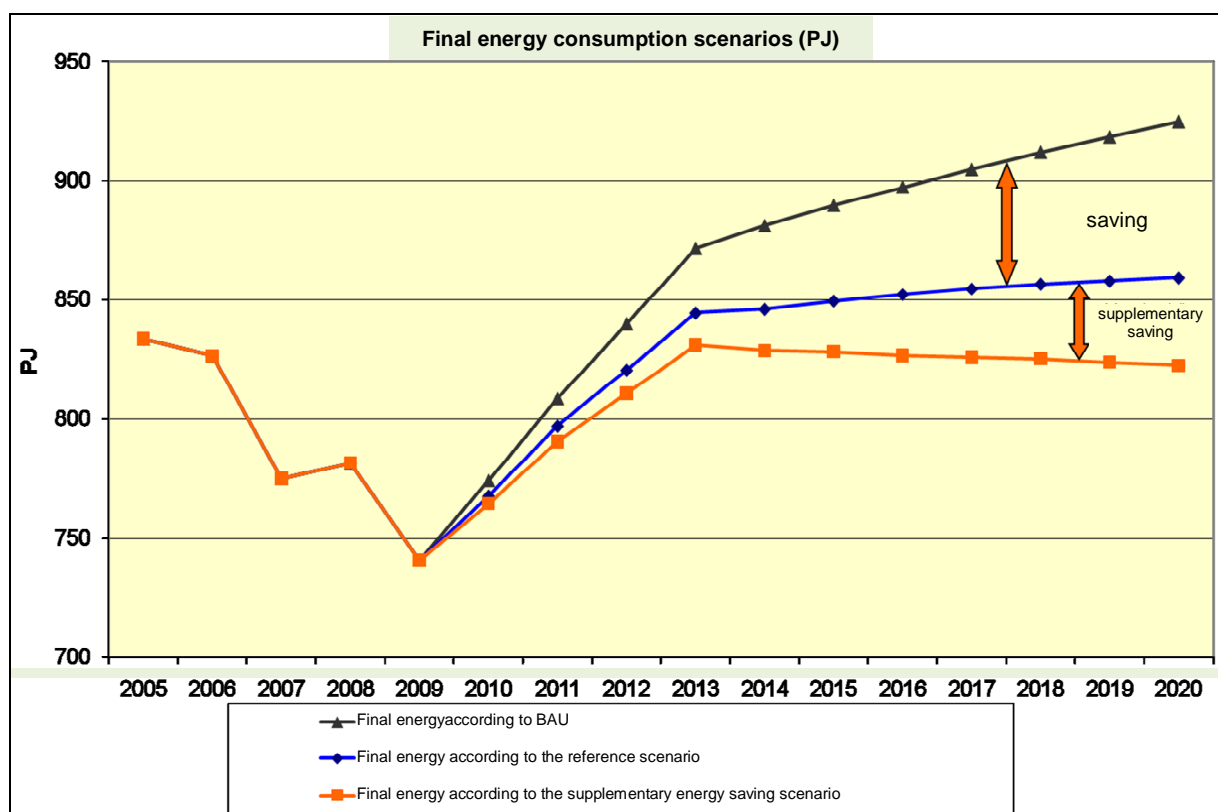


Figure 2: Gross final energy use paths between 2010 and 2020

Expected gross final energy consumption of Hungary in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures 2010–2020 (ktoe)

Table F/1

	2005	2010		2011		2012	
	Base year	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency
(1) Heating and cooling	12 192	10 392	10 347	10 626	10 520	10 940	10 774
(2) Electricity	3 609	3 682	3 675	3 801	3 785	3 922	3 898
(3) Transport as in Article 3(4)(a)	3 964	4 107	4 083	4 405	4 369	4 592	4 544
(4) Gross final energy consumption	19 909	18 332	18 255	19 036	18 878	19 598	19 360

	2013		2014		2015	
	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency
(1) Heating and cooling	11 322	11 094	11 116	10 817	11 008	10 636
(2) Electricity	4 001	3 969	4 089	4 047	4 169	4 118
(3) Transport as in Article 3(4)(a)	4 744	4 685	4 897	4 825	5 005	4 922
(4) Gross final energy consumption	20 167	19 849	20 205	19 792	20 288	19 782

	2016		2017		2018	
	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency
(1) Heating and cooling	10 887	10 434	10 759	10 251	10 625	10 069
(2) Electricity	4 245	4 185	4 316	4 247	4 383	4 308
(3) Transport as in Article 3(4)(a)	5 116	5 020	5 228	5 121	5 342	5 223
(4) Gross final energy consumption	20 355	19 746	20 412	19 728	20 462	19 712

	2019		2020	
	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency
(1) Heating and cooling	10 476	9 874	10 412	9 719
(2) Electricity	4 444	4 363	4 506	4 418
(3) Transport as in Article 3(4)(a)	5 417	5 286	5 492	5 349
(4) Gross final energy consumption	20 493	19 677	20 525	19 644

3. Renewable energy source use targets and trajectories

The aim of Chapter 3 is to present how the 2020 targets for the individual types of renewable energy sources have been determined by taking into account the considerations described in Chapter 1 (key areas, opportunities and limiting factors) and what the schedule for their planned achievement is.

3.1. *National overall target*

Renewable energy sources contribute extensively to the fulfilment of national economic objectives (job creation, GDP increase, security of supply, etc.), and therefore, it is a strategic objective to increase their use to the highest possible extent. Thus, the national target is not based on the mandatory EU target value, but instead targets the maximum value delimited by the possibilities and limiting factors. Consequently, if progress made in areas which constitute limiting factors (e.g. more funding is available than planned) or technological advances enable it, the use of renewable energy sources is likely to exceed the planned targets.

Based on the above, the consolidated national target has been set on the basis of the sum of realistically achievable maximum ratios with regard to the individual types of renewable energy sources. Taking into account the currently known parameters of the limiting factors, it would be a realistic target to increase the gross consumption of renewable energy sources to at least 120.56 PJ by 2020 (sectoral distribution is presented in Chapter 3.2). Based on the energy path described in Chapter 2, this would be 14.65% of total gross energy consumption.

Table F/2

A	Share of energy from renewable sources in gross final consumption of energy in 2005 (Table 3.2-2)	4.3%
B	Target of energy from renewable sources in gross final consumption of energy in 2020	14.65%
C	Expected total gross energy consumption in 2020 (ktoe)	19 644
D	Gross renewable energy source use according to the 2020 target (ktoe)	2 879

3.2. *Sectoral targets and trajectories*

When determining the targets for the individual types of renewable energy sources, the boundaries imposed by the following limiting factors must be examined (in this order):

- (a) sustainable quantity potential of the given type of renewable energy source;
- (b) controllability of the electricity system;
- (c) the limited nature of financing opportunities.

The utilisation of **hydropower** is primarily a **water management, flood protection and environmental issue**, and therefore, it will be considerations of such nature that will be of key importance when examining the limits of available possibilities. For

environmental and water management reasons, we did not explore the possibility of installing new major barrages or weirs when drafting the NAP. Thus, in respect of hydropower, the NAP calculated with so-called **dwarf hydroelectrical plants** having an output of less than 10 MW_e – which already play an important part in the regulation of smaller rivers and can be installed into existing weirs – and with so-called **flow-through turbines** with an output between 100 and 500 kW_e, which are installed in river beds. The installation of dwarf hydroelectric plants must be implemented within the framework of catchment area management plans. Water retention is of special importance in areas where rapid rainfall can cause damage. When planning reservoirs, it must be examined whether the local assets justify the implementation of semi-natural storm reservoirs that are fitted into the landscape, or if there is also a possibility to install energy-generating turbines. Hydroelectric plants can primarily serve as efficient and cost-effective solutions in local environments, for own energy use purposes.

If environmental and water management considerations are taken into account during the installation of a hydroelectric plant, hydroelectric energy represents one of the cleanest energy sources, and can also be regulated very well, thus contributing to the controllability of the electricity system. Therefore, the national target for 2020 takes into account installation potential in the field of hydroelectric power. The possibilities and sites for the installation of dwarf hydroelectric plants have been assessed, indicating that a total of **16 to 17 MW_e** of installed electrical power could realistically be installed **until 2020**. Considering the small amount of energy that can be gained, water management, environmental protection and nature conservation interests must be given priority in catchment area management.

Based on surveys conducted in the past years, we have determined the sites where larger wind turbines could be installed cost-effectively, taking into account environmental protection and nature conservation considerations. Based on this, Hungary has a total **wind energy** potential of several thousand MW_e. Wind energy is an extremely environmentally friendly, modern energy source (with practically no CO₂ emissions), which could represent one of the key elements of energy supply in the future. It is, however a **non-controllable**, weather-dependent technology. Thus, the proliferation of wind energy is **inhibited**, until the time energy storage can be ensured in an economical manner, **by the controllability and capacity of the electricity system**. The national target for 2020 is thus aligned, in respect of wind energy, to the limit of controllability of the electricity system, which is, to our present knowledge, capable of receiving wind energy up to an approximate total output of 740 MWe.

In addition to larger wind energy parks, the NAP also factors in the spreading of smaller wind turbines (with an output of a few kW) and dwarf turbines, which would generate power for the network periodically, and would primarily play an important part in local autonomous energy supply. Based on expert estimates, these can be expected to emerge at a total electricity output of approximately 10 MW_e until 2020. Based on this, a realistic target of **750 MW_e** can be set for the creation of **wind energy** capacities by 2020. If the flexibility of the electricity network increases (due to smart grid technology or other new power plant units that can be regulated in a flexible way), and if energy storage developments (e.g. hybrid wind-hydrogen systems) produce results that can be utilised in an economical manner, wind energy

production may exceed the abovementioned target. Dual-purpose utilisation, which primarily promotes own energy supply and secondarily the sale of “surplus green energy” might be given preference.

As regards **geothermal energy**, the geothermal gradient in Hungary significantly exceeds the global average, and represents one of the natural treasures of the country. In accordance with sustainable resource management, special attention must be paid to the preservation of this natural asset when establishing new capacities, which usually necessitates re-injection or recovery for the appropriate purposes. There is significant potential in increasing the role of geothermal energy in heat supply, which is already at this time a widespread method of heating in certain areas (e.g. in horticulture) in Hungary. In addition to the direct costs of the construction of wells and re-injection (which would not be necessary in all cases), the most important limiting factor in the case of geothermal energy is, due to the costs of the establishment of a heat supply and distribution system, the provision of funding.

With regard to **solar energy**, the theoretical potential could amount to several tens of thousands of MW, while the most significant limiting factor is, in relation to the high price of the installations, represented by the available support frameworks. Notwithstanding, considering the number of sunlight hours in Hungary, the utilisation of solar energy for thermal purposes can, through advanced technology, be a very good means of spreading the use of renewable energy sources; in the case of photovoltaic solar energy, the accelerated research and development works focused on practical applications, as well as the results that can be expected within a short period of time, will enable the proliferation of competitive systems.

In respect of **heat pumps**, the theoretical potential could amount to several hundred PJ, and the greatest limiting factor is, again, funding.

Hungary possesses excellent agro-ecological conditions for a competitive production of **biomass**. Hungarian agriculture is capable of sustainably producing biomass in excess of food and feed demands (see Chapter 5 for a detailed estimate of the relevant potential), and at the same time, **there is a significant biogas production potential**. The theoretical potential of energy sources of biological origin (bioenergy) could exceed as much as 20% of the energy source demand estimated for 2020, and bioenergy-based electricity production can be planned well in advance, and is also controllable. Therefore, the limitations of the production of bioenergy mainly lie in competitiveness. Bioenergy can primarily play a more important part in fulfilling local heating demands in the future, but we also intend to place emphasis on the spreading of small and medium-capacity combined electricity and heat generating systems.

In connection with **biofuels**, the opportunities for domestic production represent a significant potential based on excellent agro-ecological conditions. On the basis of an estimate by the experts of the Institute for Agricultural Mechanisation at the Ministry of Agriculture and Rural Development, more than 10% of the estimated consumption for 2020 can be fulfilled from first generation biofuels only, while at the same time ensuring the fulfilment of food and feed provision objectives; and with the emergence of second generation biofuels through the expansion of the scope of raw materials, this volume can be increased even further depending on the seasonal variations in

the amounts of agricultural produce. The use of biofuels is thus limited mainly by reasons of **motor technology**, since due to their construction current vehicles can only operate reliably on fuel that contains only limited amounts of biofuel. Therefore, the increased spreading of this technology will require the proliferation of vehicles that can operate on engine fuel with higher amounts of biofuel components or consist purely of biofuel. For this we intend to provide incentives by way of means of financing, mainly in the area of public transportation.

We also consider the spreading of alternative fuels to be important, and to this end, we intend to place emphasis in the next programming period on the spreading of electrical, hydrogen-based and hybrid technologies, equipment and related infrastructure.

Based on the above, the limiting factors that represented bottlenecks in relation to the individual renewable energy sources during the determination of the targets for 2020 are summarised in Table 3.

Name	Sustainable potential, technological/technical limitation	Controllability of the electricity system	Financing limitation
Hydropower	+16–17 MWe		
Wind energy		740 MWe	
Geothermal energy	57 MWe		
Solar energy			
Heat pumps			
Biomass			
Biogas			
Biofuel			

Table 3: Relevant limiting factors in the determination of the targets for the individual renewable energy sources

Renewable energy sources are currently only competitive against fossil energy sources to a limited degree, primarily due to the fact that the external costs⁶ of the latter are usually not incorporated into their prices. Thus, **in order to ensure the competitiveness of renewable energy sources, state incentives and financing will be required.** The state- and market-based financing of the spreading of renewable energy sources includes the following:

- direct production (market) support (green electricity, green heat);
- investment support;
- interest rate subsidies, green financing (loans provided by state-owned financial institutions, refinanced credit programmes, guarantees for market loans, etc.);
- indirect production incentives (favourable tariffs, mandatory admixture ratios, tax benefits);
- *(state aid provided for information and promotional activities);*
- *(state aid provided for research and development and training);*

⁶ E.g. the costs of damage caused by climate change, the environmental pollution related to supply, military expenditures, or, in the past decades, the budgetary expenditures spent on the establishment of a gas network

- (state aid provided for the establishment of consultancy networks).

In order to meet the targets of the NAP and to spread the use of renewable energy sources, we are planning, in combination with regulatory incentives, to employ all means of support listed above, to a differentiated extent adjusted to the type and scale of the renewable energy source types.

Name	Production support	Indirect incentives	Investment support	Green financing
Hydropower	X		X	X
Wind energy	X			
Geothermal energy	X		X	X
Solar energy	X	X	X	X
Heat pumps	X	X	X	X
Biomass	X		X	X
Biogas	X		X	X
Biofuel		X	X	X

Table 4: Areas of financial state intervention used to promote the spreading of the individual types of renewable energy sources

The scope of the financial incentives that can be provided through support and financing means is limited. As regards financial means, a separate limitation is represented by the incentive framework financed by the consumers, as this amount cannot be increased significantly.⁷

Thus, it must be decided to what extent the limited resources are allocated to the individual types of renewable energy sources. Multiple considerations can be taken into account when determining the degree of allocation, depending on whether the intention is to maximise

- the amount of energy;
- the reduction of CO₂ emissions;
- the use of waste for energy purposes;
- GDP increase;
- job creation;
- other environmental and social benefits

for every unit of support provided.

When determining the allocation of resources, the results of the Green-X model have been used, and priority considerations were job creation and the amount of energy that can be generated per unit amount of support. The energy source mix resulting from the allocation and the limiting factors under Table 3 is presented in Tables F/3, F/4, F/10 and F/11.

⁷ Compared to the average of the EU 15, Hungarian households spend a larger percentage of their income on energy sources. Thus, until incomes catch up, it will not be justified to increase consumer prices.

National 2020 target and estimated trajectory of energy from renewable sources in heating and cooling, electricity and transport

Table F/3

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Renewable energy – heating and cooling (%)	5.4%	9.0%	8.8%	8.6%	8.5%	9.1%	9.8%	11.8%	13.7%	15.7%	17.4%	18.9%
Renewable energy – electricity (%)	4.3%	6.7%	6.5%	6.9%	7.5%	8.6%	8.1%	7.1%	8.6%	10.2%	10.7%	10.9%
Renewable energy – transport (%)	0.22%	3.7%	4.6%	5.0%	5.0%	5.2%	5.4%	5.8%	6.4%	7.3%	8.0%	10.0%
Overall share of renewable energy (%)	4.2%	7.4%	7.3%	7.4%	7.5%	8.0%	8.3%	9.3%	10.7%	12.3%	13.4%	14.65%
Of which from the cooperation mechanism (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Surplus for cooperation mechanism (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

As in Part B of Annex I to the Directive		2011–2012	2013–2014	2015–2016	2017–2018		2020
		$S_{2005} + 20 \% (S_{2020} - S_{2005})$	$S_{2005} + 30 \% (S_{2020} - S_{2005})$	$S_{2005} + 45 \% (S_{2020} - S_{2005})$	$S_{2005} + 65 \% (S_{2020} - S_{2005})$		S_{2020}
RES minimum trajectory		6.04%	6.91%	8.21%	9.96%		13%
RES minimum trajectory (ktoe)		1 169	1 368	1 621	1 963		2 554

Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)

Table F/4.a

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
(A) Expected gross final consumption of RES for heating and cooling	949	941	944	955	990	1049	1248	1421	1600	1743	1863
(B) Expected gross final consumption of electricity from RES	244	246	269	299	350	333	297	366	439	465	481
(C) Expected final consumption of energy from RES in transport	150	200	226	236	250	266	290	330	379	425	535
(D) Expected total RES consumption	1344	1387	1439	1490	1590	1648	1835	2117	2418	2633	2879
(E) Expected transfer of RES to other Member States	0	0	0	0	0	0	0	0	0	0	0
(F) Expected transfer of RES from other Member States and 3rd countries	0	0	0	0	0	0	0	0	0	0	0
(G) Expected RES consumption adjusted for target	1344	1387	1439	1490	1590	1648	1835	2117	2418	2633	2879

Planned changes in the use of renewable energy sources between 2005 and 2020 (ktoe)

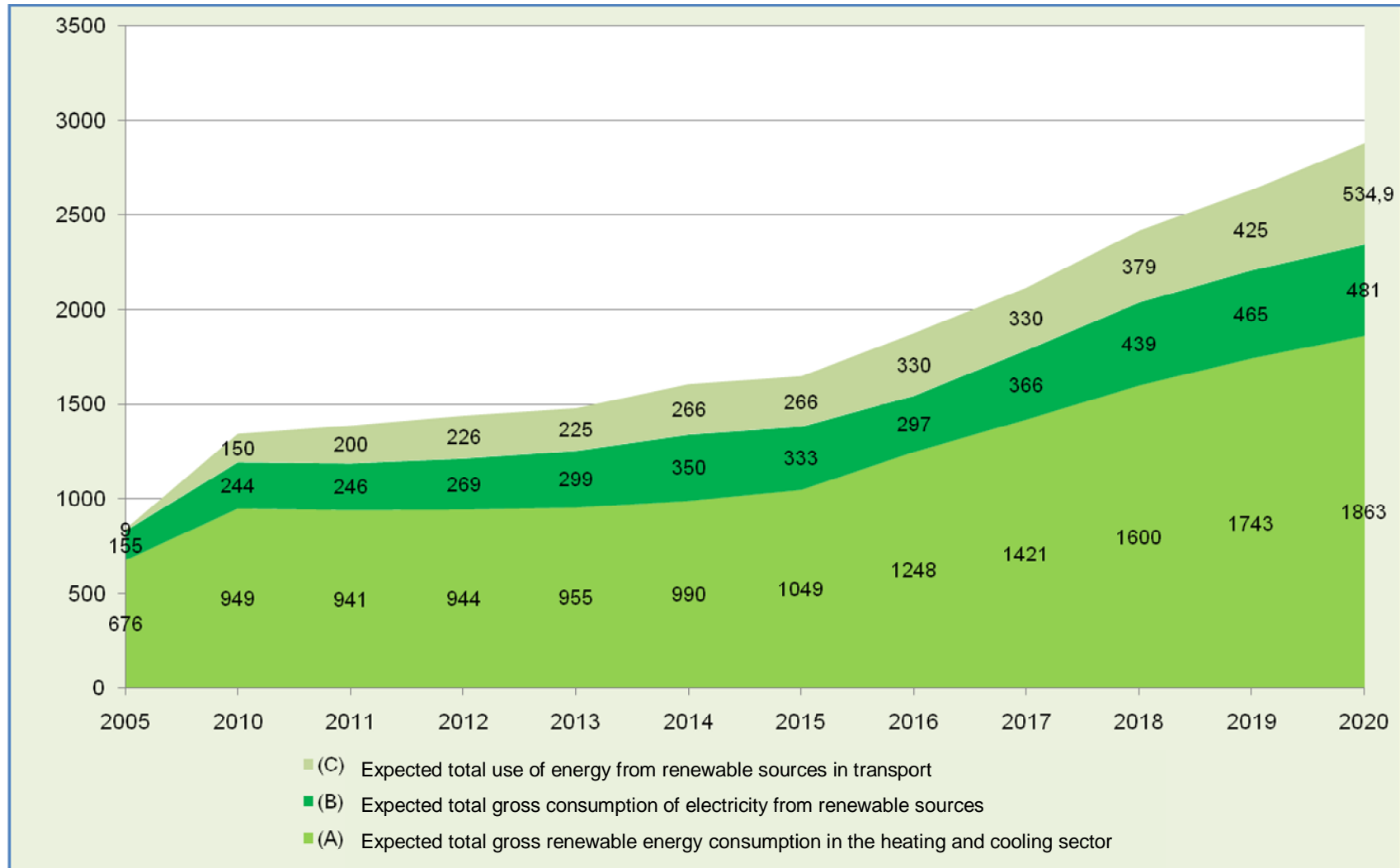


Figure 3: Planned development path of renewable energy sources (source: Green-X)

Calculation table relating for the share of renewable energy in transport (ktoe)

Table F/4.b

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
(C) Expected RES consumption in transport	5	150	200	226	236	250	266	290	330	379	425	535
(H) Expected RES electricity in road transport	0.0	6	7	9	10	14	15	16	18	21	22	24
(I) Expected consumption of biofuels from wastes, residues, non-food cellulosic and ligno-cellulosic material in transport	0	18	18	18	18	21	21	22	24	25	26	27
(J) Expected RES contribution to transport for the RES-T target (C) + (2,5-1)*(H)+(2-1)*(I)	5	177	228	258	269	292	310	336	382	435	484	598
Calculation of the transport target %	0.22%	4.34%	5.23%	5.68%	5.74%	6.05%	6.29%	6.70%	7.45%	8.33%	9.16%	11.18%

4. Effective and planned measures serving the implementation of the National Action Plan

Text written in italics inside borders represents the questions of the template.

4.1. Summary of the measures serving the fulfilment of the renewable energy source targets of the National Action Plan

In addition to the requirements laid down in Decision 2009/548/EC, the National Action Plan must contain an outlook, measures and guidelines for the following ten years, which can enable a breakthrough for Hungary, and at the same time enable social and economic development and recovery. The primary purpose of the measures set out is job creation, the reduction of fossil energy imports, the establishment of the green economic industry, and through these, the economic development of Hungary. The types of measures relating to the expected results presented below can serve as a compass in the upcoming period for the target groups concerned. In addition to general objectives, the measures also contain specific programme points based on the geographical (the Carpathian Basin), agro-ecological and economic assets of the country, which cover both vertical (sectoral) and horizontal areas (green employment). In this framework, the greatest emphasis is placed on segments with the highest number of tasks to be completed and problems to be resolved. The measures are essentially characterised by a product-chain-based approach. Taking this into account, the measures are grouped around four major pillars:

- I. **Support measures and programmes** (national financing, EU co-financing, direct EU resources, etc.)
- II. **Other (market and budgetary) financial incentives** (financing of green economy development, research and development, adaptation of the reception of green electricity, biofuel benefits, tariffs, tax issues, etc.)
- III. **General regulatory and comprehensive programme-formulation incentives** (sustainable energy management act, renewable energy act, simplification of authorisation procedures, establishment of regional energy programmes, review of energy procedures for buildings, etc.)
- IV. **Social measures** (employment, national and regional training, social awareness-raising, a network of energy experts, etc.)

An order of priority among the measures cannot be determined, considering their close interrelations and points of connection. Nevertheless, in the short term, adaptations that lay down the foundations and determine the operability of the renewable energy sector must be implemented. The most important measures are based on a consensus and are the result of professional consultations in which representatives of both the social and the civil sector participated (GKI Energy Research and Consulting Ltd., Energy Club, WWF Hungary, Greenpeace Hungary, Hungarian Academy of Sciences, Budapest University of Technology, Hungarian Association for Renewable Energy, sectoral associations, etc.).

Table F/5

Name and reference of the measure	Type of measure	Expected result	Targeted group or activity	Existing or planned	Start and end dates of the measure
1. Act on sustainable energy management	Legal	Guaranteeing a predictable environment in the long term	<ul style="list-style-type: none"> - the law will concern all renewable energy source types, measures and actors (producers, users, distributors, funders) - it will contain goals, the framework, and the main characteristics and guidelines of the most important measures 	Planned	The law is expected to be adopted in 2011
2. Mandatory off-take scheme (MOT system) for renewable-based electricity and renewable energy sources, through the establishment of a	Legal The measure will be based on the following laws: <ul style="list-style-type: none"> - Act a LXXXVI of 2007 on Electricity (hereinafter referred to as the EA); - Government Decree 	<ul style="list-style-type: none"> - Increase of the amount of electricity generated from renewable energy sources; - building of new small and medium-scale capacities, mitigation of risks, provision of financing, having regard in particular to the fact that regulations and turnovers that can 	<ul style="list-style-type: none"> - energy producers (investors) - funders (predictability), - establishers of small and 	Effective; planned to be adapted	<ul style="list-style-type: none"> - start: 2003 - there is no planned application deadline; energy policy foresees the maintenance

financial framework separate from cogeneration. Tariffs and differentiations in green electricity prices are planned to be laid down in legislation	<p>No 273/2007 (X. 19.) on the implementation of certain provisions of Act LXXXVI of 2007 on Electricity (hereinafter referred to as EA Imp.);</p> <ul style="list-style-type: none"> - Government Decree No 389/2007 (XII. 23.) on the mandatory off-take and off-take price of electricity generated using energy produced from renewable energy sources or waste and cogenerated electricity (hereinafter referred to as the MOT Decree); - Decree No 44/2008 (XII. 31.) of the Minister for Transport, Communications and Energy on the pricing of universal services on the electricity market and product packages to be provided within the framework of universal service provision 	be calculated in advance provide security and predictability for investors,	medium-sized autonomous systems		<p>of the mandatory off-take scheme in the long term</p> <ul style="list-style-type: none"> - adaptation of the system is planned for 2011
3. Simplification of authorisation procedures, creation of a simpler new regulatory framework [in accordance with Article 13 and recitals (40) to (44) of the RED]	Indirect, horizontal measure, legislative measure	<ul style="list-style-type: none"> - the expected result of the revision of the rules of the authorisation procedure and the simplification and harmonisation of the procedures is a shortening of the duration of authorisation procedures and the procedures gaining an incentive effect - as a result of more transparent, shorter authorisation procedures 	renewable energy sources sector (the population, SMEs, the industry, local governments, investors)	Planned	The measures are planned to be introduced continuously from 1 January 2011

		with less administrative costs, investments can be implemented more rapidly and preparations can be less time consuming			
4. Preparing administrative staff for the application of the amended laws relating to the authorisation procedures	Indirect, horizontal measure	Comprehensively familiarising the employees of the major authorities concerned with the modified authorisation procedures, thereby ensuring a problem-free transition between the old and the new regulatory frameworks	<ul style="list-style-type: none"> - Government officials, - civil servants - background institutions - institutional employees involved in governmental work 	Planned	The measures are planned to be introduced continuously from 1 January 2011
5. Preferential electricity tariffs for geothermal energy (heat pumps) and solar energy	Legislative measure	Spreading of geothermal energy (heat pump) systems and solar energy systems	<ul style="list-style-type: none"> - Investors - SME sector 	The heat pump tariff is in effect, and is planned to be extended to solar collectors	There is no planned end date for the measure
6. Establishment of an off-take and support scheme for green heat	Financial measure on a legislative basis	Spreading the application of thermal energy produced from renewable energy sources, primarily in the field of heat supply	<ul style="list-style-type: none"> - Investors (district heating plants based on renewable energy sources) - SME sector 	Planned	The measure is planned to be implemented from 1 October 2010
7. Regulation of the feeding of biogas of appropriate quality	The measure is of a legislative nature, and is currently based on the following laws:	Increase of biogas production, facilitation of network feeding	<ul style="list-style-type: none"> - Energy producers - Investors 	In effect; planned to be adapted	- No planned application deadline;

into the distribution network	<ul style="list-style-type: none"> - Act XL of 2008 on Natural Gas Supply; - Government Decree No 19/2009 (I. 30.) on the Implementation of Act XL of 2008 on Natural Gas Supply 		- SME sector		<p>energy policy calculates with these measures in the long term</p> <ul style="list-style-type: none"> - Adjustment of the system is planned for 2011
8. Investment support for the period between 2011 and 2014 to ensure the increase of renewable energy source use	<p>The measure is a financial incentive</p> <p>The support schemes for the spreading of renewable energy sources that have been operating since 2005 (some of them for longer) are the following:</p> <ul style="list-style-type: none"> - Energy Saving Credit Fund (still operational) - Environmental Protection and Infrastructure Operational Programme (2004–2006) - Environment and Energy Operational Programme (2006–2010) - National Energy Saving Programme (2006–2009) - Green Investment Scheme (2009–2010) - measures under the New Hungary Rural Development Plan (NHRDP) 	Increase and implementation of investments (new installed capacities)	<ul style="list-style-type: none"> - the measures serve to support investors - there are financial measures to cover all segments (the population, the budget, local governments, the non-profit sector, market actors, agricultural operators) 	Some of the measures are already in effect, but they are planned to be integrated and their efficiency increased (more rapid evaluations) within the framework of the “New Széchenyi Plan” that is aimed at the development of the Hungary’s economy	<ul style="list-style-type: none"> - The new tender schemes are expected to be published in 2011 - programmes under Community co-financing are planned to go on in their current form until 2014, and are planned to be continued afterwards
9. Launch of an independent	The measure is a financial incentive	The necessary support framework ensures more effective energy	- Investors	Planned	In alignment with the EU

operational programme for energy in the next development period (2014–2020) (with a funding of approximately HUF 800 billion that will support both the promotion of renewable energy sources and energy efficiency)	The launch of an independent operational programme with a considerable budget under the management of the competent ministry and the improvement of the efficiency of the tendering system are planned for the planning period between 2014 and 2020, taking into account strategic ideas for the increase of renewable energy source use	investments (new capacities)	- if housing interventions continue to have limited availability from the Cohesion Fund, then the target group will be market and non-profit actors other than the population		planning cycle, the measure is planned for the period between 2014 and 2020
10. Funds and programmes from Community financing	<p>The measure is a financial incentive</p> <p>The measure is based on funds directly published for tendering by the EU (NER 300, EEA/Norwegian Financial Mechanism, Cost, CIP, IEE, SAVE, Altener, STEER, TEN-E, FP7, JPI, South East Europe, Central East Europe, etc.)</p>	<ul style="list-style-type: none"> - In addition to co-financed EU resources, there could also be a possibility to call resources available directly from Brussels - In the area of sustainability, energy efficiency and renewable energy sources, Hungary, as an EU Member State, could have the opportunity to participate in international projects, tenders and calls which are based largely on cooperation between EU Member States 	<ul style="list-style-type: none"> - SMEs - local governments - public institutions - educational institutions - research institutes - settlements - micro-regions 	In effect and planned	Continuous
11. Training programmes with a low time requirement – intervals of 1–2 years (National	The measure is a financial incentive using support schemes under the Social Renewal Operational Programme of the New	Increasing the number of persons with appropriate qualifications in the field of energy, promoting an energy-intelligent professional approach, increasing the number of renewable energy experts	Participants of the training activities and educational institutions,	Planned	Continuously from 2011

Qualifications Register, accredited training, continuing training, retraining, tertiary education, energy auditor training, training courses, etc.)	Hungary Development Plan, and will subsequently be based on the resources of the new development plan from 2014		and subsequently, through them, the entire renewable energy sector		
12. Medium-term educational and training programmes – three years (e.g. technical training, skilled worker training)	The measure includes both legal and financial incentives It is based on the use of support schemes under the Social Operational Programme of the New Hungary Development Plan, and will subsequently use the resources of the new development plan from 2014 (educational infrastructure)	Increasing the number of persons with appropriate qualifications in the field of energy and of sectoral skilled workers	Participants of the training activities and educational institutions, and subsequently, through them, the entire renewable energy sector	Planned	Continuously from 2011
13. Higher education and training programme (energy engineer, renewable energy engineer, environmental engineer, MSc training, PhD training, etc.)	The measure includes both legal and financial incentives It is based on the use of support schemes under the New Hungary Development Plan Social Renewal Operational Programme, and subsequently on the resources of the new development plan from 2014 (educational infrastructure).	Increasing the number of engineers with a high level of professional expertise required for the implementation and operation of the investments	Participants of the training activities and educational institutions, and subsequently, through them, the entire renewable energy sector	In effect and planned	Continuously, and from 2011
14.a Launch of informational, awareness-raising, training and consultation	The measure is a financial incentive, its resources being the New Hungary Development Plan, the new development programme, as well as direct	- Increasing the environmental awareness of users, providing information about the opportunities in renewable energy sources, thereby increasing motivation for	Energy users in all renewable energy segments	Planned	Continuously from 2011

programmes, programmes serving awareness-raising (in accordance with Article 14 of the RED), and the establishment of a green economy information database (portal)	EU-level programmes	<p>investment, through the use of campaigns and other communications techniques</p> <ul style="list-style-type: none"> - launch of “from kindergarten to old age” awareness-raising programmes - the aim of the consultancy programme is to supply smaller consumers with appropriate information, and to prepare them for effectively implementing their investments - providing information to sectoral actors in accordance with Article 14 of the RED - the aim of the information portal is to make information and data pertaining to renewable energy sources available directly, in one place (official procedures, examples of best practices, etc.) 			
14.b Establishment of a consultancy network for the development of a green economy at the level of micro-regions and settlements	The measure is primarily of a legislative nature, with ancillary indirect effects	<ul style="list-style-type: none"> - Increasing the energy awareness of micro-regions and local governments, freeing up financial resources for value-creating activities, fulfilling local energy demands to an increasing degree through local resources, and promoting this process, while taking into account other social and economic demands and environmental considerations - Increasing the energy conservation and energy efficiency of existing and new installations, while taking 	Energy users in all renewable energy segments	Planned	Continuously from 2011

		<p>account of local characteristics and resources</p> <ul style="list-style-type: none"> - Maximisation of comparative advantages 			
<p>15. Green employment (green collar workforce) for low-qualification workforce</p> <p>(a) Value-creating, sustainable, integrated complex green public employment programmes for local governments</p> <p>(b) Biomass brigade, fulfilment of energy requirements from local resources</p>	<p>The measure is a financial incentive</p> <p>Funded by: the National Employment Fund and the National Employment Foundation</p> <p>Funded by: the Labour Market Fund</p>	<p>The aim of the measure is to collect and process currently unexploited energy sources produced in the areas surrounding villages and small towns (within a maximum distance of 30 km) and along roads (agricultural and forestry by-products, communal wastes), and to utilise them in institutions and facilities maintained by local governments, SMEs and the industry</p>	<ul style="list-style-type: none"> - Low-qualification employees - local governments - the SME sector - the industry 	Planned	Continuously from 2011
<p>16. Creation of high-qualification green collar jobs</p> <p>(a) Related to the introduction and mass production of new green know-how</p>	<p>The measure is a financial incentive. It will be funded until 2014 by the Social Renewal Operational Programme, the Economic Development Operational Programme, the National Employment Foundation, the Labour Market Fund, and subsequently by the</p>	<ul style="list-style-type: none"> - New types of green jobs, which will emerge due to innovative technologies and in the related new sectors - The number of jobs may increase in certain "traditional" green sectors due to the production of new products (e.g. solar collector 	<ul style="list-style-type: none"> - Highly qualified workforce - SMEs - the green industry - the environmental industry 	Planned	Continuously from 2011

<p>(b) Adaptation, production and distribution of existing green technology</p> <p>(c) Traditional, environmentally sound, energy efficient architectural technologies</p> <p>(d) Green Micro-region – Green Mentor</p> <p>(e) Green SMEs – Green jobs</p>	operational programmes of the new development plan	<p>assembly, production and installation of wind turbines, biomass boilers and accessory technologies)</p> <p>- Existing jobs requiring old and new skills, new skilled workers in construction, heating technology mechanics, insulation technicians, etc.</p> <p>- Good practices, local opportunities, implementation of micro-regional strategies, creation of green networks with a network of mentors</p>	<p>- local governments</p> <p>- micro-regions</p> <p>- most disadvantaged micro-regions</p>		
<p>17. Allocation of EU ETS auction revenues to the implementation of energy saving measures and the promotion of the use of renewable energy sources</p>	<p>- The measure contains both legal and financial incentives</p> <p>- According to Directive 2009/29/EK, as from 2013, 100 percent of emission allowance units in the electricity industry will be allocated within the framework of auctions, while a gradually increasing percentage beginning at 30 percent will be allocated in the same way in other industries, with the exception</p>	Provision of the required support framework (new capacities)	<p>- Investors</p> <p>- if the cohesion funds only enable housing interventions to a limited degree, the target group will primarily be the population</p>	Planned	Following the commencement of the EU ETS auctions, for as long as the auction system exists

	of industries that are at a risk of "carbon leakage"				
18. Creation of a national spatial plan, spatial plans for priority regions (spatial plans for the Lake Balaton Priority Resort Area, the Budapest Agglomeration), county-level spatial plans, regional energy maps	<p>The measure is based on the following laws:</p> <ul style="list-style-type: none"> - Act XXI of 1996 on Regional Development and Spatial Planning; - Government Decree No 76/2009 (IV. 8.) on the Procedures of the Spatial Planning Authority; - Act XXVI of 2003 on the National Spatial Plan (NSP); - Act CXII of 2000 on the Approval of the Spatial Plan for the Lake Balaton Priority Resort Area and the Establishment of the Lake Balaton Spatial Planning Regulations; - Act LXIV of 2005 on the Spatial Plan for the Budapest Agglomeration; - Government Decree No 76/2009 (IV. 8.) on the Procedures of the Spatial Planning Authority 	<ul style="list-style-type: none"> - The long term spatial plans will facilitate the environmental, social and economic evaluation of energy investment opportunities, and serve as guidelines for investors - the regional energy maps (geographic data files containing in an integrated manner the energy use, economic, social and environmental characteristics, infrastructure and renewable energy potential of a region) facilitate decision-making on the part of the investors 	<ul style="list-style-type: none"> - Investors in the field of energy - local governments 	<ul style="list-style-type: none"> - the review of the plans currently in effect from the perspective of energy is being planned - the establishment of regional energy maps is being planned 	<ul style="list-style-type: none"> - the measure is to be applied during the review of spatial plans (every five years); - the review of the plans from the perspective of energy is planned to commence on 1 January 2012 (in parallel with the review of the NSP Act)
19. Energy regulations (specifications) for buildings, in accordance with Article 13(4) of the RED	<p>The measure is based on the following laws:</p> <ul style="list-style-type: none"> - Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the Determination of the Energy Characteristics of Buildings; - Government Decree 	Construction of new buildings and the increased application of renewable energy sources during the renovation of existing ones in accordance with technical/technological and economic conditions (e.g. stipulation of a mandatory ratio for four-dwelling or larger condominiums, or in the case of	Developers	In effect (the application of renewable energy sources must be	From 1 January 2012 for public buildings, and subsequently extended continuously to all building

	No 264/2008 (XI. 6.) on the Energy Review of Heat Generating Installations and Air Conditioning Systems	the construction of offices larger than 250 m ²)		assessed), planned (mandatory requirements)	types.
20. Green financing, including the examination of the establishment of a Green Development Bank	The measure is of financial nature The aim of the measure is the establishment of financial funds for the financing of green investments	The aim of the measure is to provide resources for the implementation of investments	<ul style="list-style-type: none"> - Financing sector - investors (SMEs, the population, local governments , other non-profit actors) 	Planned	Financial schemes from 1 July 2011, creation of the green bank from 1 January 2012
21. Research and Development	The measure includes both legal and financial means.	Utilisation-oriented R&D, promotion of industrial and SME technological innovation, assistance to cooperations, consortia and clusters, emergence of new technological applications (new generation biofuels and alternative fuels, pyrolysis, fermentation procedures, combustion technology, solar cells and collectors, development of re-injection procedures, etc.), green technology incubators, research centres, knowledge centres. Facilitation and promotion of participation in international research projects.	<ul style="list-style-type: none"> - R&D sector, - SME sector - investors, - educational institutions - training centres - local governments - non-profit organisations - industrial actors - public institutions 	In effect, planned to be continued	Continuously from 2011
22. Pilot programmes – Best practices	The measure includes financial means.	New, innovative solutions, exemplary results, practical application and introduction of implemented solutions to society	Renewable energy sector	In effect, planned to be continued	Continuously from 2011
23. Development of	Financial means: measures	Decrease in equipment prices	- Industrial	In effect,	Continuously

related industries – Green industrial development, (development of the production of solar cells, collectors, boilers and other renewable energy equipment)	under the Economic Development Operational Programme (EDOP) of the New Hungary Development Plan		actors - SME sector	planned to be continued under the New Széchenyi Plan	from 2011 (under the EDOP until 2014, and continued from 2014 as a part of the new development plan)
24. Promotion of the application of biofuels through mandatory admixture and miscellaneous tax benefits	<p>The measure is based on the following laws: Laws in effect:</p> <ul style="list-style-type: none"> - Act CXXVII of 2003 on Excise Taxes and Special Rules on the Marketing of Excise Goods; - Act XXIX of 2004 on the Amendment of Certain Acts, the Repealing of Legal Provisions and the Establishment of Certain Legal Provisions in connection with Hungary's Accession to the European Union; - Government Decree No 138/2009 (VI. 30.) on the Rules for the Implementation of Certain Provisions for the Promotion of the Use of Biofuels for Transport Purposes; - the Hungarian Parliament has approved the proposed Act on the Promotion of the Use 	<p>Market creation through the stipulation of mandatory mixing ratios for biofuels and reduced taxes on certain fuels containing biocomponents</p> <p>Facilitation of use through the standardisation of new biofuel and alternative fuel types</p>	<ul style="list-style-type: none"> - Fuel distributors - vehicle owners 	In effect, planned	Continuous

	of Renewable Energy for Transport Purposes and the Reduction of Emissions of Greenhouse Gases from Energy used in Transport, and the law will enter into force on 5 December 2010				
25. Increase of the use of biofuels through user-side expansion (public transport)	Legal and financial means	<ul style="list-style-type: none"> - Facilitation of the use of biofuels through supporting the acquisition of vehicles capable of using pure biofuels or fuels with a high concentration of biofuel components, including means to support the use of biogas in public transport - the aim of green public procurement is to promote the acquisition of the above vehicle types through public procurement procedures 	Local governments, public transport companies	Planned	Support for the acquisition of public transport vehicles from 2011, green public procurement from 2012
26.a The phase of the Agricultural Energy Programme between 2010 and 2014	Financial incentives. Laws currently in effect: <ul style="list-style-type: none"> - Decree No 71/2007 (VII. 27.) of the Minister for Agriculture and Rural Development; - Decree No 72/2007 (VII. 27.) MARD; - Decree No 78/2007 (VII. 30.) MARD; - Decree No 26/2007 (IV.17.) MARD; - Decree No 27/2007 (IV. 17.) MARD; - Decree No 44/2009 (IV. 11.) MARD; - Decree No 35/2008 (III. 27.) 	Sustainable provision of the biomass amounts required for achieving the targets set, facilitation of local processing and the use of renewable energy sources in agriculture and forestry	Producers in agriculture and forestry	In effect	Continuous until 2014, and in alignment with the new EU agricultural aid scheme from 2014

	MARD; - Decree No 25/2008 (III. 8.) MARD; - Decree No 47/2008 (IV. 17.) MARD				
26.b Continuation of the Agricultural Energy Programme in the next development period (2014–2020), which will support both the promotion of renewable energy sources in agriculture and energy efficiency	The measure is a financial incentive The launch of an independent programme with a considerable budget under the management of the Ministry of Rural Development that applies agricultural, forestry and rural development considerations, and the improvement of the efficiency of the tendering system are planned for the planning period of 2014–2020, taking into account the strategic concepts for increasing renewable energy source use	The necessary support framework will ensure more efficient energy investments (new capacities)	Agricultural and forestry actors concerned	Planned	The measure is planned for the period between 2014 and 2020, in alignment with the planning cycle of the EU
27. Energy programmes for public buildings	Legal regulation and financial incentives	Increased incorporation of renewable energy sources during the modernisation of public buildings, in accordance with Article 13(6) of the RED	Government bodies, operators of public institutions	Planned	Continuously from 2011
28. Grid development (decentralised, local	Legal regulation and financial incentives	Increased integration of weather-dependant technologies, local utilisation, sales.	Investors in weather-dependent	Planned	Continuously from 1 January 2012

energy grids), smart grid systems		Organisation of low-capacity power plants producing for local networks into balance groups (1 village – 1 MW).	technologies, builders of small renewable facilities		
29. Creation of a Renewable Energy Council	The measure is of a regulatory nature	The measure foresees the establishment of a Renewable Energy Council, following the model of the National Council on the Environment. The aim of this Council will be the facilitation and support of communications between the public sector and market actors and interest groups.	The main target group of the measure are renewable energy associations and interest groups, but in an indirect way, all market actors will be involved	Planned	From 2011

4.2. Regulatory and authorisation system for facilitating the use of renewable energy sources⁸

“The key to the long-term sustainability of the energy sector is an independent, predictable, transparent and accountable sectoral regulatory framework. This also guarantees that the consumers pay an equitable price for these essential services.”

Excerpt from the New Széchenyi Plan, 28 July 2010

In addition to presenting the regulatory and authorisation procedures currently in force, and the valid aid schemes, this sub-chapter provides information on the directives and Government objectives establishing the framework for their currently ongoing revision and their adaptation planned for the years 2011–2012. The aim of the adaptation of the regulations in force is to establish a client-friendly regulatory and authorisation system promoting the use of renewable energy sources, which would, through a simpler and shorter normative procedure, facilitate the timely completion of investments and ensure the predictable scheduling of the use and allocation of aids and funding.

At the time of the finalisation of the NAP, the transposition of Articles 17 to 19 of the RED into national legislation is still in progress; the Hungarian Parliament has adopted the required legislative provisions and the law⁹ will enter into force on 5 December 2010.

4.2.1. Administrative procedures and spatial planning

When answering the following questions, Member States are requested to explain the current national, regional and local rules concerning the authorisation, certification and licensing procedures applied to plants and associated transmission and distribution network infrastructure for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products. Where further steps are needed to ensure that procedures are proportionate and necessary, Member States are requested also to describe planned revisions, expected results and the authority responsible to carry out such revisions. When information is technology specific, please indicate it. When regional/local authorities have a substantial role, please also explain it.

(a) *List of existing national and, if applicable, regional legislation concerning authorisation, certification, licensing procedures and spatial planning applied to plants and associated transmission and distribution network infrastructure:*

I. Comprehensive administrative laws governing multiple areas:

- Act XL of 2008 on natural gas supply (hereinafter referred to as GSA);
- Act LXXXVI of 2007 on electricity;
- Act XVIII of 2005 on district heating;
- Act CXL of 2004 on the general rules of administrative proceedings and services;

⁸ Specific measures for the fulfilment of the requirements under Articles 13, 14, 16 and 17 to 21 of Directive 2009/28/EC

⁹ Act CXVII of 2010 on the promotion of the use of renewable energy for transport purposes and on the reduction of greenhouse gas emissions from energy used in transport

- Act LXXIV of 1999 on the management and organization of the prevention of disasters and the prevention of major accidents involving dangerous substances;
- Act XCIII of 1990 on duties;
- Government Decree No 138/2009 (IV. 30.) on the rules for the implementation of certain provisions for the promotion of the use of biofuels for transport purposes;
- Government Decree No 19/2009 (I. 30.) on the implementation of the provisions of Act XL of 2008 on natural gas supply (hereinafter referred to as GSA Imp.);
- Government Decree No 273/2007 (X. 19.) on the implementation of certain provisions of Act LXXXVI of 2007 on electricity;
- Decree No 117/2007 (XII. 29.) of the Minister for Economy and Transport on the financial and technical requirements of connection to the public electricity network;
- Decree No 37/2007 (XII. 13.) of the Minister for Local Governments and Regional Development on construction authority procedures;
- Government Decree No 347/2006 (XII. 23.) on the designation of bodies responsible for official and administrative tasks related to the environment, nature and water;
- Decree No 129/2005 (XII. 29.) of the Minister for Economy and Transport on the charges of certain technical safety administration procedures and administrative services of the Hungarian Trade Licensing Office;
- Decree No 33/2005 (XII. 27.) of the Minister for Environment and Water on the administrative service charges of environmental, nature and water authority procedures;
- Act XXI of 1996 on regional development and spatial planning;
- Act XXVI of 2003 on the National Spatial Plan.

II. Particular laws governing specific areas:

(a) Construction authorisation procedures

- Government Decree No 193/2009 (IX. 15.) on construction authority procedures and the supervision of the construction authority;
- Government Decree No 382/2007 (XII. 23.) on the detailed rules of the authorisation procedures of the construction authority in the electricity industry;
- Government Decree No 343/2006 (XII. 23.) on the designation and the conditions for the operation of the construction and construction supervision authorities;
- Government Decree No 308/2006 (XII. 23.) on the National Office of Cultural Heritage;
- Government Decree No 260/2006 (XII. 20.) on the Hungarian Trade Licensing Office;
- Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings
- Government Decree No 157/2005 (VIII. 15.) on the implementation of Act XVIII of 2005 on district heating;
- Government Decree No 253/1997 (XII. 20.) on national town planning and construction requirements.

(b) Environmental authorisation procedures

- Act LIII of 1995 on the general rules of environmental protection;
- Government Decree No 314/2005 (XII. 25.) on environmental impact assessments and uniform environmental use authorisation procedures.

(c) Water rights authorisation procedures

- Act LVII of 1995 on water management;
- Government Decree No 72/1996 (V. 22.) on the exercising of water management authority

(d) Mining law

- Act LXXXVIII of 1997 on the formation and protection of the built environment (BEA);
- Act XLVIII of 1993 on mining;
- Government Decree No 193/2009 (IX. 15.) on the implementation of the BEA;
- Government Decree No 267/2006 (XII. 20.) on the Hungarian Office for Mining and Geology;
- Government Decree No 203/1998 (XII. 19.) on the implementation of Act XLVIII of 1993 on mining.

(e) Spatial planning

- Act XXVI of 2003 on the National Spatial Plan;
- Act XXI of 1996 on regional development and spatial planning;
- Act CXII of 200 on the approval of the Spatial Plan for the Lake Balaton Priority Resort Area and the establishment of the Lake Balaton Spatial Planning Regulations;
- Act LXIV of 2005 on the spatial plan for the Budapest Agglomeration;
- Government Decree No 218/2009 (X. 6.) on the content requirements of regional development concepts, regional development programmes and spatial plans, and the detailed rules of their interrelations, drafting, harmonisation, adoption and publication;
- Government Decree No 76/2009 (IV. 8.) on spatial planning authority procedures.

(f) Permits by the Prime Minister's Office

- Decree No 33/2009 (VI. 30.) of the Minister for Transport, Communications and Energy on the conditions of invitations to tender for the establishment of wind power plant capacities, the minimum content requirements of the tenders and the rules of the tender procedures;
- Decree No 91/2007 (XI. 20.) of the Minister for Economy and Transport on the amounts of the administrative service charges of the Hungarian Energy Office and the rules of the payment of administrative service charges and supervisory charges.

(g) Tax warehouse permits

- Act CXXVII of 2003 on excise taxes and special rules on the marketing of excise goods.

<p>(b) <i>Responsible Ministry(/ies)/authority(/ies) and their competences in the field (bodies with country-wide powers having county and local offices.)</i></p>

- (a) Ministry of National Development: energy supply, energy regulations, energy policy, building energy, tender schemes;
- (b) Ministry of the Interior: spatial planning, construction regulations;
- (c) Ministry of Rural Development: environmental protection, nature conservation, agriculture;
- (d) Office of the Chief Medical Officer of State: medical authorisations;
- (e) Hungarian Office for Mining and Geology (district mining inspectorates): mining facilities, ground source heat pumps;
- (f) Local governments: construction affairs;
- (g) Inspectorates for environment, nature and water (as regional bodies subordinate to the National Inspectorate for Environment, Nature and Water): environmental authorisations, powers of the special authority for landscape protection;
- (h) Hungarian Energy Office (hereinafter referred to as the Office): energy authorisation (competence: national);
- (i) National Inspectorate for Disaster Management: disaster management authorisation;
- (j) National Office of Cultural Heritage: special authority in construction authorisation procedures;
- (k) Hungarian Trade Licensing Office (HTLO): technical permits;
- (l) Local governments: construction authorisation;
- (m) Central Agricultural Office (CAO): agricultural matters (e.g. soil protection);
- (n) National Transport Authority.

(c) *Revision foreseen with the view to take appropriate steps as described by Article 13(1) of Directive 2009/28/EC by: [date].*

The Government is committed to reducing the administrative and bureaucratic burdens on enterprises in the future. Energy regulations and authorisation constitute a significant part of this process.

Authorisation procedures are currently complicated, complex, and in some cases require the participation of several high authorities and special authorities. The possibilities for making authorisation procedures faster and simpler are already the subject of an ongoing comprehensive governmental review.

After the evaluation of the results of the comprehensive review, it will be possible to outline the specific measures enabling the establishment of a regulatory system that provides a simple, transparent, normative, competitively neutral, predictable basis for planning that is reliable in the long term. The government's endeavour to simplify the procedures of the authorities constitutes an important part of the objectives of the New Széchenyi Plan, and is also part of the ongoing package of governmental measures aimed at the reform of public administration. The complete review of the regulatory framework is planned to be carried out until 2012.

As part of our information and awareness-raising programmes we are planning to draw up a separate, integrated guidance material concerning investments and procedures related to renewable energy sources in accordance with Article 13(1)(b) of the RED, enabling those concerned to find all required information in one document.

The preparation of the staff of the authorising authorities, and the deepening and refreshment of their knowledge on renewable energy sources, is also an important part of the training programme.

(d) Summary of the existing and planned measures at regional/local levels (where relevant):

Based on Hungary's administrative characteristics, the regulations are of national importance. Regional and local differences mostly occur in spatial plans, and thus, the measures are in compliance with the legislative background presented in point (a).

During the review of the spatial and town plans, we are also planning to ensure, in accordance with Article 13(3) of the RED, that the regulations take due account of the specificities of renewable energy sources.

(e) Are there unnecessary obstacles or non-proportionate requirements detected related to authorisation, certification and licensing procedures applied to plants and associated transmission and distribution network infrastructure for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products? If so, what are they?

The complexity and complicatedness of the procedures, the relatively large number of authorising authorities involved and the procedural deadlines might present obstacles to the realisation of the investments, and therefore, a review aimed at the simplification of such procedures and the establishment of a one-stop-shop system is already in progress.

(f) What level of administration (local, regional and national) is responsible for authorising, certifying and licensing renewable energy installations and for spatial planning? How will coordination between different responsible authorities be improved in the future?

The establishment, commissioning and operation permits in respect of the electricity and natural gas markets are issued by the Hungarian Energy Office (hereinafter referred to as the Office) as the national authority. The Ministry of the Interior is the body responsible for authorisation in spatial planning. Mining and environmental permits are issued by the regional supervisory bodies, and local government permits by the local governments. Permits relating to construction are issued by the HTLO in the field of electricity, gas and district heat supply.

Based on Annexes 1 and 2 to Government Decree No 314/2005 (XII. 25.) on environmental impact assessment and uniform environmental use authorisation procedures, the following activities are conditional on an environmental impact assessment:

- Thermal power plant with an electrical output of 20 MW or more, and other combustion installations with a heat output of 300 MW or more;
- Hydroelectric plants at protected natural sites of national importance;
- Wind farms with a total output of 10 MW or more at protected natural sites of national importance;
- Use of bodies of groundwater through water abstraction structures or groups of water abstraction structures at an annual water abstraction of 5 million m³ or more;

- Surface water transfer installations with an annual transfer capacity of 100 million m³.

Activities conditional on a uniform environmental use permit:

- Combustion installations with a heat input of more than 50 MW_{th}.

During environmental and uniform environmental use authorisation procedures the authority of first instance is the Inspectorate for Environment, Nature and Water having territorial competence, while the authority of second instance is the National Inspectorate for Environment, Nature and Water. If the relevant environmental requirements are incorporated into the permit of another authorising authority, the Inspectorate for Environment, Nature and Water having territorial competence acts as the special authority.

The improvement of coordination is related to the review referred to in point (e) (introduction of the one-stop shop system). The required targeted measures can be determined in the light of the results of the finished study.

The Ministry of the Interior is the body responsible for spatial planning authorisation. Spatial planning authority procedures are conducted by the competent chief state architect. Government Decree No 76/2009 (IV. 8.) on spatial planning authority procedures allows for the authorisation of greater differences in the case of line energy facilities than those specified in the Act on regional development and spatial planning, and for elements of national and regional importance to be incorporated. In spatial planning issues, the chief state architect cooperates as a special authority in environmental authorisation procedures, and in construction procedures in the electricity industry.

(g) *How is it ensured that comprehensive information on the processing of authorisation, certification and licensing applications and on assistance to applicants made available? What information and assistance is available to potential applicants for new renewable energy installations on their applications?*

The authorising authorities provide information on all issues through their customer services, and the required information is also included in the documentations of the various tenders. Additionally, we are planning to publish information pertaining to authorisation procedures in a unified, comprehensive structure in the future, in order to ensure easier access and increased transparency. In this context, we are planning to publish both printed and electronic documents, from which future investors will be able to obtain information about the individual phases and steps of the authorisation process.

(h) *How is horizontal coordination facilitated between different administrative bodies, responsible for the different parts of the permit? How many procedural steps are needed to receive the final authorisation/licence/permit? Is there a one-stop shop for coordinating all steps? Are timetables for processing applications communicated in advance? What is the average time for obtaining a decision for the application?*

Certain provisions of Act CXL of 2004 on the general rules of administrative proceedings and services already stipulate data exchange and cooperation between the authorities as a general rule (if data is available about a client at a specific

authority, it cannot be obtained from the client, but must instead be transmitted by the authorities through communications between each other), but the system requires further development. The simplification of procedures has special priority among the measures included in table F/5.

We do not have a one-stop shop system at present. The introduction of a simplified one-stop shop system is a priority objective of the New Széchenyi Plan in accordance with the Government's efforts to restructure public administration.

(i) Do authorisation procedures take into account the specificities of the different renewable energy technologies? If so, please describe how. If they do not, do you envisage taking them into account in the future?

The procedures take account of the differences between energy sources only to a limited degree, and focus primarily on the specifics of the field concerned. The review of the procedures intends to take into account the specifics of renewable energy sources. To this end, we are planning to issue evaluation and inspection guidance documents in respect of the individual procedures as a part of the adaptation of the procedural framework with a view to facilitating the work of the authorities. The aim of these will be twofold: on one hand, they will facilitate the work of the appliers of the law, and on the other hand, they will also serve as guidelines for investors with regard to the aspects the authorities will examine and evaluate during the procedure.

(j) Are there specific procedures, for example simple notification, for small-scale, decentralised installations (such as solar panels on buildings or biomass boilers in buildings)? If so, what are the procedural steps? Are the rules publicly available to citizens? Where are they published? Is the introduction of simplified notification procedures planned in the future? If so, for which types of installation/system?

For small-scale renewable energy investments that are still subject to a permit and have a capacity of over 0.5 MW, the Office issues combined small-scale power plant permits in a simplified procedure. This permit contains both an establishment and a production authorisation. The authorisation process is independent of the type of the power plant.

According to point 25 of Annex 1 to Decree No 37/2007 (XII. 13.) of the Minister for Local Governments and Regional Development on construction authority procedures and the contents of parcel establishment and architectural technical documentations, construction activities for the installation of solar collectors and solar cells are not conditional on authorisation or notification.

The installation of boilers and heat pumps does not require a construction authority permit either, as it does not involve any construction activities. Authorisation of the establishment and connection to the network of household-scale small electric power plants is carried out by the distribution companies, and the relevant requirements and necessary steps are included in the Office-approved regulations of the electricity distributors.

Wind turbines not considered small-scale power plants, such as the auxiliary buildings under point 67 of Annex 1 to the National Town Planning and Construction

Requirements (NTPCR) are, pursuant to point 13 of Annex 1 to Decree No 37/2007 (XII. 13.) of the Minister for Local Governments and Regional Development, conditional on a simplified construction permit or on notification, depending on their height.

These rules are laid down in legislation and are accessible to the citizens. The legislation is available both in printed (in the Hungarian Official Journal) and in electronic form.

In the framework of the review of the authorisation procedure, the scope of facilities subject to simplified procedures is planned to be extended. The exact determination of the specific facilities to be included in the extended scope, their parameters and the set of requirements enabling the extension will be possible after the evaluation of the results of the ongoing review.

The improvement of the ability of local communities to create and retain jobs, meet local energy demands to an increasing extent through local resources, thereby achieving favourable economic and social effects, is an aspiration of the Government clearly defined in the New Széchenyi Plan. The simplification and extension of the authorisation and regulatory procedures of local small and medium-scale capacities serves the achievement of the aforesaid effects.

(k) Where are the fees associated with applications for authorisation/licences/permits for new installations published? Are they related to the administrative costs of granting such permits? Is there any plan to revise these fees?

The amounts of the administrative, procedural and service charges charged by the Office, as well as the method of payment, are laid down in a ministerial decree. The fees of environmental and other procedures are regulated in a similar manner (requiring the amounts of charges and fees charged by the authorities to be published by legislation).

The determination of the procedural fee in environmental authorisation procedures is regulated by Decree No 33/2005 (XII. 27.) of the Minister for Environment and Water on the administrative service charges of environmental, nature and water authority procedures. The fees vary depending on the costs of the administrative procedures and are reviewed periodically.

The information material on the planned simplified, easily accessible, uniform, comprehensive procedure will contain all relevant information, including information on fees.

(l) Is official guidance available to local and regional administrative bodies on planning, designing, building and refurbishing industrial and residential areas to install equipments and systems using renewable energy sources in electricity and heating and cooling, including in district heating and cooling? If such official guidance is not available or insufficient, how and when will this need be addressed?

The laws on spatial planning listed under point (a) contain information on installation options. More specific information can be obtained by investors from the Office, the regional environmental inspectorates and the local governments.

In the framework of the information and awareness-raising programme we are also planning to provide authorities applying the law with more detailed information. The guidance documents referred to in point (i) also cover the planning and establishment of industrial and residential areas in respect of renewable energy sources.

We are also planning to supply the local public administration with information via the planned micro-regional and local consultancy network for green economy development included in the action plan, while the training programme includes the continued training of local public administration staff. The purpose of the planned consultancy network for green economy development is the integration of uniform, high-standard professional knowledge into local public administration and the complex application of this knowledge, which takes into account local characteristics, needs and social and economic interests.

<p>(m) <i>Are there specific trainings for case handlers of authorisation, certification and licensing procedures of renewable energy installations?</i></p>

Government Decree No 133/2010 (IV. 22.) on the National Qualifications Register and the procedure for the amendment of the National Qualifications Register (OKJ) lists several qualifications related to professional activities in the field of energy. Based on OKJ data, the professions concerned can be found under numbers 94, 95, 96, 98, 101 and 270. The professional content of the particular qualifications is determined by the ministry responsible for vocational qualification, with the involvement of experts. Among the qualifications in the field of energy, there is a qualification entitled “Renewable energy source engineer.” The professional content of the qualifications is laid down in the sectoral decree of the minister responsible for vocational qualification that contains the professional and examination requirements.

In the field of higher education technical training, facilities using renewable energy sources and the approval, certification and authorisation procedures related to them are included in the curricula of higher education institutions in both bachelor’s and master’s training courses (in energy engineer, facility engineer, building engineering and process technology programmes). In the indicated subject, those working in the field, or interested students, can only obtain qualifications separately, in postgraduate programmes. The higher education institutions concerned undertake or can undertake to teach the abovementioned subjects and provide information about the special legislative background within their own competence, in the framework of specific training or training courses, in agreement with the intentions of the competent Hungarian and EU authorities. Nevertheless, there is a lack of coordination between educational and training systems. Several educational and training institutions provide training in the same field with frequent overlaps, resulting in an excess of professionals in some areas, and a shortage of them in others.

In order to avoid anomalies and hiatuses, we are planning the launch of a short-, a medium- and a long-term educational and training programme in green economy development in the near future (see table of measures, points 11 to 13), which will be based on geographic assets and opportunities (e.g. forestry biomass engineer training is justified in Western Hungary, and in Eastern Hungary it would be feasible to launch agricultural bioenergy engineer training programmes).

The case handlers of the authorisation procedures are planned to be given further training in the field of specific knowledge relating to renewable energy sources within the framework of the training programme.

4.2.2. Technical specifications

(a) *To benefit from support schemes do renewable energy technologies need to meet certain quality standards? If so, which installations and what quality standards? Are there national, regional standards that go beyond European standards?*

In general, the following criteria apply to all tenders for the use of renewable energy sources. Support cannot be granted to investments where the equipment to be acquired for the intended technological modernisation does not comply with the relevant European directives, laws or the Hungarian decrees and standards transposing those. Furthermore, in certain cases the support schemes also impose special technical requirements, which serve efficiency and environmental protection.

The **laws and rules** applicable to tenders for the use of renewable energy sources under the Environment and Energy Operational Programme (hereinafter referred to as EEOP) announced within the framework of the European Union's cohesion policy for the financial period between 2007 and 2013 are the following:

- Act LIII of 1995 on the general rules of environmental protection;
- Act XXVI of 2003 on the National Spatial Plan;
- Act CXII of 2000 on the approval of the Spatial Plan for the Lake Balaton Priority Resort Area and the establishment of the Lake Balaton Spatial Planning Regulations;
- Act LXIV of 2005 on the spatial plan for the Budapest Agglomeration;
- Act LXXVIII of 1997 on the formation and protection of the built environment;
- Act XLIII of 2000 on waste management;
- Act XVIII of 2005 on district heating;
- the Electricity Act;
- Government Decree No 264/2008 (XI. 6.) on the energy review of heat generating installations and air conditioning systems;
- Government Decree No 176/2008 (VI. 30.) on the certification of the energy characteristics of buildings;
- Government Decree No 157/2005 (VIII. 15.) on the implementation of Act XVIII of 2005 on district heating;
- Decree No 8/2001 (III. 30.) of the Minister for Economy on bringing into force the Regulations on the Technical Safety Requirements for Electrical Works;
- Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings;
- Decree No 9/2008 (II. 22.) of the Minister for Local Governments and Regional Development on the publication of the National Fire Protection Regulations;
- Decree No 3/2009 (II. 4.) of the Minister for Local Governments on the technical requirements of the fire protection of facilities utilising renewable energy sources: biogas, bioethanol and biodiesel;
- Decree No 22/2009 (VII. 23.) of the Minister for Local Governments on the rules of obtaining fire protection conformity certificates;

- Parliamentary Decision No 96/2009 (XII. 9.) on the National Environmental Protection Programme for the period between 2009 and 2014;
- Parliamentary Decision No 60/2009 (VI. 24.) on the preparation of the framework act on climate protection;
- Parliamentary Decision No 29/2008 (III. 20.) on the National Climate Change Strategy;
- Parliamentary Decision No 96/2005 (XII. 25.) on the National Development Policy Concept;
- Parliamentary Decision No 132/2003 (XII. 11.) on the National Environmental Protection Programme for the period between 2003 and 2008;
- Government Decision No 1076/2010 (III. 31.) on Hungary's Amended National Energy Efficiency Action Plan;
- Government Decision No 1005/2010 (I. 21.) on the National Climate Change Programme;
- Government Decision No 1103/2006 (X. 30.) on the approval of the New Hungary Development Plan;
- Government Decision No 2233/2004 (IX. 22.) on national targets related to the use of biofuels and other renewable fuels for transport purposes;
- Government Decision No 2361/1996 (XII. 17.) on the Japanese aid for the preparation of the World Bank's programme entitled "Hungary – renewable energy and regional development project" facilitating the use of biomass for energy purposes.

The EEOP is a support scheme announced for the financial planning period between 2007 and 2013. For the period after 2013, we are planning to continue the tendering system through the launch of an own operational programme for energy. The following technical specifications will be incorporated into the support schemes currently in effect. In order to reach our policy goals, we are planning to continue to include appropriately selected technical specifications and requirements (e.g. minimum efficiency) among the tender requirements.

I. The following technical and quality requirements have been incorporated into the EEOP tender EEOP-4.2.0/A "Satisfying local heating and cooling demand from renewable energy sources," which supports renewable energy sources:

- The applicant has the obligation to provide in its tender a detailed presentation of the technology it intends to acquire and its operational conditions. The factual accuracy of these is checked by the evaluators of the tender.
- With regard to the technical solutions used for the projects, the reference document (BREF) approved by the EU, which contains the best available technology (BAT) for the technology in question, must be taken into account (but its use is not mandatory).
- The investments must be in compliance with the prevailing energy policy and environmental policy goals, must be technically feasible and must meet the technical, safety and environmental specifications in force; support cannot be granted to investments that do not meet all of these requirements. Support cannot be granted to investments where the equipment to be acquired for the intended technological modernisation does not comply with the relevant

European directives, laws or the Hungarian decrees and standards transposing those.

Requirements concerning raw materials used for renewable technologies:

Criteria for biomass: – products and wastes of vegetable origin (excluding products treated or contaminated with special substances which have become waste, such as railway sleepers, blockboard, etc.) – from the perspective of biomass putrefaction: products and wastes of vegetable origin, biodegradable organic part of domestic waste collected separately (biowaste), manure, wastes of animal origin, waste water sludge in compliance with the quality requirements of authorisation for putrefaction.

Secondary raw materials: During construction, it is possible to use certified wastes as raw materials. This can be waste from own production or waste produced by others, but must in all cases be certified. Waste produced during one's activities can in many cases be recovered as raw material, provided that it meets the requirements as to its composition and use, and has been certified (e.g. in the production of concrete, certified sand and other debris produced during demolition works can be used).

Additional considerations in case of the establishment of bioethanol plants: – Support cannot be granted to applicants who do not provide credible proof that the bioethanol production technology in the production block has sufficient references. Support can only be granted to projects where the bioethanol planned to be produced meets the requirements laid down in Article 17(2) to (6) of the RED based on the feasibility study and the business plan. – Support cannot be provided for the implementation of projects where CO₂ savings do not reach at least 35 percent (based on the calculation method specified in the RED).

In order to ensure that even in the case of automatic evaluation, it is professionally appropriate tenders that are granted support, the following quality and standard criteria have been incorporated into the scheme for each equipment type:

I. Installation of solar collector systems	
The solar collector to be procured	Must have a CE marking
	Must meet the requirements of the quality standard EN 12975-1 and 2 and must pass the quality test of the same standard
	Must have Solar Keymark and/or DIN-CERTCO certifications
	Manufacturer's warranty must be at least 5 years.
	Authorised operating pressure must be at least 5 bar.
	The material of the solar collector to be procured must be recyclable, and the disassembly and recycling guidelines for the collector must be available.
	The heat carrying fluid used must have an EU safety data sheet
	Its operating range must be between -30 and +120°C.
	The annual solar yield must be more than 600 kWh/m ²
Support stand (where applicable)	Must have an MSZ EN 729-2 operating certificate and an MSZ EN 287-1 welding certificate

II. Biomass boilers (wood, wood chips, pellets)	
The biomass boiler to be procured	Must have a CE marking
	Its heating water quality must comply with the EN 12828 standard
Efficiency criteria: the device to be installed must comply with any of the following standards, which lay down testing methods and requirements	EN 13240:2001/A2:2004 or MSZ EN 13240:2001/A2:2005 adopted on the basis thereof OR EN 303-5: 1999 Heating boilers for solid fuels, hand and automatically fired, nominal heat output of up to 300 kW. Terminology, requirements, testing and marking. OR MSZ EN 3003-5: 2000 adopted on the basis thereof.
Emission values: the emission values of the device to be installed must comply with any of the following standards	EN 13240:2001/A2:2004 Roomheaters fired by solid fuel. Requirements and test methods, or tests carried out on the basis of MSZ EN 13240:2001/A2:2005 adopted on the basis thereof. EN 14785: 2006 Residential space heating appliances fired by wood pellets. Requirements and test methods. MSZ 14785: 2006 adopted on the basis thereof. EN 12809:2001 Residential independent boilers fired by solid fuel. Nominal heat output up to 50 kW. Requirements and test methods. MSZ EN 12809:2001 or MSZ EN 12809:2001/A1: 2005 adopted on the basis thereof.
Pellet boilers	
Pellet burner	The pellet burner must be made of heat-resistant steel.
	The grills of the pellet burner must be auto-cleaning.
	It must have an automated feeding system.
The pellet boiler to be procured	Must have a boiler drum made of steel in accordance with the EN10025 standard, and must have lining and insulation of a minimum thickness of 80 mm
	Must have an ash compartment.
	Its authorised minimum expected operating pressure must be 3.0 bar.
	Its authorised maximum flow temperature must be 95°C
	The storage of the boiler must have fill-level monitoring
Storage of the boiler	The storage of the boiler must have an integrated pellet separator
	It must have microprocessor-operated controls with a transparent menu system and a display for controlling and monitoring the system.
Control technology, controls	The electromotors must have overload protection.
	Breakdowns must be indicated via text or an annotated display lights system.
	Automatic ignition with monitoring
	Continuous performance modulation.
	Operationally tested backfire prevention equipment with the necessary mouth.
Miscellaneous	Automatically cleaned heat exchanger, turbulent cleaning

	The device must have lambda sensor monitoring, and the related control technology must be automatic
Wood chip boilers	
Boiler drum	The boiler drum must be made of steel in accordance with the EN10025 standard, and must have lining and insulation of a minimum thickness of 80 mm.
	The boiler drum to be procured must have an ash compartment.
	The combustion chamber must have a built-in thermometer and temperature control.
	Chimney draft must be ensured through a fan, speed regulator and monitoring function.
	Authorised minimum expected operating pressure must be 3.0 bar.
	Authorised maximum flow temperature must be 95°C,
	The combustion technology efficiency of the boiler drum to be procured must be more than 90 percent.
Fuel feeding	The backfire-prevention device must comply with the Directive TRVB H 118.
	Microprocessor-operated controls with a transparent menu system and a display for controlling and monitoring the system, fuel level display.
Control technology, controls	Electromotor overload protection.
	Breakdown indication via text or an annotated display lights system.
	Automatic ignition with monitoring.
	Continuous performance modulation.
	Automatic ignition through hot air injection.
Miscellaneous	Automatically cleaned heat exchanger, turbulent cleaning, can be timed periodically.
	Combustion technology control through lambda sensor for regulating secondary air injection and fuel, and automatic monitoring.
	Combustion ash and flue ash discharged automatically into the ash compartment.
	Boiler efficiency is higher than 85 percent when using chips of a specific quality.
	Capacity to store chips for at least 5 days.
III. Installation of heat pump systems	
Estimated annual average COP value of the heat pump to be procured	The estimated annual average COP value for the production of heating energy and the hot water used (for the calculation of the COP value the total amount of electricity consumption in the heating season must be taken into account; electricity used for cooling cannot be taken into account) must be at least 4.2 in the case of ground-source, ground collector and water-based heat pumps, and 4.0 in the case of all other heat pumps, and must be certified through a declaration of conformity by the manufacturer and contractor.

The heat pump to be procured	Must have a CE marking
	Must comply with the MSZ-EN 60335-2-40-2003 series of standards
Metering requirements for heat pumps	<p>A calorimeter must be installed. Heat quantity metering must calculate the total heat quantity (heating + DHW together) generated by the heat pump on the basis of the temperature of the media directly exiting and returning into the condenser unit of the heat pump, as well as their volume flow rate.</p> <p>An electricity consumption meter must be installed, which will measure the amount of electricity used by the heat pump separately from other electricity consumption.</p> <p>A device registering the amount of electricity consumed by the heat pump and the amount of heat generated by the heat pump on at least a monthly basis must be available.</p> <p>External temperature must be measured, and logged on an hourly basis.</p> <p>The values measured and registered must be made available to the organisation managing the tender annually.</p>
Conditions for the installation of ground-source heat pumps	<p>The probes will be pulled down by probe weights.</p> <p>A mixture containing cement and betonite will be injected from bottom to top into the bore-hole through an extra pipe placed firmly and permanently into the bore-hole next to the probes.</p> <p>According to the VDI 4640 series of standards, the heat conductivity of at least one ground circle must be measured and documented on the basis of a "Geothermal Response Test" procedure, and the bore-hole resistance indicating the filling of the hole must be examined. The heating/cooling efficiency values determined on the basis of the engineering plans and the lambda values obtained from the measurements must be compared in a 25-year process model. The contractor must declare (in a contractor's declaration) that based on this, the ground circle will provide sufficient geothermal energy in the long term and is capable of regeneration.</p>

During the professional evaluation of the tenders and during the aid awards, the appropriate technical standard and the extent of emission reduction must be taken into account.

II. The Green Investment Scheme Energy Efficiency Sub-Programme (hereinafter referred to as GIS EE) is an invitation to tender open to the public, and is aimed at the energy efficiency renovation of traditional residential properties. The tender supports residential energy saving and renewable energy source use investments. The invitation was first published in December 2009.

No technology-specific eligibility criteria have been specified in GIS EE, but when the next invitation to tender will be published, the following criteria, similar to those of the EEOP, are planned to be included:

I. Installation of solar collector systems	
The solar collector to be procured	Must have a CE marking (manufacturer/distributor)
	Must meet the requirements of the quality standards EN 12975-1 and 2 and must pass the quality test of the same standards (manufacturer/distributor)
	Must have Solar Keymark and/or DIN-CERTCO certifications (manufacturer/distributor).
	Manufacturer's warranty must be at least 5 years (manufacturer/distributor).
	Authorised operating pressure must be at least 5 bar.

	The surface of the solar collector must face in a direction between the cardinal directions west, south and east, and must not be obstructed by terrain objects or surrounding buildings (contractor) or (certifier) – for accounting purposes
	The heat carrying fluid used must have an EU safety data sheet (contractor) – for accounting purposes.
	Operating range must be between -30 and +120°C.
	The annual solar yield must be more than 600 kWh/m ² .
Support stand (where applicable)	Must have an MSZ EN 729-2 operating certificate and an MSZ EN 287-1 welding certificate.

II. Biomass boilers (wood, wood chips, pellets)	
The biomass boiler to be procured	Must have the CE marking (manufacturer/distributor)
	Heating water quality must comply with the EN 12828 standard
Efficiency criteria: the device to be installed must comply with any of the following standards, which lay down testing methods and requirements	EN 13240:2001/A2:2004 or MSZ EN 13240:2001/A2:2005 adopted on the basis thereof OR EN 303-5: 1999 Heating boilers for solid fuels, hand and automatically fired, nominal heat output of up to 300 kW. Terminology, requirements, testing and marking. OR MSZ EN 3003-5: 2000 adopted on the basis thereof.
Emission values: the emission values of the device to be installed must comply with any of the following standards	EN 13240:2001/A2:2004 Roomheaters fired by solid fuel. Requirements and test methods, or tests carried out on the basis of MSZ EN 13240:2001/A2:2005 adopted on the basis thereof. EN 14785: 2006 Residential space heating appliances fired by wood pellets. Requirements and test methods. adopted on the basis thereof. MSZ 14785: 2006 EN 12809:2001 Residential independent boilers fired by solid fuel. Nominal heat output up to 50 kW. Requirements and test methods. MSZ EN 12809:2001 or MSZ EN 12809:2001/A1: 2005 adopted on the basis thereof. (manufacturer/distributor)
Pellet boilers	
Pellet burner	The pellet burner must be made of heat-resistant steel. (manufacturer/distributor)
	The grills of the pellet burner must be auto-cleaning.
	Must have an automated feeding system. (contractor) or (certifier) – for accounting purposes
The pellet boiler to be procured	Must have a boiler drum made of steel in accordance with the EN10025 standard and must have lining and insulation of a minimum thickness of 80 mm (manufacturer/distributor)
	Must have an ash compartment. (manufacturer/distributor)
	Its authorised minimum expected operating pressure must be 3.0 bar. (manufacturer/distributor)
	Its authorised maximum flow temperature must be 95°C
	The storage of the boiler must have fill level monitoring (manufacturer/distributor)

Storage of the boiler	The storage of the boiler must have an integrated pellet separator
	Must have controls for controlling and monitoring the system (manufacturer/distributor)
Control technology, controls	The electromotors must have overload protection (contractor)
	Breakdowns must be indicated via text or an annotated display lights system.
	Automatic ignition with monitoring
	Continuous performance modulation (manufacturer/distributor)
	Operationally tested backfire prevention equipment (manufacturer/distributor)
Miscellaneous	Automatically cleaned heat exchanger. (manufacturer/distributor)
	The device must have lambda sensor monitoring, and the related control technology must be automatic. (manufacturer/distributor)
Wood chip boilers	
Boiler drum	The boiler drum must be made of steel in compliance with the EN10025 standard and must have lining and insulation of a minimum thickness of 80 mm (manufacturer/distributor)
	The boiler drum to be procured must have an ash compartment (manufacturer/distributor)
	The combustion chamber must have a built-in thermometer and temperature control (manufacturer/distributor)
	Chimney draft must be ensured through a fan, speed regulator and monitoring function (manufacturer/distributor)
	Authorised minimum expected operating pressure must be 3.0 bar (manufacturer/distributor)
	Authorised maximum flow temperature must be 95°C,
	The combustion technology efficiency of the boiler drum to be procured must be more than 90 percent (manufacturer/distributor)
Fuel feeding	Must have a backfire-prevention device (manufacturer/distributor)
	Controls equipped with a display for controlling and monitoring the system, fuel level display (manufacturer/distributor)
Control technology, controls	Electromotor overload protection.
	Breakdowns indication via text or an annotated display lights system.
	Automatic ignition with monitoring.
	Continuous performance modulation (manufacturer/distributor)
	Automatic ignition through hot air injection.
Miscellaneous	Automatically cleaned heat exchanger, turbulent cleaning, can be timed periodically (manufacturer/distributor)

	Combustion technology control through lambda sensor for regulating secondary air injection and fuel, and automatic monitoring (manufacturer/distributor)
	Combustion ash and flue ash discharged automatically into the ash compartment (manufacturer/distributor)
	Boiler efficiency is higher than 85 percent when using chips of a specific quality (manufacturer/distributor)

III. Installation of heat pump systems	
Nominal COP value of the heat pump to be procured	The nominal COP value of the heat pump apparatus must be at least 4.5 W10/W35 under operating conditions in the case of ground-source, ground collector and water-based heat pump systems (the values correspond to the values under the EHPA Quality Label certification system). (manufacturer/distributor)
The heat pump to be procured	Must have a CE marking (manufacturer/distributor)
	Must comply with the MSZ-EN 60335-2-40-2003 series of standards (manufacturer/distributor)
Requirements for heating systems using heat pumps	The heating system supplied with heating energy by the heat pump must possess heat dissipators operating at a low temperature level; forward heating water temperature must not be higher than 45°C (contractor) or (certifier). An electricity consumption meter must be installed, which will measure the amount of electricity used by the heat pump separately from other electricity consumption. Additionally, a calorimeter must be installed, which calculates the total heat quantity (heating + DHW together) generated by the heat pump on the basis of the temperature of the media directly exiting and returning into the condenser unit of the heat pump, as well as their volume flow rate.
Conditions for the installation of ground-source heat pumps	<p>The probes will be pulled down by probe weights. A mixture containing cement and betonite will be injected from bottom to top into the bore-hole through an extra pipe placed firmly and permanently into the bore-hole next to the probes.</p> <p>According to the VDI 4640 series of standards, the heat conductivity of at least one ground circle must be measured and documented on the basis of a "Geothermal Response Test" procedure, and the bore-hole resistance indicating the filling of the hole must be examined. The heating/cooling efficiency values determined on the basis of the mechanical plans and the lambda values obtained from the measurements must be compared in a 25-year process model. The contractor must declare (in an contractor's declaration) that based on this, the ground circle will provide sufficient geothermal energy in the long term and is capable of regeneration (contractor).</p>

4.2.3. Building energy (regulations and incentives)¹⁰

“Hungary must facilitate the implementation of the ‘European energy-efficient buildings initiative’ to promote green technologies and the development of energy-efficient systems and materials in new and renovated buildings in the construction industry.”

Excerpt from the Programme of National Cooperation, 22 May 2010

The aim of subchapter 4.2.3 is to present the possibilities for utilising renewable energy in the field of building energy. The energy characteristics of buildings and construction standards are closely linked to the use of renewable energy sources for heating and cooling purposes, and therefore, giving special attention to this area is also justified from the perspective of renewable energy sources. Furthermore, the use of certain types of renewable energy sources is inseparably linked to building energy.

The energy condition of Hungarian buildings is below the EU average, and thus, their reconstruction and modernisation represents an especially significant potential in the field of energy. Buildings are currently responsible for 40% of Hungary’s total energy consumption, and approximately two thirds of this is used for heating and cooling. The heating of buildings is one of the largest sources of CO₂ emissions.

The importance of energy modernisation in the building sector is further supported by the fact that it is this sector where energy savings can be achieved in the most cost-effective way. Building energy is also one of the major priority areas of the EU, as this has been proven to be the area where climate protection targets can be achieved most efficiently.

For this reason, the Government is planning to launch a comprehensive energy programme for buildings in 2011 as a part of the New Széchenyi Plan, the aim of which will be the energy modernisation of buildings, the promotion of energy efficiency, and contribution to the use of renewable energy sources.

The planned programmes are intended to provide a single framework for the energy efficient development of residential, public and other buildings, the use of renewable energy sources in buildings, renovations and the energy-efficient construction of new buildings. The complex building energy programme comprises several elements, and its financing (support programmes), regulatory (specifications, standards), and awareness-raising and information exchange sub-programmes build upon each other in a complex way.

When referring to increasing the use of renewable energy sources in buildings, the supply of renewable electricity from the national grid should not be considered. The focus here is on increasing local supply of heat and/or electricity to individual buildings. The direct supply of heat or cooling through district heating and cooling in buildings could also be taken into account.

¹⁰ Article 13(3) of Directive 2009/28/EC

(a) *Reference to existing national and regional legislation (if any) and summary of local legislation concerning the increase of the share of energy from renewable sources in the building sector:*

The most important EU and national laws on building energy in force are the following:

- Directive 2002/91/EC of the European Parliament and of the Council on the energy performance of buildings;
- Directive 2006/32/EC of the European Parliament and of the Council on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC;
- Council Directive 89/106/EEC on the approximation of laws, regulations and administrative provisions of the Member States;
- Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings;
- Act LXXVIII of 1997 on the formation and protection of the built environment;
- Act LVIII of 1996 on the professional chambers of design and expert engineers and architects;
- Act LIII of 1995 on the general rules of environmental protection;
- Government Decree No 192/2009 (IX. 15.) on engagement in certain professional activities in the construction sector;
- Government Decree No 191/2009 (IX. 15.) on implementation activities in the construction industry;
- Government Decree No 193/2009 (IX. 15.) on construction authority procedures and the supervision of the construction authority;
- Government Decree No 176/2008 (VI. 30.) on the certification of the energy characteristics of buildings;
- Government Decree No 291/2007 (X. 31.) on construction supervision activities;
- Government Decree No 343/2006 (XII. 23.) on the designation and the conditions for the operation of the construction and construction supervision authorities;
- Government Decree No 244/2006 (XII. 5.) on the detailed rules on the eligibility to practice the professions of technical construction supervisor and responsible technical manager;
- Government Decree No 104/2006 (IV. 28.) on the rules on the eligibility to practice town planning and technical architectural planning and technical construction expert activities;
- Government Decree No 103/2006 (IV. 28.) on the detailed rules of the continuing vocational training system related to the practicing of certain regulated professions in the construction sector;
- Government Decree No 253/1997 (XII. 20.) on national town planning and construction requirements;
- Government Decree No 105/1996 (VII. 16.) on the support of building renovations resulting in energy saving;
- Decree No 37/2007 (XII. 13.) of the Minister for Local Governments and Regional Development on construction authority procedures and the contents of parcel establishment and architectural technical documentations;
- Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings;

- Joint Decree No 3/2003 (I. 25.) of the Interior Minister, the Minister for Economy and Transport and the Minister for Environment and Water on the detailed rules of the technical requirements, conformity certification, marketing and use of construction products;
- Joint Decree No 11/1985 (VI. 22.) of the Minister for Construction and Urban Development, the Minister for Industry, the Minister for Transport, the Minister for Agriculture and Food Supply and the Minister for Internal Trade on the mandatory period of suitability of certain construction component and products used in their production;
- Decree No 9/2010 (I. 21.) of the Minister for National Development and Economy on the detailed rules and individual aid entitlements for the use of resources allocated to the priorities of the Environment and Economy Operational Programme;
- Government Decision No 2078/2008 (VI. 30.) on Government measures aimed at the improvement of the energy characteristics of buildings;
- Decree No 10/2009 (IV. 14.) of the Minister for National Development and Economy on indicative targets in the construction sector;
- Act LIII of 2006 on the acceleration and simplification of the implementation of investments of special importance to the national economy;
- Government Decree No 161/2008 (VI. 19.) on the construction affairs examination and continued vocational training of construction and construction supervisory authority decision-preparers and decision-makers.

The heat transmission coefficient requirements for building enclosure structures under **Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings** are the following:

Building enclosure structure	Required heat transmission coefficient value U [W/m ² K]
Frontal glazed doors and windows (with wood or PVC frames)	1.60
Frontal glazed doors and windows (with metal frames)	2.00
Frontal glazed doors and windows with a nominal surface area of less than 0.5 m ²	2.50
Frontal glass walls	1.50
Skylights	2.50
Flat skylight windows	1.70
Non-glazed frontal gates	3.00
Frontal doors or doors between heated and unheated spaces	1.80
External walls	0.45
Flat roofs	0.25
Attic coverings	0.30
Structures separating heated loft areas	0.25
Lower cover panels above arcades	0.25
Lower cover panels above unheated basements	0.50
Frontal doors or doors between heated and unheated spaces	1.80
Walls between heated and unheated spaces	0.50
Walls between adjacent heated buildings	1.50
Walls in contact with the ground between 0 and 1 m	0.45
Floor laying on the ground in a 1.5-metre wide strip along the circumference (can be replaced with heat isolation of identical resistance placed on the base)	0.50

Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings additionally provides for the following: during the preparation of investment programmes for new buildings with a useful area of more than 1000 m², and during planning, the following must be assessed from a technical, environmental and economic point of view: the possibility of using decentralised energy supply systems based on renewable energy sources, district or block heating and cooling or heat pumps.

The review of Decree No 7/2006 will be due in 2011. The Energy Performance of Buildings Directive (EPBD recast) of the European Parliament and of the Council specifies the use of cost-effective calculation methods, the methodology of which will be proposed by the Commission at the meeting of the Energy Demand Management Committee (EDMC) after hearing the specific measures (Concerted Action 3). This is expected to take place one year from now, and thus it would be reasonable for Hungary to wait for the Commission's proposed guidance before taking a decision on national regulations. Accordingly, the reviewed requirement values are expected to be published in 2012.

As a general rule, **solar cells and solar collectors** can be installed without a final construction permit in Hungary. In certain cases, however, a construction permit must be obtained, for example if the required equipment is intended to be installed on buildings under monument protection, if the installation involves significant changes to the façade of the building or if a large open-air system is concerned.

The following regulations apply to small-scale power plants and household-scale power plants (up to 50 kVA) during **energy authorisation**:

In the case of solar cell systems connected to the grid it is the size of the system which determines what further procedure the investors must expect. In the case of solar cell systems with an output of more than 500 kW, the authorisation procedure for small-scale power plants applies, during which a permit must be requested for their installation from the competent construction authority, and a combined small-scale power plant permit from the HTLO. Pursuant to the implementation decree of the effective Electricity Act (EA Imp.), construction authority permits are issued by the Authority of Metrology and Technical Safety of the HTLO having territorial competence. The process is complemented by the network access contract concluded with the licensee, which is a pre-requisite for the Office's permit.

The classification "household-scale power plant" offers more simple conditions, and refers to "power plants" which are connected to a low-voltage grid and the connected load of which does not exceed 50 kVA. The legislator's intention with the introduction of this category was to facilitate, from an authorisation point of view, residential users reducing the amount of electricity obtained from the grid by using electricity generated by devices of their own. This category is also more advantageous from a financial point of view, as through so-called "give-take" accounting the electricity supplier applies annual balance accounting, i.e. it deducts the amount of solar energy generated into the grid from annual consumption. The electricity supplier having territorial competence must be contacted in the case of household-scale power plants as well. The supplier must be informed about the operation of solar cell systems by way of a request form, in which a declaration must be made as to

whether the owner of the solar cell intends to use the energy produced solely for private purposes or also intends to feed energy into the public network. In the latter case the electricity purchase contract must be adjusted accordingly.

The relevant strategies relating to building energy are the following:

National strategies concerning the renewable energy use of buildings

National Sustainable Development Strategy – NSDS

Government Decision No 1054/2007 (VII. 9.) on the adoption of the National Sustainable Development Strategy addresses the issue of increasing the proportion of renewable energy used in buildings (the reduction of residential and community energy consumption through better heat insulation, more energy-efficient machinery and equipment, the shift of consumption patterns towards goods and services requiring less energy) on a theoretical level over several chapters, but does not quantify targets. The new Energy-Efficiency Action Plan currently being planned is expected to contain quantified targets for all of the above.

National Environmental Protection Programme (2009–2014)

The Programme, adopted by Parliamentary Decision No 96/2009 (XII. 9.), contains specific goals in relation to energy efficiency and the use of renewable energy, but does not specify separate quantified targets in the case of buildings. Its measures include, *inter alia*, the drawing up and implementation of a coordinated government programme aimed at improving the energy efficiency of existing buildings in the residential and institutional sectors and of new buildings to be built; improving the energy efficiency of households (e.g. through the modernisation of heating, cooling and lighting systems); building insulation; establishing the regulatory conditions for the energy-efficient substitution of the energy use of village and small town public institutions with decentralised biogas producing systems.

National Climate Change Strategy – NCCS

Parliamentary Decision No 29/2008 (III. 20.) on the National Climate Change Strategy (NCCS) does not set out specific goals or an outlook for the use of renewable energy sources with regard to buildings. The NCCS does mention the necessity of the following renovations in the case of buildings: renovation or replacement of doors and windows, heat insulation of building enclosure surfaces (insulation of wall, attic and floor coverings, modernisation of heating installations, heating regulation, individual regulation of district heating).

Draft Complex Building Energy and Climate Protection Programme (CBC)

The aim of the programme is to draw up the concept of a system for promoting energy efficiency investments with a significantly higher throughput than before. The programme intends to support the renovation of all types of residential building in a single framework; as well as the renovation of public buildings and the construction of

new buildings with low energy consumption. A further goal is to support the use of renewable energy sources in residential buildings.

The Complex Building Energy and Climate Protection (CBC) Financing Mechanism is a conceptually new support scheme, which is independent from previous schemes and does not represent an upgraded version of those, but is instead intended to replace them. Building energy is one of the major priority areas of the EU, as it has been proven to be the area where climate protection targets can be achieved most efficiently. The new EU directives necessitate a new support scheme, one far more efficient and with a significantly higher throughput. Both the technical and environmental considerations and EU expectations point to complex energy efficiency projects, and this approach is reflected in the establishment of the CBC system.

The mechanism intends to integrate residential and public buildings, energy efficiency and renewable energy sources, modernisation and energy-efficient new constructions, complex projects and smaller renovations into a single framework. Reviewing the characteristics of the potential projects and the interests of the various target groups within this system, which follows an integrated approach, we are planning to draw up pilot tenders, which will differ from each other within the single framework in their structure, requirements and the financial funds to be applied. One of the new features of the mechanism will be the points system, the advantage of which is that it will be suitable for the simultaneous application of criteria measurable on different scales. The most important criteria will be energy efficiency and the use of renewable energy sources.

The complex, high-throughput tender scheme will also require a new organisational background and operational mechanism.

The quality of the projects to be implemented and of the support scheme will be guaranteed by several new elements. These include a system of accreditation for products, service providers and contractors, the quality bonus awarded for the Outstanding Construction Product trademark, the professional and consultancy services provided by the Climate-Friendly Buildings Development Agency Network, the electronic tender management system and the monitoring and registration system for successfully completed projects.

The fundamental goal of the Government is to achieve the highest possible energy efficiency through the lowest possible costs. To this end, the support arrangements to be adapted in the following period will take extensive account of the time in which the investments produce a return. The linked application of complex energy efficiency and renewable resources will have priority. As regards funding, the Government intends to develop forms of financing for green economy development to ensure an increased involvement of capital market resources in addition to aids.

In current invitations to energy efficiency tenders there are only energy efficiency specifications concerning the requirements that buildings where the introduction of renewable energy source use is intended must meet.

- Only those applicants are eligible to participate in the **EEOP 4.2.0/A tender** where the buildings concerned by the investment comply with the specifications in

force [Government Decree No 176/2008 (VI. 30.)] with regard to energy, i.e. they fall under at least energy category C.

- Similarly, the following condition applies in the case of **GIS EE** tenders: heating and cooling technologies using renewable energy, as well as boiler replacements, are only eligible to aid if the property concerned by the investment falls into at least energy category C in its original condition or if the property will fall into energy category C through the simultaneous implementation of other investments that result in energy saving (e.g. insulation works).

(b) <i>Responsible Ministry(/ies)/authority(/ies) and other bodies:</i>
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- (a) Ministry of National Development;
- (b) Ministry of the Interior;
- (c) Ministry of National Economy;
- (d) Local governments (as the competent construction authorities);
- (e) Non-Profit Limited Liability Company for Quality Control and Innovation in Building;
- (f) Energy Centre Non-Profit Ltd. (as a contributor in conducting tender schemes).

(c) *Revision of rules, if any, planned by: [date].*

In accordance with the Action Plan, the revision of the rules will commence in 2011. It is a strategic objective of the Government to reduce the specific energy consumption of newly constructed buildings to 120 kWh/m² within five years.

The obligation of legal harmonisation in relation to **Directive 2010/31/EU** of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings falls under the scope of activities and competence of the Ministry of the Interior. The revision of Decree No 7/2006 of the Minister Without Portfolio is scheduled for 2011.

(d) *Summary of the existing and planned measures at regional/local levels:*

Having regard to recital (4) of the RED, development activities must contribute to the strengthening of social and regional cohesion and to the reduction of poverty and social inequalities. In order for us to be able to use resources effectively, it is crucial to adapt the developments to regional and social assets, to coordinate them, and to increase the involvement of regions, microregions, priority regions and cities.

In the use of renewable energy sources at national level, the promotion of local applications is of special importance. A significant portion of renewable energy sources is available cheaply, and at the same time, regions in the countryside could fulfil a significant part of their energy demand through own resources in an environmentally sound manner and at lower costs. Renewable energy production and development could have a positive effect on local governments, as they could launch developments for the renewable-based energy supply of public institutions managed by them by using locally produced raw materials and local workforce.

The existing measures are the support schemes (EEOP, GIS, NEP), and the provisions of Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings (legislation and programmes with a national scope).

In accordance with points 3, 4, 7 and 8 of the Action Plan, additional aid and financing facilitation schemes are planned to be announced in the future. At the same time, the requirement to use renewable energy sources is being prepared through the gradual amendment of regulatory provisions.

(e) *Are there minimum levels for the use of renewable energy in building regulations and codes? In which geographical areas and what are these requirements? (Please summarise.) In particular, what measures have been built into these codes to ensure the share of renewable energy used in the building sector will increase? What are the future plans related to these requirements/measures?*

The minimum requirements are laid down in Decree No 7/2006 (V. 24.) of the Minister Without Portfolio on the determination of the energy characteristics of buildings referred to above, on the basis of which it is already now required to

examine the possibilities for the application of renewable energy sources in the case of buildings with an area of more than 1000 m².

The Government is planning on introducing specific renewable energy source ratios and/or maximum CO₂ emission values for certain building types and construction sites in the future. The mandatory specifications are planned to be introduced gradually, taking into account the capacities of developers and property owners, especially in cases where the specifications concern a wide scope of persons.

In respect of building energy, the fields of energy efficiency and renewable energy utilisation cannot be separated from each other and treated independently. Energy-efficient and renewable solutions must be combined in a particular building in such a way as to ensure that they are in accordance with each other, complement each other and yield the best possible result (substitution of fossil energy sources and reduction of CO₂ emissions).

(f) *What is the projected increase of renewable energy use in buildings until 2020? (If possible differentiating between residential — "single-unit" and "multiple unit", commercial, public and industrial.) (To answer this question you may use a table as Table 6 below. Data could be given yearly, or for selected years. Both heating and cooling and electricity consumption from renewable energy sources should be included.)*

According to national statistics the utilisation of renewable energy sources can be divided based on its purpose into electricity generation and thermal use. Practically almost all of thermal energy use serves the heating of buildings and the fulfilment of the domestic hot water needs of buildings.

There is currently no reliable data available that would enable an examination or projected estimation of the renewable energy use of the various building types (public, residential, commercial and industrial buildings). Survey data concerning residential buildings is available in Hungary, which indicates the number of residential buildings and their average area (average: 78 m²): 4 209 472 buildings in 2005, 4 330 681 buildings in 2010 (source: Hungarian Statistical Office).

An estimation of data concerning all buildings would only be possible if all data relevant to Hungarian buildings was available. To this end, a survey covering the entire building stock will be required in the near future.

Considering the significant lack of data, the objective of creating a data provision and data processing system for the measurement of the energy consumption and energy condition of buildings owned by the state and by local governments has been laid down in the National Action Plan (Europe 2020 strategy). The data provision system would serve the purpose of measuring the energy consumption and energy condition of buildings owned by the state and by local governments once a year. To this end, an electronic questionnaire containing basic questions concerning the energy consumption of the buildings or groups of buildings and the energy condition of the building(s) concerned needs to be drawn up. The answers would be processed by a designated background institution, which would produce reports based on them. Once in possession of the data, priority areas could be determined within the building stock, and buildings with a high potential for generating projects in the most cost-

effective way and with rapid returns could be selected. Delegated experts and energy auditors would be sent to the buildings selected, and would carry out additional surveys and could provide assistance and advice to the operators of the buildings in connection with opportunities for energy modernisations and project preparations.

The complex, energy-efficient renovation of collective residential buildings, traditional residential buildings and residential buildings built using industrialised technology, and the promotion of the energy-efficient construction of new buildings is a special priority in Hungary's energy efficiency plans for the future. This objective is aimed at the improvement of the energy-efficiency of buildings (energy modernisation of building enclosure structures, energy systems and mechanical equipment, creation of thermal energy or electricity generating capacities using renewable energy sources) which are maintained by multiple consumers simultaneously (buildings constructed using industrialised technology / panel housing estates / multi-occupancy buildings). The long-term goal is to create sustainable, liveable (landscaped) residential areas and to increase the quality of life of the residents through the modernisation of housing estates. As the concepts of green buildings and green cities (green roofs, green walls, green surfaces) gain ground, they could become integral parts of the energy programmes for public and private buildings.

<p><i>(g) Have obligations for minimum levels of renewable energy in new and newly refurbished buildings been considered in national policy? If so, what are these levels? If not, how will the appropriateness of this policy option be explored by 2015?</i></p>
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There are currently no such provisions in Hungary. According to our plans, the ministry in charge will draw up new rules for renewable energy sources, which will probably lay down rules for such requirements and specifications (for public buildings in the first phase, then for larger commercial and industrial buildings, and then for larger new apartment blocks in the next phase).

The introduction of the application of the policy under point (g) must be supported by appropriate examinations, especially from the perspective of cost-benefit analyses, and account must be taken of opportunities for technological adaptation. The introduction of mandatory ratios, as described in point (f), is planned to be realised gradually.

Solutions increasing energy efficiency and renewable energy use can be applied most successfully and cost-effectively in the case of new buildings. The reason for this increased cost-effectiveness is that the conversion of an already existing building is always more costly than designing and constructing a building according to the conditions of efficient energy use and renewable energy utilisation to begin with (e.g. the building is oriented correctly, the size and orientation of glazed surfaces is in harmony, the building is constructed of modern building materials without heat bridges, the footing of the building is also insulated, the conditions for using low-temperature surface heating are present, etc.). The reason for the increased success rate is that in the case of existing buildings, certain solutions would not be feasible, or could only be realised subsequently at unrealistically high costs (e.g. insulation of floors lying on the ground), and that in the case of new constructions, the energy efficient and renewable energy-utilising technologies exert their effect during the entire life of the building (less fossil fuel use, less pollutant emission, lower costs).

Accordingly, newly built apartment blocks must in all cases be constructed in such a way as to ensure that they are optimal from a building energy point of view, and incorporate the largest possible number of solutions that increase energy efficiency and result in renewable energy usage within reasonable investment limits. This leads to a definite decrease in overheads and operational costs, and could contribute to the improvement of the standard of living of a considerable portion of society. The improvement of the energy efficiency of buildings and the use of renewable energy technologies should, whenever possible, be implemented in a complex, interlinked manner in as many cases as possible.

(h) *Please describe plans for ensuring the exemplary role of public buildings at national, regional and local level by using renewable energy installations or becoming zero energy buildings from 2012 onwards? (Please take into account the requirements under the EPBD).*

The tender schemes give special priority to public buildings, and can provide as much as 100 percent aid for energy performance modernisation and development works. In the tender schemes, new constructions or renovations meeting the parameters of “low energy requirement building” or “passive house” can receive special support through a “bonus system.”

The advantage of a system of bonus points is, among other things, that it is easy to modify and can be supplemented with new considerations at any time. Quality considerations can not only be applied to criteria, but also to bonus points, i.e. the amount of actual aid, and thus, for example, any type of new, modern renewable technology can very easily be incorporated and can receive aid immediately. In the case of public buildings the possibility of using renewable energy is a special consideration, since in these buildings the establishment of building monitoring systems is relevant, which increases the energy efficiency indicators of regulation-sensitive renewable energy production systems.

Taking into account Article 13(5) of the RED, the Ministry of National Development initiated the drafting of a modernisation programme aimed at the energy reconstruction of state-owned public buildings, and the scheme is expected to be announced in 2011. Within the scheme, an expected mandatory element will, in addition to energy saving and efficiency requirements, be the use of renewable energy sources and the requirement of a maximum CO₂ emission level.

It is a priority goal of the Government that the energy efficiency and renewable energy programmes initiated in the first half of 2011 are implemented taking into account the principle of “lowest costs, highest savings.” Public buildings owned by the Hungarian state are among the largest energy consumers of the building sector, and for this very reason it is a special priority that in the short and medium term the energy consumption of public buildings is significantly reduced and energy saving is improved, taking increased account of the principles of reasonability and cost-effectiveness. The achievement of these future goals would probably also result in a significant decrease in state expenditures. In the case of the aforementioned buildings, the goal is to promote complex renovations that enable energy savings of at least 60 percent (energy modernisation of building enclosure structures, energy systems and mechanical installations, creation of capacities for the generation of

thermal energy or electricity from renewable sources). The aim of this complex modernisation is to ensure that the energy renovation of buildings is linked to climate protection goals, and in particular to the applicability of renewable energy technology.

In order to achieve the goals under Directive 2010/31/EC significant legislative amendments will be required, the preparation of which has already begun. Through gradually tightened requirements a condition close to an energy demand of zero must be achieved in the case of new buildings. However, this goal cannot be achieved by using only regulatory means; it is also important to place significant emphasis on the training of experts working in the construction industry.

Almost all seven main breakthrough points of the New Széchenyi Plan stress the importance of training appropriate experts. Supporting vocational training and retraining in the construction industry is of exceptional importance. Among the training courses to be accredited in relation to the construction industry, preference is given to courses the curricula of which place special emphasis on professional knowledge required for increasing the energy efficiency of buildings and energy efficient facility management.

(i) How are energy efficient renewable energy technologies in buildings promoted? (Such measures may concern biomass boilers, heat pumps and solar thermal equipment fulfilling eco-label requirements or other standards developed at national or Community level (cf. text of Article 13(6))).

I. EEOP – Environment and Energy Operational Programme

Owing to its membership in the European Union, Hungary is eligible to several thousand billion forints of aid from EU resources for development purposes in the period between 2007 and 2013. From the total budget of EUR 4916 million of the Environment and Energy Operational Programme, which is realised under the EU's cohesion policy, two priorities support energy projects in Hungary: 5.15 percent of the total budget are available for the goals of the priority axis "Increasing the use of renewable energy," and 3.14 percent for those of the priority axis "Efficient energy use" which is aimed at promoting energy saving. For the period after 2013 we are planning to continue the tender scheme by launching an independent energy operational programme.

Support for the priority axis "Increasing the use of renewable energy" is provided from the European Regional Development Fund, and therefore, only the regions of Western Transdanubia, Central Transdanubia, Southern Transdanubia, Northern Hungary, Northern Great Plain and Southern Great Plain are eligible to EEOP aid. The region of Central Hungary supports investments aimed at increasing the use of renewable energy sources independently, through an operational programme of its own, a "mirror programme" corresponding to the renewable energy priorities of EEOP. The primary goal of EEOP is to have a favourable influence on the resource structure of domestic energy sources, i.e. to facilitate a shift from fossil energy sources to renewable ones. With a view to achieving an increased proportion of renewable energy sources, applications can be submitted for heat and/or electricity generation aid.

The scheme is also regulated by a number of effective laws, the two most important of which are Joint Decree No 16/2006 (XII. 28.) of the Minister Heading the Prime Minister's Office and the Minister of Finance on the general rules of procedure for the use of aid from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the period between 2007 and 2013, and Decree No 19/2007 (VII. 30.) of the Minister Heading the Prime Minister's Office on the rules on the appropriations specified in the New Hungary Development Plan for Regional Development Operational Programmes from the perspective of state aid.

EEOP schemes for the period between 2009 and 2010:

- EEOP-2009-4.2.0 "Satisfying local heating and cooling demand from renewable energy sources," which supports the increase of renewable energy source use. The total amount of aid available under the EEOP-2009-4.2.0 schemes "A" and "B" is HUF 6 billion. In the case of scheme "B," single-round, standard rules of procedure are used, while in the case of scheme "B," automatic rules of procedure apply with continuous submissions).
- EEOP-2009-4.4.0 "Renewable-based electricity generation, heat and electricity cogeneration and biomethane production" (planned aid budget of HUF 10 billion; standard, single-round procedure with continuous submission).
- EEOP-2009-4.3 "Renewable-based regional development" (planned aid budget of HUF 6 billion, procedure planned to consist of two rounds, first-round project proposals can be submitted from 4 January 2010 until 31 May 2010).
- EEOP-2010-4.7.0 "Support for the preparatory and project development activities of geothermal-based heat and electricity generation projects" (planned aid budget of HUF 3 billion, procedure planned to consist of two rounds, with continuous submission).
- EEOP-2009-5.2.0/A "Third-party financing" and EEOP-2009-5.2.0/B "Third-party financing: energy modernisation of buildings combined with renewable energy utilisation." (The total amount of aid available under the EEOP-2009-5.2.0 "A" and "B" schemes is HUF 4 billion, the procedure of scheme "A" is automatic, while that of scheme "B" is a single-round, standard procedure with continuous submission.)
- EEOP-2009-5.3.0/A "Energy development of buildings and modernisation of street lighting" and EEOP-2009-5.3.0/B "Energy development of buildings combined with renewable energy utilisation" (The total amount of aid available under the EEOP-2009-5.3.0 "A" and "B" schemes is HUF 6 billion; both schemes follow a standard, single-round procedure with continuous submission).
- EEOP-2009-5.4.0 "Energy modernisation of the district heating sector" (planned aid budget of HUF 8 billion; standard, single-round procedure with continuous submission).
- EEOP-2009-7.4.0 "Energy Rationalisation of Healthcare Institutions (EgInER)" (planned aid budget of HUF 0.5 billion; standard, single-round procedure. Project proposals can be submitted from 4 January 2010 until 31 May 2010).

II. CHOP-2009-3.3.3. – Increasing the use of renewable energy sources

The region of Central Hungary supports investments aimed at increasing the use of renewable energy sources independently, through an operational programme of its own, a “mirror programme” corresponding to the renewable energy priorities of EEOP.

III. Energy Efficiency Credit Fund (EECF)

The Energy Efficiency Credit Fund supports the implementation of investments aimed at increasing energy efficiency and the utilisation of renewable energy sources through credit provided at preferential interest rates. The Credit Fund was founded in 1991, and by the end of 2006 its credit facility amounted to HUF 2.39 billion. The Fund is managed by Energia Központ Nonprofit Kft. (Energy Centre Non-Profit Ltd.) and lending is provided by Kereskedelmi és Hitelbank Rt. The preferential loan is open for application to enterprises and local governments, and the programme is operational and available to the public to this day.

The Fund finances the implementation of developments that result in energy savings and through these energy savings effectively contribute to reducing the energy demand of the national economy, to the reduction of its energy costs, to the mitigation of environmental pollution and to the reduction of import dependency. The goal is to substitute traditional energy sources with renewables and with waste energy, to create the conditions of economical energy source management, the reduction and prevention of identified energy losses at the lowest possible expenditure.

IV. National Energy Saving Programme (NESP)

1999 saw the launch of a long-term energy saving programme, the tender scheme of which was operated by the Ministry of Economy and Transport (the legal successor of which is the Ministry of National Development) under the name of Energy Saving Programme in 2000, as part of the Széchenyi Plan between 2001 and 2002, and under the name National Energy Saving Programme (NESP) between 2003 and 2006. The goal of these programmes was to support projects aimed at energy saving and the utilisation of renewable energy sources, for which they provided preferential loans and non-refundable aid until 2000, and non-refundable aid only from 2001. The last invitation to a NESP tender was announced in 2009. A tender for the promotion of the use of renewable energy sources was published under the code number NEP-2009-4 at the beginning of August 2009 (increased use of heat or electricity generated from renewable energy sources, biomass, geothermal energy, wind energy, hydropower, organic waste, installation of solar collectors, solar cells and heat pumps). The tender scheme provided the largest amount of incentives to renewable energy source investments; in this field the maximum amount that could be granted per flat was HUF 1.47 million, while the maximum aid intensity was 35 percent. A total of HUF 2 billion (approximately EUR 7.2 million) had been earmarked for the programme in 2009.

V. Green Investment Scheme (GIS)

The source of funding from GIS tenders are the revenues from the transfer of CO₂ allowances, and it provides aid on the basis of Government Decree No 323/2007 (XII. 11.) on certain rules of the implementation of Act LX of 2007 on the implementation framework of the UN Framework Convention on Climate Change and the Kyoto Protocol thereof to legal persons, organisations without legal personality and business associations without legal personality established in Hungary, Hungarian branches of enterprises established abroad, individual entrepreneurs and natural persons, unless provided for otherwise by an international treaty.

In addition to the abovementioned tender scheme, aid for renewable energy use investments can also be obtained within the framework of the EEA/Norwegian Financial Mechanism. The tender scheme for the EEA/Norwegian Financial Mechanism will be established in the near future, and its fundamental pillars will be the development of a green economy, including renewable energy sources, environmental protection, research and development, education and training and awareness-raising. These support incentives could contribute greatly to the fulfilment of our targets.

Tenders announced or being planned within the framework of the GIS:

- GIS Panel Sub-programme: under the tender, applications can be submitted for aid for the renovation of residential buildings built using industrialised technology, for investments that result in noticeable energy saving as justified in the concept and in an increase in the use of renewable energy sources,
- The GIS Energy Efficiency Sub-programme offers funding in the case of properties built using traditional technology to the following: natural persons, housing associations, apartment blocks, for investments that result in noticeable energy saving and an increase in the use of renewable energy sources. In the case of properties built using industrialised technology, only natural persons may apply and only for door and window replacement and heating modernisation.

Planned measures: within the framework of far-reaching complex energy modernisation programmes for buildings (energy efficiency developments) to be set up under the New Széchenyi Plan, the competent ministry is planning on publishing invitations to tender in the first half of 2011, through which Hungary will be able to meet its 10% total energy saving target and the renewable energy source ratio set out by the NAP by 2020. In order to reach these goals, the Government is planning on launching extensive energy saving programmes and green economy development, as announced in the government programmes and the New Széchenyi Plan.

The following policy targets have been set under the Programme:

- the renovation of an average of at least 50 thousand traditional and 30 thousand panel buildings and the construction of 22 thousand new, energy-efficient homes per year;
- the renovation of an average of 3.2 thousand public institutions (and institutions providing public services) per year: during the 10-year duration of the programme, the energy modernisation of all national educational institutions, hospitals, official

and other buildings of justice and administration that require renovation will be implementable;

- the average extent of the energy savings achieved by the investments must, depending on the circumstances, be at least 60 percent;
- the aim of the aid in the case of newly constructed buildings is to promote construction that is more energy efficient than required by the specifications; the target in this case is 25 kWh/m² per year.

The following priorities have been determined for the complex energy renovation of buildings:

- (a) Sub-Programme “Renovation of Traditional Residential Buildings”
- (b) Sub-Programme “Panel and Apartment Block Reconstruction”
- (c) Sub-Programme “Energy-Efficient New Construction”
- (d) Sub-Programme “Reconstruction of Public Buildings” (central and local government buildings)
- (e) Priority Project (pilot projects) Sub-Programme: energy-efficient renovation of hospitals, healthcare institutions, sports facilities and baths
- (f) Industrial Actors Sub-Programme for SMEs (energy-efficient modernisation of business associations)

The New Széchenyi Plan is also taking into account existing aid schemes, but these are expected to undergo client- and investor-friendly reorganisation in the future.

VI. EU-funded programmes – Cooperations between Member States

Following Spain and Belgium in the current presidency trio, Hungary will be holding the rotating presidency of the European Union for six months beginning with January 2011. This office will involve great responsibility and a wide scope of activities. The responsibility to undertake tasks represents, at the same time, a position of opportunities, as it enables the setting of priorities which essentially serve the interests of all Member States. One such priority is the extensive promotion of renewable energy sources. The conditions of this are mostly determined by the given Member State's assets and the available support and financing policy. In the case of EU-financed programmes, Hungary will have the opportunity to propose priorities and Community programmes which contribute the most to the achievement of the EU 20-20-20 targets.

In addition to cooperations between Member States, third countries can also be involved, and the participation of countries that are not EU Member States, but are significant actors in the bloodstream of Europe, could also be facilitated. The EEA/Norwegian Financial Mechanism could serve as a basis for such cooperation, as it also offers aid for investments aimed at the use of renewable energy sources. The tender scheme for the EEA/Norwegian Financial Mechanism will be established in the near future, and its fundamental pillars will be the development of a green economy, including renewable energy sources, environmental protection, research and development, education and training and awareness-raising. These support incentives could contribute greatly to the fulfilment of our targets.

Hungary considers it important to participate as much as possible in directly “Brussels-announced” Community programmes published by the European Union through social and economic actors. These programmes provide opportunities for project developments and the implementation of shared ideas and goals within the framework of collaboration and cooperation in consortia with other Member States along specific priorities that are also available to Hungary. Hungary intends to participate in the following programmes.

The **NER300** initiative provides considerable financial aid to at least eight projects in the field of carbon dioxide capturing and storing technologies, and to at least 34 projects in the field of innovative technologies utilising renewable energy sources. Its goal is the promotion of a low-carbon-emission economy in Europe, the creation of “green” jobs and contribution to the achievement of the ambitious climate change objectives of the EU.

The **COST** cooperation was established with the aim of harmonising fundamental technical and scientific research conducted from national aid at European level. Through its flexible basic principles, COST has initiated actions coordinating the research activities of national research institutes, universities and industrial enterprises. The cooperation is operating with the support of the European Commission and the Council. Participants in COST actions are primarily universities and research institutes, and, to a lesser degree, industrial companies. Participating countries are generally free to use the results of the common research activities.

The aim of the Transeuropean Networks (**TEN**), which were established in the field of transport, telecommunications and energy, is to facilitate the development of the internal market, the consolidation of economic and social cohesion, and the linking of island, landlocked and peripheral regions with the central regions of the EU.

The priorities of the Transeuropean Energy Networks must be compatible with the goals of sustainable development. These priorities are the following: (a) the use of renewable energies and the improvement of the links between the facilities producing them; (b) the use of the most effective technologies through which losses and environmental risks related to energy transport can be reduced to a minimum; (c) the establishment of energy networks in island and peripheral regions through the diversification of energy sources and the use of renewable sources of energy, and (d) cooperation between the networks of the EU and the networks of new Member States and third countries. Under the financial perspective for the period between 2007 and 2013, an amount of 155 million has been earmarked for TEN-E.

With small and medium-sized enterprises as its main target, the Competitiveness and Innovation Framework Programme (**CIP**) supports innovation activities (including eco-innovation), provides better access to finance and delivers business support services in various regions. The CIP is divided into three operational programmes, one of which is the Intelligent Energy Europe Programme (**IEE**). The priority objective of the IEE programme is to provide funding for non-technological activities promoting the use of renewable energy, to the more efficient exploitation of the energy reserves of the Community and to the favourable influencing of market and regulatory conditions in the field of energy.

Applications can be submitted in the following areas under the programme:

- **SAVE:** energy efficiency, rational use of resources in buildings, industrial facilities and products
- **Altener:** new and renewable energy sources in electricity generation, cooling and heating systems, homes, houses; biofuels
- **Steer:** energy efficiency, use of new and renewable energy in shipping and transport.

The Seventh Framework Programme for research and technological development (**FP7**) is the EU's main instrument for funding research in Europe. FP7 supports research in specific priority areas with the aim of ensuring that the EU can become or remain a world leader in those sectors.

FP7 is structured around four main fields of activities, which constitute four individual programmes and a fifth individual programme for nuclear research. Under the "Cooperation" programme research funding will be granted to international cooperation projects within and outside the borders of the European Union. The programme will facilitate the development of knowledge and technology in ten fields belonging to the main areas of science and research (including energy). Research activities will enjoy support and reinforcement in order to be able to face the social, environmental, public health and industrial challenges of Europe, to serve the public good and to assist developing countries.

The Joint Programming Initiative (**JPI**) is one of the five new measures set out in the Green Paper entitled "The European Research Area: new perspectives." Its goal is to encourage international cooperations in R&D. The JPI does not question the results achieved by earlier initiatives (such as COST); on the contrary, it encourages their further application and supplementation with new, planned means.

The aim of the South East Europe Transnational Cooperation Programme (**SEE**) and the Central Europe programme (**CE**) is to strengthen regional cohesion, stability and competitiveness by improving transnational cooperation, increasing integration and ensuring sustainable development in Central and South East Europe.

Hungary's EU presidency in the first half of 2011 could facilitate participation in the programmes.

4.2.4. Information provisions¹¹

“Education and awareness-raising have a crucial role. In the field of education new experts will need to be trained as the development of a green economy will require special expertise. Technical and skilled worker training programmes will need to be launched in addition to higher education courses. The establishment of regional centres for professional advice and knowledge will be required for an appropriate exploitation of regional bio-energy conditions. For general information and awareness-raising among the public, promotional campaigns must be initiated, which will widely provide information about, and promote, not only energy efficiency and energy saving, but also renewable energy sources.”

Excerpt from the New Széchenyi Plan, 28 July 2010

“Success ... will not only require material resources, but intellectual and emotional ones as well.”

Excerpt from the Programme of National Cooperation, 22 May 2010

This sub-chapter presents the rules on information currently in force, as well as the means used for the dissemination of information. The ambitious, targeted development of a green economy, which serves universal national interests, requires the availability of appropriate expertise, as well as the guaranteed availability of readily comprehensible, useful and up-to-date information to all parties concerned. The restructuring of the current system, which lacks a comprehensive concept, will be essential in the light of the abovementioned goals, and therefore, the aim of the new draft measures described herein will be to implement the leap in quality that is required in the field of information and training.

Current and future information and awareness raising campaigns and programmes, as well as planned revisions, and expected results have to be described. Member States should also indicate which responsible authority will monitor and review the effects of the programmes. When regional/local authorities have a substantial role, please also indicate and summarise it.

(a) *Reference to existing national and or regional legislation (if any) concerning information requirements according to Article 14 of Directive 2009/28/EC.*

The laws concerning information, largely relating to tender schemes, are the following:

- Act XLVI of 1993 on Statistics (consolidated version including Government Decree No 170/1993 (XII. 3.) on the implementation thereof);
- Act LIII of 1995 on the General Rules of Environmental Protection (in the context of the right to facts and data relating to the environment);
- Act XC of 2005 on the Freedom of Electronic Information (in the context of the electronic publication obligation of administrative bodies and institutions with public responsibilities);
- Act CI of 2007 on Ensuring the Accessibility of Data Required for the Preparation of Decisions;

¹¹ Article 14(1), (2) and (4) of Directive 2009/28/EC

- Government Decree No 335/2007 (XII. 13.) on the Implementation of Act CI of 2007 on Ensuring the Accessibility of Data Required for the Preparation of Decisions;
- Government Decree No 292/2009 (XII.19.) on the Operational Rules of Public Finances (in the context of rules on aid granted by way of tender procedures).

Several Parliamentary Decisions refer to the special role of awareness raising, information and training, not expressly in relation to the use of renewable energy sources, but rather in connection with a sustainable way of life:

- Parliamentary Decision No 96/2009 (XII. 9.) on the National Environmental Protection Programme for the period between 2009 and 2014;
- the National Sustainable Development Strategy (its adoption is provided for by Government Decision No 1054/2007 (VII. 9.);
- Parliamentary Decision No 40/2008. (IV. 17.) on Energy Policy for the Period between 2008 and 2020;
- Parliamentary Decision No 29/2008 (III. 20.) on the National Climate Change Strategy.

(b) Responsible body/(ies) for dissemination of information at national/regional/local levels.

The quality and financing framework for information is determined at national level by the Ministry of National Development, in close cooperation with the National Development Agency, which is responsible for coordinating the tenders. Energy Centre Non-Profit Ltd. plays an important part in the coordination of the programmes: as the organisation performing the operational tasks of the support scheme for the improvement of energy use efficiency it fulfils tender management and other support-related tasks within the energy tender scheme.

Campaigns promoting green awareness-raising, a sustainable way of life and the related behaviour patterns can be realised within the framework of tenders. In these, the related activities are performed by civil and professional organisations, the press, educational institutions (kindergartens, primary and secondary schools, higher education and continuing training institutions), local governments, micro-regional associations and other non-profit organisations.

(c) Summary of the existing and planned measures at regional/local levels (where relevant).

By the end of 2010 all governmental institutions have launched initiatives for the promotion of green awareness-raising. As part of the climate protection campaign series launched by the State Secretariat for Environmental Protection at the Ministry of Rural Development, and earlier by the Ministry of Environment and Water, renewable energy sources have been included in the informational campaign. Additionally, every year the Ministry publishes an invitation to the so-called "Green Resources" tender for the support of civil organisations, among the winners of which there are, every year, projects the main purpose of which is the dissemination of information related to renewable energy sources, both at national and regional level. The National Development Agency, jointly with Energy Centre Non-Profit Ltd., has organised numerous national road shows where the available aid schemes have been presented and several publications and information materials have been

disseminated. In order to ensure that concerted measures and results that build upon each other are realised in the future, a thorough, well-thought-out awareness-raising work and time schedule must be drawn up so as to enable all actors of society and the economy to participate in the aforementioned programmes, regardless of their age.

The awareness-raising programmes that will be launched next year will enable the implementation of global, national-level campaigns using complex, diverse campaign elements, but the implementation of the individual elements of these, i.e. the organisation of conferences, the creation of publications or the conducting of regional or local campaigns, will also play an important part. An important consideration during the implementation of the programmes will be to provide opportunities for initiatives that approach the methodology of promotion by taking into account regional specifics.

(d) Please indicate how information is made available on supporting measures for using renewable energy sources in electricity, heating and cooling and in transport to all relevant actors (consumers, builders, installers, architects, suppliers of relevant equipment and vehicles). Who is responsible for the adequacy and the publishing of this information? Are there specific information resources for the different target groups, such as end consumers, builders, property managers, property agents, installers, architects, farmers, suppliers of equipment using renewable energy sources, public administration? Are there information campaigns or permanent information centres in the present, or planned in the future?

The current aids related to green awareness-raising are available through tender schemes. Invitations to tender in the field of energy must be published on the homepages of the Ministry and the National Development Agency, in the Official Bulletin published as an annex to the Hungarian Official Journal, as well as in at least one daily newspaper, thus ensuring information. Data that need to be published by other means are included in Government Decree No 292/2009 (XII.19.) on the Operational Rules of Public Finances.

In addition to the information provision required by legislation, information is disseminated through the awareness-raising and information campaigns of the responsible ministries, the background institutions for energy and the organisations coordinating the use of EU resources. Currently, information about measures supporting the use of energy produced from renewable sources in electricity supply, heating and cooling, as well as transport, is provided by Energy Centre Non-Profit Ltd. under the Ministry of National Development. These include information relating to aid schemes funded from national resources (NAP, EECF, GIS Panel, GIS Climate-Friendly Home) and from EU resources (EEOP, EIOP). Energy Centre Non-Profit Ltd. publishes the information on its homepage and in several professional journals in the form of advertisements.

I. Out of the measures planned for the future the information of the various target groups about expected initiatives for the use of energy produced from renewable sources in the field of electricity supply, heating and cooling and transport will rest on multiple pillars in the future. One of the most important of these will be the **setting up of an energy consultancy network**, which will consist of a national

energy agency with an extended scope of activities, as well as a network of county – and later town and microregional – energy experts under its direction.

Through the network, the Government will direct, assist and coordinate the following in a responsible manner:

- information provision, advice and awareness-raising relating to energy investments to the population, the local governments and the economic sector;
- the transmission of information on the existence, capacity and volume of investments not implemented from budgetary aid into the energy statistics system through the green database;
- checks and certifications relating to energy investments;
- a more effective and comprehensive tender coordination in this field.

II. The second pillar is planned to be the creation of an **online platform based on a professional database**, which will enable up-to-date information to be provided to decision makers, the consultancy network, economic actors, the local governments and the population. Working with the database, the network's staff of experts, which could represent the key to a green industry and energy in the future, will be able to offer advice, develop and plan in possession of a continuous flow of accurate information.

Planned steps and tasks:

- (a) Provision of credible, real-time and comprehensive information to economic actors, local governments and the population, in short, the stakeholders, with regard to green economy, green industry and environmental technologies.
- (b) The database includes statistical data, explanatory diagrams, maps and case studies, the provision of technological, financing and background industry information.
- (c) It must be ensured that potential partners can find each other and obtain information as to where they may obtain funding or what comparative advantages and opportunities the companies or local governments concerned possess based on their location.
- (d) Provision of information to visitors unfamiliar with the opportunities that can be found in green technologies, on the basis of which they can immediately begin planning their renewable or alternative energy, energy efficiency or climate and environmental technology investments.

III. The conducting of awareness-raising campaigns constitutes the third pillar of green awareness-raising, during which the population can be familiarised with energy saving and renewable energy solutions and opportunities, and the methods of adapting to the effects of climate change. Online and offline channels of communication must be used, and green solutions, including technologies, innovations, procedures, funding opportunities, the competitive advantages of a given region, and the financial savings and positive climate effects that can be achieved through green solutions must be introduced to the population through a country-wide road show. This requires awareness-raising activities that do not approach the consequences of climate change in an abstract manner, and do not attempt to educate the public on how to behave properly, but instead attempt to bring

green technologies and the economic rationalities directly affecting these technologies closer to the people.

(e) *Who is responsible for publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity? (Supplier of the equipment or system, public body or someone else?)*

So far, only the professional organisations representing the individual renewable energy industries have been publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources. Additionally, the manufacturers and distributors of the equipment, and the contractors provide information about their products and services and their costs and benefits on their own websites and in person to those interested. In connection with agricultural aid (EAFRD), an agricultural machinery catalogue is available in electronic format on the website of the Hungarian Agricultural and Rural Development Agency (ARDA), which also contains equipment from the renewable energy sector (biomass boilers, pelleters, etc.).

In the upcoming period we intend to bring information concerning the net benefits and costs of equipment and systems using renewable energy sources and information relating to energy efficiency to the various target groups on one hand through the **energy consultancy network** mentioned earlier, and at the same time, professional groups active in the field of alternative and renewable energy will also play an important part. An additional goal is to set up a **quality filter within the framework of our on-line platform based on the green database** to be created, which will indicate the net benefits and costs of equipment and systems using renewable energy sources in the fields of heating and cooling and electricity supply to all target groups. Both forms of information provision are planned to be implemented under the coordination of the Ministry of National Development and its background institutions.

Furthermore, the **national energy efficiency auditing and monitoring system** planned to be implemented in the future will contribute greatly to mapping these systems and equipment. This system could also assist tenderers in planning energy saving investments of appropriate effectiveness.

(f) *How is guidance for planners and architects provided to help them to properly consider the optimal combination of renewable energy sources, high efficiency technologies and district heating and cooling when planning, designing, building and renovating industrial or residential areas? Who is responsible for that?*

In the new governmental configuration the Ministry of National Economy is the ministry in charge of construction, while energy is the responsibility of the Ministry of National Development and the Office. The most important guidance material is **Decree No 7/2006 (V. 24.) of the Minister Without Portfolio** on the determination of the energy characteristics of buildings referred to earlier. In connection with the certification of the energy characteristics of buildings, **Government Decree No 176/2008 (VI. 30.)** provides that new energy certificates must be issued in the case of new buildings constructed on the basis of a final and enforceable construction authority permit issued in a procedure initiated after the entry into force of the aforementioned **MWP Decree No 7/2006 (V. 24.)**.

Pursuant to the effective Government Decree No 212/2010 (VII. 1.) on the scope of activities and competence of the individual ministers and the State Secretary heading the Prime Minister's Office, which defines the new governmental structure, the Minister for National Economy is responsible for construction economy, as well as for housing management and housing policy, and at the same time the Minister for National Development is responsible for development policy and for the management, regulation and checking of indicative targets relating to development, for the implementation of energy policy, including renewable energy policy and energy saving policy (action plans, tender schemes, etc.), and for energy strategy, climate policy, energy efficiency policy and energy saving policy.

(g)*Please describe the existing and planned information, awareness raising and training programmes for citizens on the benefits and practicalities of developing and using energy from renewable sources. What is the role of regional and local actors in the designing and managing these programmes?*

The population does not possess sufficient information on the environmental effects of their lifestyle (modes of transportation, environmental protection, sustainability, energy awareness), and therefore, the information available is often incomplete during decision-making. The prevailing consumer habits are often contrary to the principles of sustainability. Surveys indicate that, although half of the population is aware that consumption has detrimental environmental effects, three quarter believe that the problem should be solved solely through technological progress. People often do not intend to change their lifestyles despite realising globally, on the whole, the unsustainability of current lifestyle patterns. Decision-makers at business, local, regional and national political level also easily make decisions that are contrary to sustainability, while referring to the lack of interest on the part of the population. However, there are also favourable trends. Primarily in the countryside, and also among those paying charges in proportion to consumption, traditional consumption habits that can be considered partially sustainable (such as low water consumption, rational use of energy, the presence of recycling solutions) have been preserved.

Out of the existing measures, the **EEOP priority axis for the promotion of a sustainable lifestyle and the related behavioural patterns** aims to promote sustainable lifestyle and the related behavioural patterns by means of awareness-raising, information and training. Its goal is to improve the environmental awareness, environmental culture and environmental ethics of consumers, especially in the areas of everyday life, such as household, workplace, transport and leisure time, through information campaigns and cooperative community efforts. The target groups for awareness-raising with regard to sustainability are the population in general, children, young people, households, corporate, organisational and institutional decision-makers, political decision-makers, educational experts, teachers, communications experts.

The budget available under the **EEOP priority axis "Sustainable consumption and lifestyle"** is HUF 1 billion. Tenders can be submitted since May 2008. Based on our experience so far, the scope of applicants has been quite diverse. Tenders have so far been submitted, *inter alia*, by schools, associations, foundations, non-profit limited liability companies, and a few budgetary authorities. The topics chosen for the

campaigns are diverse; the most popular areas are selective waste collection, energy efficiency and renewable energy sources.

The aim of the planned awareness-raising programme listed among the measures of Table F/5 is to provide the civil society, educational institutions and local governments a tool through which they can present the importance of creating a green economy to a wide audience, illustrate the required changes and the results that can serve as an appropriate basis for further progress. An important goal of the programme is to emphasise the specifics of certain regions, and to present the potential lying in a green economy by taking into account local problems and opportunities.

In the implementation of the green awareness-raising programme we are primarily counting on those civil and professional organisations, media outlets, educational institutions (kindergartens, primary and secondary schools, higher education and continuing training institutions), local governments, microregional associations and other non-profit institutions, which can convey the importance of a green economy in a credible manner during their awareness-raising activities.

The invitations to tender in the field of awareness-raising will enable the implementation of global, national-level campaigns that use complex, diverse campaign elements, but the implementation of the individual elements of these, i.e. the organisation of conferences, the creation of publications or the conducting of regional or local campaigns, will also play an important part. Information provision will be centred around popularising the application of renewable and alternative energy sources and the related practical knowledge.

The energy expert training programmes to be launched in the future will focus on knowledge that can be put to use in practice. For this reason, going against current trends, we are planning to implement a large portion of training in the form of practical training in workshops and plants. During the selection of training sites we are therefore planning to involve institutions that maintain active connections with the actors of the green industry, i.e. with renewable energy production or biomass and waste utilisation plants, etc. The tenders will enable the implementation of complex educational programmes, but the implementation of the individual elements of these will also be possible, meaning that institutions will have the opportunity to tender for the implementation of a complex educational programme or vocational training scheme, or for individual continuing training courses.

4.2.5. Certification of installers¹²

(a) *Reference to existing national and/or regional legislation (if any) concerning certification or equivalent qualification schemes for installers according to Article 14(3) of the Directive 2009/28/EC.*

The relevant **national decrees** are the following:

- Government Decree No 133/2010 (IV. 22.) on the National Qualifications Register and the procedure for the amendment of the National Qualifications Register ;
- Decree No 8/2006 (III. 23.) of the Ministry of Education on the conditions for the commencement and continuation of vocational training and the advisory body to the regional integrated vocational training centre;
- Decree No 20/2007 (V. 21.) of the Ministry of Social Affairs and Labour on the general rules and procedure of vocational examinations.

Similarly to awareness-raising, education and training will also require a well-thought-out training plan. In Hungary there is a need for the enhancement of the training of practical experts familiar with the technical, environmental-economic and agronomic basics of renewable energy production. For this reason, our further goals include the creation of a standard national training system for technicians and skilled workers participating in the vocational specialisation courses of “renewable energy manager,” “renewable energy consultant” and “green industry,” which are planned to be created.

It is important to ensure that experts performing installation and implementation activities possess certified sub-sectoral professional skills; continuing training must be a mandatory requirement for them. The certification of institutions offering continuing training must be centrally regulated and supervised. Professional organisations must be involved in professional supervision.

(b) *Responsible body/(ies) for setting up and authorising certification/qualification schemes by 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps.*

The qualification and certification scheme will be set up with the close cooperation of several institutions and organisations in the future: the Ministry of National Resources, the Ministry of National Economy, the Energy Centre, the Institute for National Vocational Training and Development of the Hungarian Accreditation Committee, the Professional Chambers, professional organisations.

(c) *Are such certification schemes/qualifications already in place? If so, please, describe.*

Qualification schemes in the field of energy efficiency, renewable energy sources and related areas are predominantly represented by the individual initiatives of institutions. In related areas, many qualifications are listed in the National Qualifications Register (OKJ). These include training courses both in the school system and in tertiary education. The professional and exam requirements for

¹² Article 14(3) of Directive 2009/28/EC

qualifications listed in OKJ are laid down in legislation; training programmes can be initiated by any institution, provided that it meets the relevant requirements for staff and equipment. The qualifications are the following:

- Building services technician (OKJ:54 582 01 0000 00 00)
- Central heating and pipeline repairman (OKJ: 31 582 09 0010 31 03)
- Cooling and air conditioning equipment repairman and serviceman (OKJ: 33 522 02 0000 00 00)
- Air engineering system repairman (OKJ:3152203000000000)
- Electric machinery and equipment repairman (OKJ:3152201000000000)
- Energy expert in the field of renewable energy sources (OKJ:525220500105202)
- Heavy-current electrician (OKJ: 5452201000000000)

(d) *Is information on these schemes publicly available? Are lists of certified or qualified installers published? If so, where? Are other schemes accepted as equivalent to the national/regional scheme?*

Information on these schemes is partially available, primarily in the records of the professional associations (Hungarian Chamber of Engineers – MMK, Hungarian Chamber of Building Engineers – MÉGSZ, Association of Cooling and Climate Technology Companies – HKVSZ, etc.).

(e) *Summary of existing and planned measures at regional/local levels (where relevant).*

Training programmes in the future can be implemented at regional level, where the members of the consortia formed would be higher education and research institutions and industrial actors of the green economy. The representatives of the educational institutions and training sites participating in the training will create the energy expert training advisory board, which will be responsible for drawing up a standard curriculum for the training, and to perform the quality monitoring and development of the training.

The training of renewable energy managers is planned at universities and colleges that already have similar specialisations, and will be based on a standard curriculum, placing emphasis on workshop practice, and taking into account quick launching, country-wide coverage, standard knowledge and the principle of regionality.

Another element of the training programme is planned to be implemented by building on the regional network of tertiary education. Based on a standard national curriculum, applicants with appropriate pre-qualifications will be able to assist a local government or a small group of local governments (a maximum of 4 to 5 small settlements), with the involvement of renewable energy managers with territorial competence.

An important element of the measures are secondary schools and vocational schools, where experts will acquire the special knowledge required for the planning, operation and installation of renewable energy generating plants and equipment in intensive workshop practice courses.

An important element of the training programme is the training of the experts and staff of authorising authorities, and their continuous provision with up-to-date information in the field of renewable energy sources, which is primarily planned to be realised in the form of short-term (a few days at most) continuing training courses and knowledge transfers. The aim of the training courses is to pass on special knowledge about the most frequent issues relating to renewable facilities and equipment in the field of the application of the law (authorisation).

When launching educational and training courses, a clear goal is to take into account quick launching, country-wide coverage, standard knowledge and the principle of regionality.

4.2.6. Electricity infrastructure development

“The spreading of renewable energies at a reasonable pace, as enabled by domestic support funding, must be facilitated, among other things, by the ‘facilitation of renewable energy producers’ access to the network’ as well.”

Excerpt from the New Széchenyi Plan, 28 July 2010

This subchapter presents the effective provisions on the operation and development of electricity networks.

Besides the current situation and already existing legislation future actions, planned revisions, responsible bodies for it and expected results have to be described.

(a) *Reference to existing national legislation concerning requirements related to the energy grids.*

- the EA;
- EA Imp.;
- Act XXI of 1996 on regional development and spatial planning;
- Act XXVI of 2003 on the National Spatial Plan;
- Government Decree No 382/2007 (XII.23.) on the detailed rules of the authorisation procedures of the construction authority in the electricity industry;
- Decree No 122/2004 (X. 15.) of the Minister for Economy and Transport on the safety zones of electrical works;
- Decree No 117/2007 (XII.29.) of the Minister for Economy and Transport on the financial and technical conditions of connecting to the public electricity network;
- Decree No 119/2007 (XII.29.) of the Minister for Economy and Transport on electricity network access fees;
- Decree No 109/2007 (XII. 23.) of the Minister for Economy and Transport on the distribution of electricity falling under the off-take obligation by the transmission system operator and the method for determining the prices applicable during distribution [hereinafter referred to as MET Decree No 109/2007 (XII. 23.)]

(b) *How is it ensured that transmission and distribution grids will be developed with a view to integrating the targeted amount of renewable electricity while maintaining the secure operation of the electricity system? How is this requirement included in the transmission and distribution operators’ periodical network planning?*

Article 25 of the EA currently stipulates the following:

“(1) The transmission system operator shall be obliged to prepare a network development plan for the networks in the electricity system that have a voltage of 120 kV or more at least every two years, taking into account the development plans and offers prepared by the distribution network licence holders and the requirements of the European electricity market.

(2) When planning the development of the transmission and distribution networks, account must be taken of the energy policy requirements of demand-side regulations,

electricity produced using energy from renewable sources and waste, and the facilitation of cogeneration of electricity.”

Transmission network development plans must also be approved by the Office. The approved plans contain the required developments and expansions, as well as an appropriate schedule for their implementation, which the network owner is obliged to implement [EA Article 25(4)]. The current (year 2008) Network Development Plan for the electricity system has been approved by the Office in its Decision No 44/2009. Based on the next proposed amendment of the EA, beginning with 2011, plans will have to be drawn up annually. According to the proposal, ten-year long-term and three-year medium-term plans will have to be prepared with an annual implementation scheduling.

<p><i>(c) What will be the role of intelligent networks, information technology tools and storage facilities? How will their development be ensured?</i></p>
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Similar to other countries in the world, there is no unlimited supply of reserve electricity for the provision of the system-level service required for the balanced operation of the Hungarian electricity system. This technical limitation determines how much electricity from non-controllable production can be allowed into the electricity system. We therefore intend to focus on the extension and promotion of electricity production solutions required for the regulation of the electricity system, including on the promotion of intelligent networks.

An intelligent network will allow performance evaluation through an on-line system and local energy management, and will consequently allow for the optimal operation of the system and the reduction of reserves and emissions. The first step in this direction will be the introduction of intelligent meters (smart metering) and the use of IT tools which will provide benefits to network operators by providing them with even more up-to-date information on energy use and supply, and which enable consumers to react to prices in the case of appropriate tariffs. Furthermore, energy storage facilities could also play an important part in increasing the flexibility and stability of the system, both at large and small-scale (e.g. electric cars). During the examination of the necessity of using hydro-gravitational storage facilities, significant emphasis must be placed on environmental protection and nature conservation considerations. Currently Hungary does not have a hydroaccumulation plant. Therefore the possibility of introducing alternative energy storage methods (e.g. with accumulators) must be examined in Hungary. Possible technical solutions during the implementation of such domestic projects could be those which are already used effectively in other countries and about which sufficient references are available to judge their technical and economic suitability.

Taking into account the provisions of Directive 2006/32/EC on energy end-use efficiency and energy services, and Directive 2009/72/EC, which was adopted as part of the third EU energy package, Article 170(19) of the EA stipulates that the rules applicable to the installation of electronic consumption meters at consumers must be regulated in a government decree.

The preparation of the government decree on smart electricity metering is carried out by the Office. In order to prepare the government decree and the introduction of

smart metering in Hungary the Office commissioned an expert selected through a tender procedure to prepare a study, which will be followed by an additional study for decisions regarding consumers and the launch and evaluation of a pilot project. At the same time, this will also serve the implementation of the timetable for the introduction of smart electricity metering required by Directive 2009/72/EC. According to point 2 of Annex 1 to the Directive, Member States shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the electricity supply market. The implementation of those metering systems may be subject to an economic assessment of all the long-term costs and benefits to the market and the individual consumer or which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their distribution. Such assessment shall take place by 3 September 2012.

Subject to that assessment, Member States or any competent authority they designate shall prepare a timetable with a target of up to 10 years for the implementation of intelligent metering systems.

Where roll-out of smart meters is assessed positively, at least 80% of consumers shall be equipped with intelligent metering systems by 2020.

Directive 2009/72/EC of the third EU energy package envisages the creation of smart electricity networks. Considering that the establishment and use of smart networks is an important means of achieving the 20/20/20 targets, Hungary will soon begin preparations for them.

Currently, a well-established demand-side management system, a so-called ripple control (RC) system is used by the licence-holding companies operating the distribution networks. This is independent of the transmission system operator's system-level regulation, and is based on the operation of remote-controlled switches in a large number of electrical hot water boilers and heat-storing electrical heating equipment installed primarily in the residential buildings of retail consumers for electricity purchase at a preferential tariff set up for this purpose. The duration for which the suppliers must keep these switched on in 24 hours is regulated in a decree, and this period varies between winter and summertime. This system is operated by the distribution network operators, in cooperation with the DSOs, in order to ensure the equalisation of their own distribution networks by varying "off" and "on" states. With a view to equalisation in the interest of the system, there is a regional delay in the switching programme, which is agreed on by the distributors with the system operator.

In the field of information technology assisting the operation of the transmission system, the most important task of MAVIR (Hungarian Transmission System Operator Company Ltd., hereinafter referred to as TSO) is to ensure a balanced operation of the electricity system, the balancing out of supply and demand. Between 1996 and 2002 the so-called ÜRIK system has been established, as a part of which there has already been an upgrade following the establishment of the EMS / SCADA system, and in 2008 the phase metering and communications system has been upgraded due to switching to a system that uses a higher sampling frequency (taking 10 high-accuracy samples per second). In 2009 new standards have been adopted in the field of communications between the SCADA system and RTUs, and the

Electronic System, which has a data link to neighbouring TSOs, has been completed in accordance with UCTE specifications.

Furthermore, there is a wind forecasting device operated at the control centre of MAVIR. MAVIR is currently striving to put this device to increased use for undertaking several measurements per day, whereby a more accurate forecast can be made. Additionally, the possibility to determine the optimal outcome through a set of commercial forecasts is under consideration.

(d)Is the reinforcement of the interconnection capacity with neighbouring countries planned? If so, which interconnectors, for which capacity and by when?

Hungary is connected to all of its neighbouring countries. The following connections and net transmission capacities are currently available:

- I. **Hungary–Austria:** one 400 kV double circuit line and one 220 kV double circuit line. The current capacity available for electricity trading along the border (NTC) is 500 MW from Hungary to Austria and 500 MW from Austria to Hungary.
- II. **Hungary–Slovakia:** two 400 kV transmission lines. The current capacity available for electricity trading along the border (NTC) is 600 MW from Hungary to Slovakia and 1150 MW from Slovakia to Hungary.
- III. **Hungary–Ukraine:** one 750 kV, one 400 kV and one double circuit 220 kV transmission line. The current capacity available for electricity trading along the border (NTC) is 450 MW from Hungary to Ukraine and 455 MW from Ukraine to Hungary.
- IV. **Hungary–Romania:** a 400 kV single circuit transmission line and a 400 kV double circuit transmission line. The current capacity available for electricity trading along the border (NTC) is 400 MW from Hungary to Romania and 400 MW from Romania to Hungary. The construction of a further circuit has recently been completed between Békéscsaba and Nádap. The purpose of this line is to create a second junction in the direction of Oradea, but it is currently not yet fully operational.
- V. **Hungary–Serbia:** one 400 kV transmission line. The current capacity available for electricity trading along the border (NTC) is 600 MW in both directions.
- VI. **Hungary–Croatia:** two 400 kV double circuit transmission lines. The current capacity available for electricity trading along the border (NTC) is 1 000 MW from Hungary to Croatia and 500 MW from Croatia to Hungary.

In the past years, multiple 400 kV cross-border interconnection lines have been established in Hungary (Hévíz–Zerjavinec; Békéscsaba–Nádap; Pécs–Ernestinovo, Szombathely–Vienna), and the related substations have been reconstructed. The Győr–Vienna connection has been cut, and two further cross-border lines (Sajóvátka–Rimavská Sobota; Hévíz–Zerjavinec Slovenian branch point) are planned to be established, at a yet unspecified date.

In compliance with UCTE and ENTSO-E specifications, the international connections and transmission capacities of the Hungarian electricity system currently enables commercial transactions of sufficient extent, security and a potential for flexible diversification.

(e)How is the acceleration of grid infrastructure authorisation procedures addressed? What is the current state and average time for getting approval? How will it be improved? (Please refer to current status and legislation, bottlenecks detected and plans to streamline procedure with timeframe of implementation and expected results.)

The authorisation procedures related to grid infrastructures are diverse. The Act on the National Spatial Plan and the lower level County Spatial Plans require a land use permit to be obtained, while sectoral laws on electricity require energy and technical safety permits, and other laws require environmental permits, etc.

The procedure for declaring lines to be public can be classified among electricity authorisation procedures; Article 66(9), Article 85(4), Article 86(5) and Article 159(n) of the EA. Pursuant to Article 168(4) of the EA, the administrative deadline is three months.

Authorisation procedures of the construction authority in the electricity industry are governed by Government Decree No 382/2007 (XII. 23.). According to Article 117(2) of the EA, the administrative deadline for the procedure of the authority is 45 work days. With a view to simplifying the authorisation procedures, the Government is planning to merge certain procedures and to introduce and accelerate an electronic authorisation procedure (point 4.2.1).

A. Current state of authorisation procedures relating to grid infrastructure: description of current legislation

Authorisation procedures relating to grid infrastructure currently consist of the following main steps:

1. Environmental permit: issued by the Inspectorate for Environment and Water; the official duration of the procedure is 45 work days.
2. Construction permit: issued by the HTLO; the official duration of the procedure is 45 work days.
3. Network interconnection agreement: issued by the TSO (MAVIR) in the case of connection to the transmission network, in accordance with the procedure regulated by the terms of business of MAVIR.
4. Establishment and operation permit issued by the Office: establishment and operation of a private line, modification of the capacity of the line, and suspension of its operation
 - the establishment and termination of a direct line, with the exception of direct lines supplying users on the premises of the power plant;
 - the establishment and operation of a private line, modification of the capacity of the line, and suspension of its operation is not conditional on a permit if it is a complete private line within a site of use.
5. Declaration of a line as public: the official duration of the procedure is three months.

In addition to the abovementioned authorities, other special authorities also participate in the authorisation procedure. The issuing of environmental permits can involve the participation of several special authorities, while the HTLO can involve additional special authorities in the issuing of construction permits if necessary.

As regards network interconnection agreements, the investor must prepare a detailed interconnection plan, which must, in the case of producers connecting to the distribution network, be approved by the TSO, following the approval of the distributor. In the case of connecting to the transmission network, the procedure is carried out by the TSO alone. During the evaluation of connections, the TSO is required to supervise, in addition to checking compliance with other technical conditions linked to the system operator (availability of the IT systems required for regulation activities), alignment with mandatory developments approved in the network development plan during its procedure. If the plan is approved, the TSO concludes the contract within a few weeks time. The contract remains valid for two years. If the plan is not approved, a new procedure is initiated in order to reach an agreement.

B. Duration of authorisation procedures relating to grid infrastructure

As described above, the duration of the most important steps is regulated. However, in reality the full procedure can last far longer than the specified duration if this is necessitated by compliance with the specifications of the special authorities, or if procedures with the property owners during the construction of the grid are protracted. In such cases, the duration can even exceed one year. Taking into account the above, the flexibility of the special authorities can be improved in several cases, which can contribute greatly to the shortening of procedural durations. The shortening of procedural durations is an essential objective of plans for the simplification of procedures.

(f) How is coordination between grid infrastructure approval and other administrative planning procedures ensured?

According to Article 3(36) of the EA, *Public network* shall mean a transmission or distribution network that is necessary for the reliable and effective operation of the electricity system. Pursuant to Article 66(9), Article 85(4), Article 86(5) and Article 159(n) of the EA, the Office decides on declaring lines as public, including declaring them as transmission or distribution lines, on the basis of the proposal of the transmission system operator.

According to Article 132(1) of the EA, the Authority may grant cable rights to the investor or the licensee of the production line to construct the production lines of power plants with a capacity of more than 50 MW and power plants utilising renewable energy sources on a third-party property, provided that such construction work does not significantly obstruct normal use of that property. Based on the cable rights permit, the investor or the licensee of the production line shall have the rights and obligations under Article 122(2) and Articles 124 to 126.

(g)Are priority connection rights or reserved connection capacities provided for new installations producing electricity from renewable energy sources?

According to Article 35 of the EA:

“(2) The conditions of access to transmission and distribution networks must ensure equal treatment, must not provide grounds for abuse, must not contain unjustified restrictions and must not jeopardize the security of supply and the specified quality of services. The preferential treatment under paragraph (3) shall not be considered to constitute a violation of the principle of equal treatment.

(3) Subject to the conditions laid down in specific other legislation, network licensees shall give preference to electricity generators that use technologies free of carbon dioxide emissions, renewable energy sources, waste or cogeneration to generate electricity, in connection with the operation of, and access to, networks”

This preference primarily concerns the costs of network interconnection. [MET Decree No 117/2007 (XII. 29.)]

According to Article 36 of the EA:

“(1) The transmission system operator may refuse access to the transmission network and the distribution network affecting the operation of the transmission network, and limit, reduce or suspend contracted supplies subject to the conditions laid down in specific other legislation and in an objective and transparent manner and without prejudice to the principle of equal treatment. Service may be limited, reduced or suspended in advance, or during the operation of the electricity system in the following cases:

...(g) the import of electricity is detrimental to the generation or use of renewable energy sources, energy generated from waste or cogenerated electricity ...”

Pursuant to Article 4(4) of MET Decree No 117/2007 (XII. 29.) on the financial and technical conditions of connecting to the public electricity network, network expansion and the installation of a connection device must be carried out by the network licensee by taking into account the least cost principle. If this cost (a) is sufficient only to enable the connection of the power plant concerned, the maximum amount that may be charged as a connection fee shall be equal to the activated value of investment, (b) if it is sufficient to enable the connection of not just the power plant concerned, a proportionate part of the activated value of the investment may be charged as a connection fee.

(5) If for the production of the electricity generated or electricity cogenerated with effective heat during the time of selling the amount of electricity subject to the mandatory off-take obligation specified in specific other legislation the power plant unit being put into commercial operation uses, in addition to other primary energy sources, a certified minimum (per calendar year) of (a) 50 percent renewable energy sources, the connection fee payable must not exceed 70 percent of the amount under paragraph (4), (b) 90 percent renewable energy sources, the connection fee payable must not exceed 50 percent of the amount under paragraph (4)..

These facilities are included in the plans, and ensure the reliable operation of the system through strengthening and developing the system.

(h) *Are any renewable installations ready to come online but not connected due to capacity limitations of the grid? If so, what steps are taken to resolve this and by when is it expected to be solved?*

We are not aware of the existence of such renewable installations.

(i) *Are the rules on cost sharing and bearing of network technical adaptations set up and published by transmission and distribution system operators? If so, where? How is it ensured that these rules are based on objective, transparent and non-discriminatory criteria? Are there special rules for producers located in peripheral regions and regions with low population density? (Cost bearing rules define which part of the costs is covered by the generator wishing to be connected and which part by the transmission or distribution system operator. Cost sharing rules define how the necessary cost should be distributed between subsequently connected producers that all benefit from the same reinforcements or new lines.)*

The technical and financial conditions of connecting to the grid are regulated by MET Decree No 117/2007 (XII. 29.). This decree contains specific provisions for the preferential conditions of the connection of power plants utilising renewable energy sources, including cost sharing.

Following the least cost principle, the development and operation of transmission and distribution networks in Hungary is the statutory obligation of the operator of the public network. The costs of the development and operation of the network are covered by the (transmission and distribution) network access fees. There is a uniform network access fee in Hungary, which is announced by the minister in charge on the basis of the proposal of the Office. Depending on user density, amounts paid in consumption-based network access fees vary in different regions of the country. In order to ensure the provision of a uniform standard of supply and that there is sufficient coverage for operational and development costs everywhere, there is a so-called equalising mechanism between the various distribution companies.

If the network development required in connection with the connection of a power plant fulfils not just the needs of that particular plant, then only a proportionate part of the activated value of the investment may be charged to that plant. The law is uniformly applicable to the entire area of Hungary, regardless of population density.

(j) *Please describe how the costs of connection and technical adaptation are attributed to producers and/or transmission and/or distribution system operators? How are transmission and distribution system operators able to recover these investment costs? Is any modification of these cost bearing rules planned in the future? What changes do you envisage and what results are expected? (There are several options for distributing grid connection costs. Member States are likely to choose one or a combination of these. According to the "deep" connection cost charging the developer of the installation generating electricity from renewable energy sources bears several grid infrastructure related costs (grid connection, grid reinforcement, and extension). Another approach is the "shallow" connection cost charging, meaning that the developer bears only the grid connection cost, but not the costs of reinforcement and extension (this is built into the grid tariffs and paid by the customers). A further variant is when all connection costs are socialised and covered by the grid tariffs.)*

According to Article 7 of the EA:

“(5) During the establishment of new generation capacities utilising renewable energy sources, the transmission system operator and the distribution network licensees shall be obliged, subject to the conditions and to the extent specified in specific other legislation, to bear the costs of technical adaptations to the public network (in particular grid connections and grid reinforcements), which create the technical conditions of connection to the distribution and transmission network. The Office shall take into account the part of these costs which is borne by the network licensees to a reasonable extent when conducting the next cost review during the regulation of the network access fees.”

The sharing of the costs of public network investments required for the connection of a power plant is provided for in Article 4(4) to (6) of MET Decree No 117/2007 (XII. 29.):

“(4) Network expansion and the installation of a connection device must be carried out by the network licensee by taking into account the least cost principle. If this cost (a) is sufficient only to enable the connection of the power plant concerned, the maximum amount that may be charged as a connection fee shall be equal to the activated value of investment, (b) if it is sufficient to enable the connection of not just the power plant concerned, a proportionate part of the activated value of the investment may be charged as a connection fee.

(5) If for the production of the electricity generated or electricity cogenerated with effective heat during the time of selling the amount of electricity subject to the mandatory off-take obligation specified in specific other legislation the power plant unit being put into commercial operation uses, in addition to other primary energy sources, a certified minimum (per calendar year) of (a) 50 percent renewable energy sources, the connection fee payable must not exceed 70 percent of the amount under paragraph (4), (b) 90 percent renewable energy sources, the connection fee payable must not exceed 50 percent of the amount under paragraph (4).”

(6) The connection fee discount under paragraph (5) must be taken into account as aid when determining the duration of the mandatory off-take obligation. System users may waive the connection fee discount under paragraph (5), having regard to sales under the mandatory off-take scheme.”

The costs of investments financed by network licensees are, pursuant to MET Decree No 119/2007 (XII. 29.) on network access fees, covered by the payments made by the users. Power plants do not pay network access fees in Hungary, but facilities utilising non-renewable energy sources have to bear their connection costs themselves.

(k) *Are there rules for sharing the costs between initially and subsequently connected producers? If not, how are the benefits for subsequently connected producers taken into account?*

According to Article 7(5) and (6) of MET Decree No 117/2007 (XII. 29.):

“(5) If within 10 years following the commissioning of a public line it is used to fulfil the needs of a further system user, the network licensee shall be entitled to charge a public line establishment fee in proportion to the new system user. The fee payable by the newly connected system user shall be equal to the product of the establishment fee increased in line with the rate of inflation and the ratio of the output requested by the newly connected system user to the total output available to all system users connected to that particular network.

(6) The network licensee shall be obliged to refund the fee collected from the newly connected system user to the system users who established the network as specified in the connection agreement between them.”

(l) *How will it be ensured that transmission and distribution system operators provide new producers wishing to be connected with the necessary information on costs, a precise timetable for processing their requests and an indicative timetable for their grid connection?*

Annex No 2 to Government Decree No 273/2007 (X. 19.) on the Implementation of the EA (hereinafter referred to as Imp.), entitled “Electricity Network Connection and Network Access Regulations” (ENR), contains the rules of the connection procedure. Further detailed rules are laid down in the operational and distribution regulations.

Necessary information is contained in the distribution regulations (which are approved by the Office). The procedure varies depending on the size of the producer and the voltage of the network connection. The details of the authorisation procedure are presented in the flowchart in *Figure 4*, which is part of the regulations and illustrates the procedure for the connection of power plants to the distribution network. All information required for the second step has been attached, and includes relevant permits, technical data and deadlines.

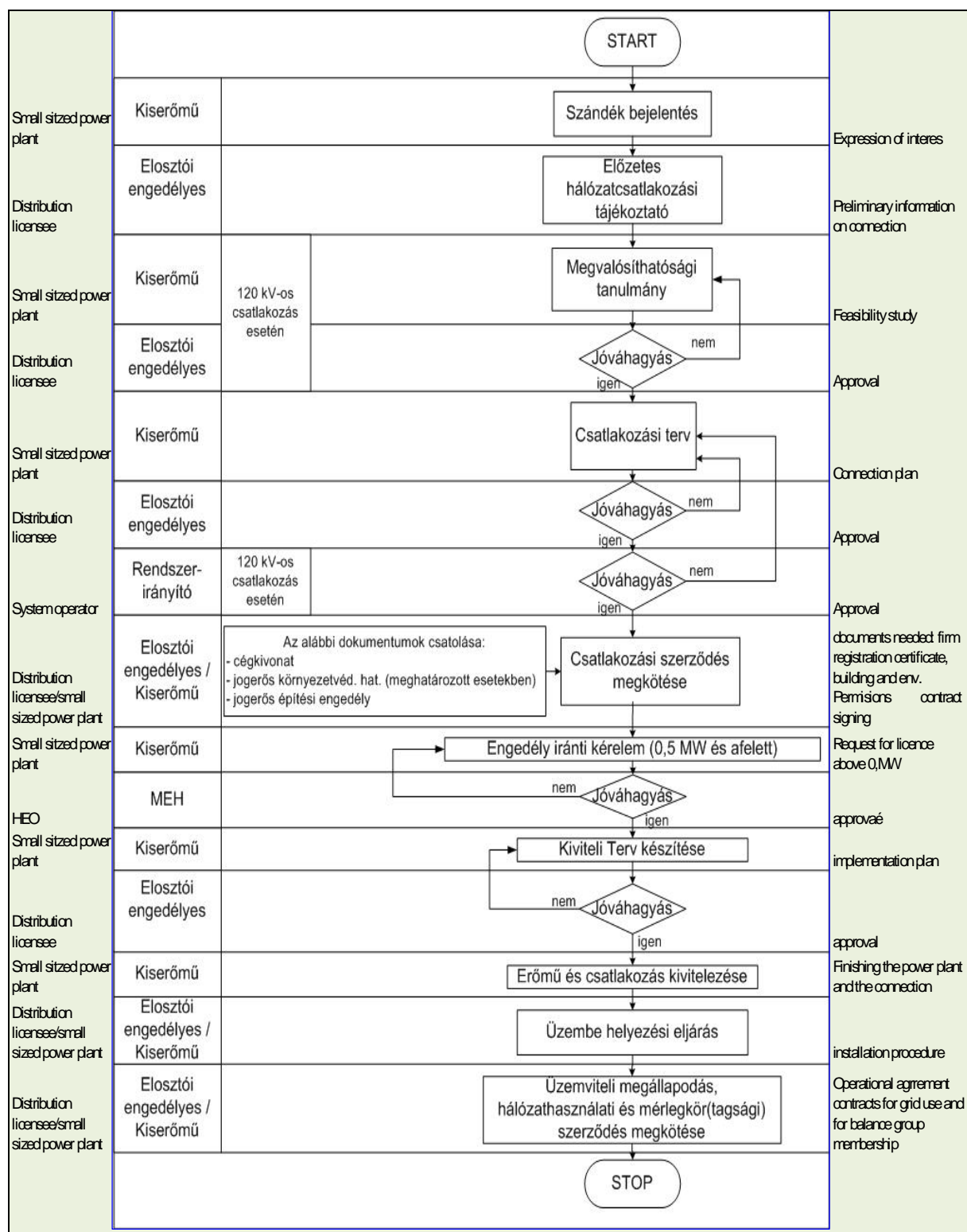


Figure 4: Authorisation procedure for connection to the electricity network

4.2.7. Electricity network operation¹³

(a)*How is the transmission and distribution of electricity from renewable energy sources guaranteed by transmission and distribution system operators? Is priority or guaranteed access ensured?*

According to Article 35 of the EA:

“(1) Network licensees shall make the transmission and distribution networks operated by them available to system users for the purpose of electricity transmission in exchange for the network access fees determined in accordance with Article 142 and subject to the obligation to conclude a contract.

(2) The conditions of access to transmission and distribution networks must ensure equal treatment, must not provide grounds for abuse, must not contain unjustified restrictions and must not jeopardize the security of supply and the specified quality of services. The preferential treatment under paragraph (3) shall not be considered to constitute a violation of the principle of equal treatment.

(3) Subject to the conditions laid down in specific other legislation, network licensees shall give preference to electricity generators that use technologies free of carbon dioxide emissions, renewable energy sources, waste or cogeneration to generate electricity, in connection with the operation of, and access to, networks.”

In accordance with the above provisions of the EA, the feeding of renewable energy sources into the network is ensured under the same conditions as those applying to non-renewable facilities.

(b)*How is it ensured that transmission system operators, when dispatching electricity generating installations give priority to those using renewable energy sources?*

According to Article 36 of the EA:

“(1) The transmission system operator may refuse access to the transmission network and the distribution network affecting the operation of the transmission network, and limit, reduce or suspend contracted supplies subject to the conditions laid down in specific other legislation and in an objective and transparent manner and without prejudice to the principle of equal treatment. Service may be limited, reduced or suspended in advance, or during the operation of the electricity system in the following cases:

...(g) the import of electricity is detrimental to the generation or use of renewable energy sources, energy generated from waste or cogenerated electricity ...”

¹³ Article 16(2), (7) and (8) of Directive 2009/28/EC

(c) *How are grid- and market-related operational measures taken in order to minimise the curtailment of electricity from renewable energy sources? What kinds of measures are planned and when is implementation expected?*

Based on Article 25(2) of the EA, when planning the development of the transmission and distribution network, account must be taken of the energy policy requirements of demand-side regulations and the facilitation of the generation of electricity from renewable energy sources and waste.

Currently there is no legislative obstacle to the generation of electricity from renewable energy sources. Several measures of the TSO facilitate the involvement of the widest possible scope of small-scale power plants utilising renewable energy sources in the regulatory process required for ensuring the balance of the system.

In order to ensure that the reserve capacities that can be used in connection with system-level services can be provided in accordance with the least cost principle, traders selling electricity generated outside the borders of the country could also apply during the tender announced by the system operator once a year. If it won, the system operator also concluded a contract for the provision of reserve capacities with the successful tenderer. The system operator maintains active relations with cooperative electricity systems in Hungary's neighbouring countries and in Europe, as well as with the system operators of countries participating in non-EU system cooperations, and has effective relations regarding the sharing of data. See the private law IT contract for cross-border electricity accounting concluded first by the system operators of 19, then 32 countries.

(d) *Is the energy regulatory authority informed about these measures? Does it have the competence to monitor and enforce implementation of these measures?*

If a producer who utilises renewable energy sources sells electricity, it gains a benefit when feeding in electricity. Its activities supervised by the Office, the system operator is responsible for the balance group of producers utilising renewable energy sources, and also ensures the equalisation of the balance group.

(e) *Are plants generating electricity from renewable energy sources integrated in the electricity market? Could you please describe how? What are their obligations regarding participation in the electricity market?*

Producers utilising renewable energy sources primarily sell electricity within a balance group separate from the free electricity market. They (usually) only enter the free electricity market after the termination (expiry) of their right to be part of the balance group. Producers utilising renewable energy sources can withdraw from the balance group for which the system operator is responsible and may join another balance group or may sell the electricity generated by them directly to the users or to traders, and may then return based on the prior notification of the producer.

In accordance with Article 2 of MET Decree No 109/2007 (XII. 23) members of the balance group of producers utilising renewable energy sources must indicate in advance their annual production schedule. The system operator, as the entity responsible for the balance group of producers utilising renewable energy sources,

buys the actual output of the balance group members at a regulated price specified by legislation. It publishes relevant data monthly. Based on actual production data and the submitted schedules the entity responsible for the balance group determines differences from the production schedule and issues invoices for the relevant surcharges. The entity responsible for the balance group allocates the electricity produced within the balance group of producers utilising renewable energy sources to traders, producers that supply users, and users who purchase electricity from abroad for their own purposes. The allocated electricity is sold by the traders and producers to the users. During the allocation procedure the entity responsible for the balance group determines the amount of electricity that the traders, the producers supplying users, and the users importing electricity from abroad for their own use must buy, taking into account the share of the individual market actors participating in the whole electricity trade. In accordance with the relevant provisions of the law, the entity responsible for the balance group informs the energy regulatory Office about the sales data and appropriate allocations of the members of the balance group.

<p><i>(f) What are the rules for charging transmission and distribution tariffs to generators of electricity from renewable energy sources?</i></p>

The rules [MET Decree No 119/2007 (XII.29)] uniformly apply to all generators. In the current situation, which is regulated by MET Decree No 119/2007 (XII.29), a zero transmission and distribution fee is applied to generators. The costs of system use, including network losses, system maintenance, the compensation of transport and other operational costs within the TSO, and capital-related expenditures, are covered 100 percent by the system users (end-consumers). The law contains a rule for the system use fee for transmission and distribution, and includes a system use fee to be paid by generators during feed-in, but its value is zero.

4.2.8. Biogas integration into the natural gas network¹⁴

“The domestic level of establishment and condition of the natural gas infrastructure, as well as domestic natural gas industry culture, are significant elements of national wealth. The economic activities built upon these could represent one of the strengths of Hungary in regional economic competition”

Excerpt from the New Széchenyi Plan, 28 July 2010

In different sectors and in different ways, biogas could play an important part with regard to energy use. Biogas can be used to generate electricity or heat, or in CHP cogeneration plants. Purified and compressed biogas can be used as fuel in transportation or can be fed into the gas network.

Biogas is currently produced at twelve sites in Hungary, one part of which is based on agricultural by-products (animal manure, plant products and by-products: silage maize, sweet sorghum, etc.), while the other segment is represented by biogas plants connected to communal waste water treatment facilities. Forty additional plants are currently under planning or construction. The vast majority of these have been granted aid through the measure under the New Hungary Rural Development Plan entitled “Modernisation of animal holdings under Decree No 27/2007 (IV. 17.) of the Minister for Agriculture and Rural Development on aid granted for the modernisation of animal holdings from the European Agricultural Fund for Rural Development.” The construction of biogas plants is impeded by several factors. In many cases the purchase price of green electricity under the mandatory off-take scheme does not produce returns within reasonable time unless the “waste heat” generated during biogas production is utilised. As a result, financing institutions often refuse to grant credits. In order to ensure that more plants are built in the near future, the green electricity off-take scheme must be reviewed, and its differentiation could be justified. When differentiating green electricity, several considerations must be taken into account: environmental impact, job creation, raw materials used, production procedure, size, purpose of heat utilisation, controllability, etc.

Measures that will be adopted in the upcoming period must pay special attention to small-capacity biogas production, considering that in many cases, appropriate raw materials are available in low quantities. Preference must be given to production installations that primarily use their own renewable energy.

(a) *How is it ensured that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources?*

The transmission and distribution tariff applies uniformly to natural gas. The law (GSA, Act XL of 2008) considers purified biogas to be gas equivalent in quality to natural gas, and thus there is no separate biogas tariff.

(b) *Has any assessment been carried out on the need to extend the gas network infrastructure to facilitate the integration of gas from renewable sources? What is the result? If not, will there be such an assessment?*

¹⁴ Article 16(7), (9) and (10) of Directive 2009/28/EC

The Hungarian gas network infrastructure is extremely advanced and reaches almost all settlements; its coverage meets the consumers' demands. The system operators carry out a ten-year survey of demands every year, and decide on the development of capacities. Standard biogas equivalent in quality to natural gas can be fed into the system, and therefore it is not unreasonable to establish parallel systems. Taking this into account, the measures of the upcoming period must include a review of the feed-in conditions laid down in Act XL of 2008 on Natural Gas Supply (gas equivalent in quality to natural gas, network access, the detailed rules of a off-take support system to facilitate the use of gas equivalent in quality to natural gas).

<p>(c) <i>Are technical rules on network connection and connection tariffs for biogas published? Where are these rules published?</i></p>
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Due to the definition of the Natural Gas Act (Act XL of 2008) [see point 4.2.8(a)] this is not necessary, as standard quality biogas is considered natural gas, and the connection conditions applicable to natural gas producers are already provided for [see Articles 66 and 66/A of *Government Decree No 19/2009 (I. 30.) on the Implementation of the Provisions of Act XL of 2008 on Natural Gas Supply*]. The rules on the connection of natural gas producers are laid down in the network code, the publication of which is mandatory. According to Article 70 of *Act XL of 2008 on Natural Gas Supply*, the connection of producers of biogas equivalent in quality to natural gas to the transmission and distribution lines must be treated as a priority. Only a partial estimate can be made as to the costs of the connection of biogas to the network, as these always depend on local technical solutions.

4.2.9. District heating and cooling infrastructure development¹⁵

“The focus of domestic energy policy will be the facilitation of an energy infrastructure and supply of services which best serve the growth of the domestic economy. This must be based on economic actors and the population obtaining these services at a high quality, high reliability and competitive prices.”

Excerpt from the New Széchenyi Plan, 28 July 2010

In this sub-chapter we present the criteria for the development of district heating networks and the direction of the planned developments. District heating networks play an important part in ensuring the sustainability of the use of renewable energy sources, especially biomass, for heating purposes, and the optimal balance between environmental, social and economic effects. Their modernisation and development are inseparable, integral parts of our efforts to develop a green economy.

(a) The necessity of the creation of a new district heating and cooling infrastructure using renewable energy sources and contributing to the 2020 target

In the heating sector, and especially in the case of regional small-scale combined biomass and electricity plants, we are planning on realising the use of heat energy through district heating systems. Part of the district heating systems has already been established but require reconstruction and modernisation, and new infrastructures must be established as well. On one hand, these serve the utilisation of renewable energy sources themselves (e.g. biomass boiler plants, thermal wells, etc.), and on the other hand they bring heat energy from renewable sources to the consumers (new line networks, thermal centres, etc.).

(b) Plans for supporting the establishment of the infrastructure

Under the EEOP for the period between 2007 and 2013, which is related to the New Hungary Development Plan and has been approved by the European Commission, an aid budget of approximately HUF 68 billion is available to assist in the utilisation of renewable energy sources, including the creation of district heating and cooling systems using renewable sources.

These include the following, currently operating tender schemes for the establishment of district heating and cooling systems:

- Tender scheme entitled “Satisfying local heating and cooling needs through renewable energy sources” (code number **EEOP-2009-4.2.0/B**). The aim of the scheme is to spread renewable-based energy production that results in less environmental loads, and to increase the role of renewable energy sources in heat generation and their share in total energy use. The planned financial allocation available is HUF 6 billion for the years 2009–2010, and is funded by the European Regional Development Fund and the budget of the Republic of Hungary.
- Tender scheme entitled “Renewable-based electricity generation, heat and electricity cogeneration and biomethane production” (code number **EEOP-2009-4.4.0**). The aim of the scheme is to spread renewable-based energy production

¹⁵ Article 16(11) of Directive 2009/28/EC

that results in less environmental loads, and more specifically, to increase the role of heat and electricity generation based on renewable energy sources within total energy use, and thereby to reduce carbon dioxide emissions. The scheme primarily supports the establishment of electricity generating capacities producing for the cooperative electricity network, and secondarily those operating in island mode. The planned financial allocation available is HUF 10 billion for the years 2009–2010, and is co-financed by the European Regional Development Fund and the budget of the Republic of Hungary.

We are planning to develop district heating infrastructure by drawing on the existing EEOP schemes, and the competent ministry is also planning on developing the distribution networks of renewable facilities under the new energy operational programme planned to be launched in 2014. Furthermore, we are planning to examine opportunities for the application of renewable energy sources during the reconstruction of existing distribution networks.

When developing district heating schemes, measures must be coordinated in such a way that both the service providers and the consumers have a stake in modernisation, the obvious result of which will be the replacement of fossil gas or other traditional resources, and the achievement of cost-effectiveness through energy efficiency and energy saving. The development programmes of the upcoming period must be coordinated in such a way that, besides the modernisation of the district heating system, the pipe network and end-user systems are also upgraded.

4.2.10. Biofuels and other bioliquids – sustainability criteria and verification of compliance¹⁶

“Considering that mature technologies for the production of second generation fuels are only partially available, Hungary produces, following the principle of prudence, cereals and oil seeds at an appropriate quantity and quality for secure domestic food supply. Meanwhile there is a sufficient surplus of cereals (maize) available, which could be used for other, alternative purposes.”

Excerpt from the New Széchenyi Plan, 28 July 2010

This sub-chapter contains information on the legislative background ensuring the sustainability of biofuel production. In accordance with international practices and essential national economic interests, the key issue in these regulations is to maintain a balance between crop production for energy purposes and food supply, and to conserve natural values.

The following part of the national action plan should explain Member States’ future strategy regarding fulfilment of the sustainability criteria for biofuels and bioliquids and verification of compliance with the scheme.

(a) *How will the sustainability criteria for biofuels and bioliquids be implemented at national level? (Is there legislation planned for implementation? What will be the institutional setup?)*

Regulations for the use of biofuels have existed in Hungary since 2005. In the first period, which lasted until 2009, we provided incentives for the use of biofuels through tax reliefs. Excise duties on bioethanol and biodiesel admixed to fuels, as well as on their ETBE bioethanol component, were recoverable. The detailed rules on the use of biofuels and other renewable fuels for transport purposes were laid down in Government Decree No 42/2005 (III. 10.).

In 2009 the tax relief on biofuels admixed to petrol and motor diesel oil was abolished, and was replaced by a marketing obligation (imposing heavy fines in the case of failure to fulfil this obligation). The mandatory percentage fuel producers, importers and distributors are obliged to market are laid down in the implementation decree of Act XCVII of 2010 on the promotion of the use of renewable energy for transport purposes and the reduction of greenhouse gas emissions from energy used in transport (hereinafter referred to as BFA), Government Decree No 343/2010 (XII. 28.) on the requirements and certification of sustainable biofuel production.

Based on the provisions of the BFA, beginning with 2011 the mandatory admixture percentage can only be fulfilled using biofuel that is certified to have been produced in a sustainable way. The sustainability requirements have been established on the basis of the RED and FQD Directives. No separate institution has been created for checking compliance with these requirements; the certification system for raw materials and, based on that, the checking of the other parts of the value chain, will be set up within the CAO.

¹⁶ Articles 17 to 21 of Directive 2009/28/EC

The laws lay down the conditions that were stipulated by the Directive, in the case of which the produced fuel of biological origin can be counted towards the fulfilment of the national target, and towards the fulfilment of the biofuel marketing obligation specified for marketers. The fulfilment of sustainability criteria is a condition for the tax relief, which is currently available for E85 fuel and, within a specific scope, to RME used in pure form.

(b)*How will it be ensured that biofuels and bioliquids that are counted towards the national renewable target, towards national renewable energy obligations and/or are eligible for financial support comply with the sustainability criteria set down in Article 17(2) to (5) of Directive 2009/28/EC? (Will there be a national institution/body responsible for monitoring/verifying compliance with the criteria?)*

Based on the BFA, only biofuel that is certified, in accordance with the conditions laid down in the BFA Imp., to have been produced sustainably can be counted towards the fulfilment of the national obligation, and tax reliefs and other financial support can also only be applied for in the case of such biofuels. Compliance with Article 17(2) to (5) of the RED is specified by Decree No 42/2010 (XII. 20.) of the Minister for Rural Development laying down the detailed rules for the regional delimitation of the sustainable production of raw materials for biofuels.

The creation of a separate institution is not justified; the task can be performed by existing authorities (CAO and the tax authority). The scheme is basically aimed at the expansion and use of existing registration systems. The fact that the requirements under Article 17(6) of the RED also represent eligibility criteria for agricultural aid, and that the produced biofuel is an excise good strictly monitored by the tax authority and subject to an accounting obligation, has also been taken into account.

In addition to this, external participants (accreditors) with appropriate expertise are planned to be involved in the accounting of GHG emissions.

As from 2011, support and incentive schemes (e.g. lower tax rates on specific biofuels) will only apply to biofuel certified to be sustainable, and it will only be possible to fulfil the mandatory admixture percentage with sustainably produced biofuels.

(c)*If a national authority/body will monitor the fulfilment of the criteria, does such a national authority/body already exist? If so, please specify. If not, when is it envisaged to be established?*

Monitoring of the fulfilment of the sustainability criteria for the production of the raw materials used for biofuels, as well as the certification of the GHG emission of production, will be performed by the CAO. The CAO is a national authority under the direction of the Ministry for Rural Development, the member of the Government in charge of agriculture. With the exception of the field of agricultural aid and other special matters, the CAO fulfils the function of agricultural authority, and also cooperates in the checking of certain aid relationships. The tax authority is also an already existing organisation.

Part of the data and records required for checking and certification tasks concerning the fulfilment of sustainability criteria (the Integrated Administration and Control System related to agricultural aid, the client registration system, the Agricultural Land Parcel Identification System (MePAR) and the monitoring data registration system) are already available at the paying agency for EAGF, EAFRD and EECF aid (ARDA).

(d)*Please provide information on the existence of national law on land zoning and national land register for verifying compliance with Article 17(3) to (5) of Directive 2009/28/EC. How economic operators can access to this information? (Please provide information on the existence of rules and distinction between different land statuses, like biodiversity area, protected area etc; and on the competent national authority who will monitor this land register and changes in land status.)*

In this respect, Act CXLI of 1997 on Real Property Registration can be considered the national law on national land registration. The land administration (real property authority), however, fulfils the function of registration authority with regard to the lands under Article 17(3) to (5) of the RED. The right to initiate procedures for the classification of these areas according to their legal nature falls within the competence of the forestry authority and the nature conservation authority. Rights, facts, data and land use designations that can be entered into the real property register in connection with some of the types of land specified in Article 17(3) to (5) of the RED can only be entered into that register on the basis of a request by the abovementioned authorities and a law issued by the supervisory body of those authorities. However, the majority of the areas defined by the RED cannot be entered into the real property register due to a lack of corresponding area categories under the national legal system.

Real property registration data are interpolated into the Agricultural Land Parcel Identification System (MePAR), which is connected to the use of EAGF aid. MePAR also partially includes the Natura 2000 status of areas.

Protected areas are specified by multiple laws (the selection of sites under nature protection has been implemented in multiple steps), and the definition of sites belonging to Natura 2000 is also published in legislation [see point (e)].

The area lists under Article 17(3) to (5) of the RED are planned to be published electronically, so that economic actors can directly access this information and can

check whether their land parcels are excluded areas under Article 17(3) to (5) of the RED (we are planning to indicate geographic delimitations in a uniform, integrated list enabling identification according to the MePAR breakdown, and also according to topographical parcel numbers if necessary).

(e) *As far as protected areas are concerned, please provide information under which national, European or international protection regime they are classified.*

National level: on the basis of the authority granted by Act LIII of 1996 on Nature Conservation (NCA), protected natural sites in Hungary are declared to be under protection

- by a decree of the minister in charge of nature conservation in the case of protected natural sites of national importance;
- by a decree of the competent local government in the case of protected natural sites of local importance.

According to Article 28(1) of the NCA, protected natural sites can be national parks, landscape protection areas, nature conservation sites and natural monuments.

The protected status of certain protected natural sites specified by the NCA is provided for by the NCA itself (“*ex lege*” protection).

European Union level: (Based on the definition of the NCA, Natura 2000 sites are not considered protected natural sites, but due to their status as protected sites of Community importance, they are also under nature protection under Hungarian law, which justifies their inclusion in the reply.) On account of its EU membership, Hungary undertook to designate sites to be included in the EU's Natura 2000 network. It fulfilled this obligation through the publication of Government Decree No 275/2004 (X. 8.) on nature conservation sites of European Community importance and Decree No 14/2010 (V. 11.) of the Minister for Environment and Water.

Act LIII of 1996 (NCA) specifies the types of sites under nature protection in accordance with the regulations in force and Hungary's international commitments. As a consequence, the categorisation of sites under nature protection is quite intricate, and there are multiple parallel “classifications.” The existence of the various types is justified by different reasons, authorisations and obligations.

The **various groups** and related sub-types are the following:

(1) Based on the importance of protection and the entity entitled to declare them to be under protection, protected natural sites can be divided into the following two types:

- (a) protected natural sites of national importance: these are declared to be under protection by way of ministerial decrees, and include sites declared to be under protection by the minister and his legal predecessors. All *ex lege* protected natural sites are considered to be of national importance.
- (b) protected natural sites of local importance: the decision on declaring them to be under protection is taken by the municipal council of the local government

concerned by way of a decree, and sites declared to be under protection by legal predecessors also belong here.

(2) Based on the extent, purpose and national and international importance of protection, protected natural sites can be:

- (a) National parks, meaning large areas of the country, which have not been substantially altered in their characteristic natural features, and the primary purpose of which is the protection of natural botanical and zoological, geological, hydrological, landscape and historic cultural values of special importance, the maintenance of biodiversity and the undisturbed functioning of natural systems, and the promotion of education, scientific research and recreation. There are currently ten national parks in Hungary, which are the following, along with the year of publication of the legal basis of their founding: Hortobágy National Park 1972, Kiskunság National Park 1974, Bükk National Park 1976, Aggtelek National Park 1984, Fertő-Hanság National Park 1991, Danube-Dráva National Park 1996, Körös-Maros National Park 1997, Balaton-Highlands National Park 1997, Danube-Ipoly National Park 1997, • rség National Park 2002. National parks can only be created by the minister by way of legislation.
- (b) Landscape protection areas, meaning large, generally contiguous areas and landscapes of the country, which are rich in characteristic natural and landscape features, and where the interaction between man and nature has created an aesthetically, culturally and naturally well-identifiable character, and the primary purpose of which is the conservation of landscape and natural values. There are currently 38 landscape protection areas in Hungary. Landscape protection areas can only be created by the minister by way of legislation.
- (c) Nature conservation sites, meaning smaller contiguous areas of the country, which are rich in characteristic and special natural values and the primary purpose of which is to conserve one or more natural values or an interconnected system of such values. There are currently 159 nature conservation sites in Hungary. Nature conservation sites of national importance can be created by the minister by way of legislation, while nature conservation sites of local importance can be created by the municipal council of the local government concerned by way of legislation.
- (d) Natural monuments, meaning individual natural values or formations of special significance, and the areas serving their protection. Natural monuments of national importance can be created by the minister by way of legislation (there is currently one such ministerial decree), while natural monuments of local importance can be created by the municipal councils of local governments by way of a local government decree. Springs, sinkholes, kunhalom mounds and motte-and-baileys protected *ex lege* are considered natural monuments.

(3) By operation of the law ("*ex lege*"):

- (a) protected natural sites include all
 - marshlands: areas of land which are permanently or periodically exposed to the effects of water or the soil of which is periodically saturated with water, and a significant part of which is inhabited by marshland communities or

marshland organisms, or the soil of which is characterised by turf in varying stages of formation or by turf formation processes. (The list of marshlands protected by operation of Act LIII of 1996 on Nature Conservation was published in information document no 8005/2001 (MK 156.) of the Minister for Environment)

- saline lakes: natural or semi-natural aquatic habitats the bed of which is covered permanently or periodically by surface water containing at least 600 mg/litre dissolved minerals predominantly consisting of sodium cations, and which are inhabited by saline communities. (The list of saline lakes protected by operation of Act LIII of 1996 on Nature Conservation was published in information document no 8006/2001 (MK 156.) of the Minister for Environment)

(b) natural monuments include all

- kunhalom mounds: raised earthworks significant from a cultural historic, cultural heritage, landscape or wildlife point of view, which can constitute defining features of the landscape due to their prominent nature.
- motte-and-baileys: linear or closed earthworks constructed for defensive purposes, which have survived as identifiable topographical features and are of historic, cultural heritage, geomorphological or landscape value.
- springs: natural surfacing points of groundwater, if their water yield persistently exceeds 5 litres/minute, even if they periodically run dry;
- sinkholes: places where permanent or ephemeral water courses are absorbed into karst;

(c) natural values include all caves: natural cavities in the rock constituting the crust of the Earth, the longitudinal axis of which exceeds two metres, and the size of which allows, in their present state or after their natural filling has been removed, for a human to enter them.

(4) Special protection categories:

(a) scientific reserves: the minister may designate national parks, landscape protection areas or nature conservation sites of national importance or specific parts of them for scientific purposes by way of a decree.

(b) biosphere reserves: national parks, landscape protection areas, nature conservation sites or specific parts of them can, if they represent exceptional scientific value by international standards, be declared biosphere reserves by the minister, in accordance with international commitments. Within biosphere reserves, a core area must be designated for the direct protection of the exceptional natural value concerned. Hungary's biosphere reserves have been proclaimed by Decree No 7/2007 (III. 22.) of the Minister for Environment and Water. There are currently 5 biosphere reserves in Hungary.

(c) forest reserves: in agreement with the minister in charge of agricultural policy, the minister declares forest areas serving the protection of natural or semi-natural forest communities, the free course of natural processes and the conducting of research as forest reserves by way of a decree. Forest reserves must also be assigned to a protection category (national park, landscape protection area, nature conservation site, natural monument).

(d) nature park: with regard to natural sites, protected natural sites and specific parts of those, the minister may approve the use of the designation "nature park," if the relevant conditions established and accepted in international practice are met.

Nature parks are larger areas of the country rich in natural, landscape and historic cultural values and serve active relaxation, recreation, recovery and sustainable tourism in nature, as well as nature conservation education, teaching, information and nature-friendly farming.

(5) Areas belonging to the protection categories specified by legal acts of the European Union:

- Natura 2000 sites (nature conservation sites of European Community importance): areas designated as special bird protection areas, special nature conservation and priority nature conservation sites by specific legislation, and special nature conservation and priority nature conservation sites approved by the European Union. In other, more general words, Natura 2000 is a contiguous European ecological network which ensures the preservation of biodiversity through the protection of natural habitat types, wild fauna and flora of Community importance, and contributes to the maintenance or restoration of their favourable nature conservation status.
- The Natura 2000 network contains sites designated on the basis of two nature conservation directives of the European Union: special bird protection areas designated through the implementation of the Birds Directive (Directive 79/409 EEC; the number of the codified Directive after the amendments became 2009/147/EC), and special and priority nature conservation sites designated on the basis of the Habitats Directive (Directive 92/43 EEC).

Provisions on Hungary's Natura 2000 sites are laid down in Government Decree No 275/2004 (X. 8.) on nature conservation sites of European Community importance. There are currently 523 Natura 2000 sites in Hungary. Land parcels concerned by nature conservation sites of European Community importance are listed in MEW Decree No 14/2010 (V. 11.).

(6) Sites designated on the basis of international memberships, commitments or conventions

- (a) Wetlands of international importance; Ramsar sites: The "The Convention on Wetlands of International Importance, especially as Waterfowl Habitat" adopted on 2 February 1971 in Ramsar (Iran) was proclaimed by Decree-Law 28 of 1979 in Hungary (the consolidated version including the amendments of 1982 and 1987 was proclaimed by Act XLII of 1993). The aim of the Convention is to promote the preservation of wetlands habitats, and to facilitate their rational utilisation, as well as the establishment of the necessary legal and institutional framework. There are currently 28 Ramsar sites in Hungary.
- (b) European Diploma areas: Founded in 1965, the European Diploma is awarded by the **Council of Europe** upon the request of the Member States to natural sites managed at a high standard and under appropriate legal protection, which are of international significance to the protection of European natural heritage due to their scientific and aesthetic value. There are currently 3 areas in Hungary awarded with the European Diploma.
- (c) World Heritage: As a result of the extensive organising work of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the multilateral international "Convention Concerning the Protection of World Cultural and Natural Heritage" was signed on 16 November 1972 in Paris. Hungary joined the

Convention in 1985 and proclaimed it in Decree-Law 21 of 1985. The Convention records values considered to be cultural and/or natural world heritage in the World Cultural and Natural Heritage List, to which values can be added upon the recommendation of member states subject to a strict set of criteria and preparations. There are currently 8 World Heritage sites in Hungary.

(f) What is the procedure for changing the status of land? Who monitors and reports at national level on land status changes? How often are the land zoning register updated (monthly, annually, bi-annually, etc.)?

With reference to point (e), the legal successor of the Ministry of Environment and Water, the Ministry of Rural Development, is the competent authority concerning the classification of land, and thus the related rights and obligations are exercised by this ministry.

(g) *How is compliance with good agro-environmental practices and other cross-compliance requirements ensured and verified at national level?*

Experience has shown that the majority of crops grown for liquid biofuel production in Hungary are maize, rape and, to a lesser degree, sunflowers and miscellaneous cereals (other crops, such as sorghum, might be included in the future). The land parcels used for growing these crops are reported by way of the prevailing single applications required for obtaining support (even those areas, for which perhaps no support will be requested), and therefore, these areas constitute a part of the selection population serving as a basis of cross-compliance checks. These areas are already now subject to the obligation under cross-compliance rules, and thus, the EU provision referred to does not require separate measures to be undertaken, as **verification is carried out under the system of cross-compliance.**

(h) *Do you intend to help develop voluntary “certification” scheme(s) for biofuel and bioliquid sustainability as described in the second subparagraph of Article 18(4) of Directive 2009/28/EC? If so, how?*

We do intend to support the development of voluntary “certification” schemes, while taking into account available means. We intend to establish the cooperations with third countries under Article 18(4) of the RED by taking into account the Commission’s position.

4.3. Support schemes to promote the use of energy from renewable resources in electricity, applied by the Member State or a group of Member States

It is now necessary to “transform the current system of subsidies (focusing the mandatory off-take scheme on renewables, review of investment aid),” maintaining a “strong motivation... for highly efficient power generation based on renewables”.

Excerpt from the New Széchenyi Plan, 28 July 2010

The sub-chapter presents the current instruments and guidelines applicable to investment and operational subsidies in the field of electricity generation based on renewable resources. A review of the system of subsidies is pending; its transformation is expected to occur in 2011. The Government intends to strongly promote the use of renewable energy sources; this is justified, apart from the obvious environmental and climate protection goals, by the beneficial impact on the security of supply as well as the development opportunities in the relevant branches of agriculture and national economy. The planned transformation of the mandatory off-take system (MOT scheme) will be complemented by measures for the review of price subsidies of fossil energy, the introduction of a green certificate, significant simplification of the official licensing procedures as well as facilitating the connection of producers of renewable energy to the grid. Taking into consideration the planning of electricity generation facilities, the time required for preparatory tasks concerning the funding of projects and, on a related note, the calculability required by investors and funders, it is necessary to grant the market players sufficient time for preparation in the event of any intervention into the system. That said, it is planned that the preparation of changes of an incentive nature and intended to improve the efficiency of the regulatory system will begin in the course of 2011.

Support schemes can be regulatory, providing for targets and/or obligations. They may provide financial support either for investment or during the operation of a plant. There are also soft measures like information, education, or awareness-raising campaigns. As soft measures are described above, this assessment should focus on regulatory and financial measures.

Please describe existing schemes with legal reference, details of the scheme, duration (indicating start and end dates), past impact and explain whether any reform or future schemes are planned and by when. What are the expected results?

4.3.1. Regulation

Regulation can set target(s) and obligations. In case there is such an obligation please detail it:

a) What is the legal basis for this obligation/target?

Support for using electricity generated from renewable energy sources is based on the following legislation and other legal means of administration:

- the EA; EA Imp. (the decree on the implementation of the EA);
- the MOT Decree;
- Decree No 109/2007 (XII. 23.) of the Minister for Economy and Transport;

- Parliamentary Decision No 40/2008 (IV. 17.) on the new Hungarian energy policy (2008–2020);
- Government Decree No 2148/2008 (X. 31.) on the new strategy for increasing the utilisation of renewable energy sources (2008–2020).

The key goal of Parliamentary Decision No 40/2008 (IV. 17.) and Government Decision No 2148/2008 (X. 31.) is to ensure that the consumption of renewable energy sources in Hungary reaches 186.3 PJ/year (TPS) in Hungary in 2020. The latter strategy will be reviewed in the light of the EU guidelines and due to the recession; its appropriate adjustment is planned in the framework of the NAP. The NAP therefore decrees that Government Decision No 2148/2008 (X. 31.) is repealed. The targets set forth by the NAP, when converted to primary figures, are more ambitious and exceed the earlier targets.

Rules for financial support are set forth in the following regulations:

- Act XVII of 2007 on certain aspects of the procedure relevant to agricultural, agromural development and fishing subsidies and other measures;
- Government Decree No 255/2006 (XII. 8.) on the fundamental rules of using subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 programming period, as well as the responsible institutions;
- Government Decree No 281/2006 (XII. 23.) on the setting up of financial processing and control systems with respect to the receipt of subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 programming period;
- Decree No 23/2007 (IV. 17.) MARD on the general rules of using subsidies co-financed by the European Agricultural Fund for Rural Development;
- Decree No 27/2007 (IV. 17.) of the Minister of Agriculture and Rural Development on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the upgrading of livestock holdings;
- Decree No 44/2009 (IV. 12.) of the Minister of Agriculture and Rural Development on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the establishment of non-food low capacity plants for the production of raw alcohol and raw oil of vegetable origin;
- Joint Decree No 16/2006 (XII. 28.) of the MeHVM-PM on the general procedural rules for using subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 period;
- Decree No 19/2007 (VII. 30.) of the Minister Heading the Prime Minister's Office and the Minister of Finance on the rules on the appropriations specified in the New Hungary Development Plan for Regional Development Operational Programmes from the perspective of state aid;
- Decree No 9/2010 (I. 21.) of the Minister for National Development and Economy on the detailed rules and individual aid entitlements for the use of resources allocated to the priorities of the Environment and Economy Operational Programme.

Pursuant to the EA, power plants producing electricity in the MOT scheme comprise a separate balance group (the MOT¹⁷ balance group), which was created by the transmission system operator (MAVIR). The transmission system operator is responsible for balancing the MOT balance group (art. 10(4) of the EA).

The plants producing electricity in the MOT scheme set up pursuant to the EA are required to sign a balance group membership agreement and an agreement regulating their cooperation in the mandatory off-take process, both based on the general terms specified in the terms of business of the transmission system operator, with the transmission system operator.

Pursuant to the EA, all electricity dealers (including universal providers), production licence holders who sell directly to users – and therefore also the users they serve –, as well as all users importing electricity (hereinafter jointly referred to as the recipients) are required to accept a proportion of electricity from the separate balance group corresponding to the portion of electricity sold to their user(s), under the terms set forth in Decree No 109/2007 (XII. 23.) of the Minister for Economy and Transport.

(b), (c) *Are there any technology-specific targets? What are the concrete obligations/targets per year (per technology)?*

There are no technology-specific targets, only an aggregate target (total GWh/year electricity produced) in the EEOP. In addition to the EEOP, the action plan of the Economic Development Operational Programme (EDOP) for the upcoming period will include elements and calls for applications which will offer opportunities for the manufacturing of green technologies, for upgrading existing technologies, for purchasing know-how, or the exploitation of developments and prototypes in practice. In this regard, green research and development and the field of renewable energy sources are closely interrelated. Detailed research and development and technology development programmes are under development.

(d) *Who has to fulfil the obligation?*

The regulations establish rights and obligations for the core actors in the electricity system. Such actors are the following:

- electricity producers using renewable energy sources (wishing to participate in the MOT scheme);
- the transmission system operator (MAVIR),
- electricity dealers (including universal providers), production licence holders who sell directly to users, and users importing electricity (hereinafter: Recipients).

The regulations on financial support set forth obligations primarily for the grant recipients (e.g. maintenance, monitoring data reporting obligations, etc.).

(e) to (f) *Supervising the performance of obligations.*

¹⁷ MOT: mandatory off-take of electricity generated from renewable energy sources, waste or CHP generation according to the procedure set forth in art. 9(2) of the EA and in separate legislation on the rules of mandatory off-take.

Under the foreseen MOT scheme, the Office performs regulatory control of the producer of the electricity subject to mandatory off-take within one year from the conclusion of the contract between such producer and the Recipients.

- Producers of electricity using renewable energy sources (selling electricity within the MOT scheme): as long as they are members of the balance group, failure to comply with their obligation to supply and comply with a schedule incurs a surcharge as specified in the decree, while non-compliance with the provisions of the decree results in legal consequences specified in the MOT Decree [Art. 7(4) to (5)] and in the EA (Art. 96).
- for MAVIR and the Recipients: legal consequences specified in Art. 96 of the EA (fine, cancellation of licence).

Compliance with the obligations is monitored by the Office. MAVIR also controls the activities of producers selling in the MOT scheme and reports to the Office any calculation which is obviously incorrect arithmetically.

(g) <i>Is there any mechanism to modify obligations/targets?</i>

There is no specific mechanism. The Office, based on the comments received and the investigation thereof, makes recommendations and submits proposals to the legislator (the Ministry of National Development), which might be followed by a change in legislation. The EA also provides for the possibility of introducing a green certificate scheme.

4.3.2. Financial support arrangements

Financial support can be classified in various ways. Examples are financial support for investment, capital grants, low interest loans, tax exemptions or reductions, tax refunds, tender schemes, renewable energy obligations with or without green certificates (tradable green certificates), feed-in tariffs, feed-in premiums, voluntary schemes.

4.3.2.1. Financial support: investment support for projects using renewable energy, available via call schemes under various central and sector-specific development programmes

a) *What is the name and a short description of the scheme? What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)*

Support schemes are described in detail in chapter 4.2.3(i). Of the support schemes presented in that subsection, the following provide support to consumers or producers.

The key goal of the **EEOP priority “Increasing the use of renewable energy sources”** is to have a favourable impact on the composition of domestic energy sources, i.e. to bring about a shift from fossil energy sources to renewable energy sources. The activities supported under the CHP scheme are the use of biomass, the production and use of biogas from biological waste, the use of geothermal energy, the installation of heat pump systems, the use of solar energy and hydropower, the installation of wind turbines not feeding power to the grid, the installation and modernisation of community district heating systems using renewable energy sources, as well as the preparation of solid fuels from renewable sources (e.g. the production of pellets and briquettes). Taking into consideration the limited acceptance capacity of the electricity grid with respect to wind power, support under the EEOP is only provided for low capacity wind power projects (max. 50 kW) at this time.

Investors can obtain support via tender schemes. The aid intensity of schemes promoting renewables ranges from 10% to 80%; the final aid intensity is established for each project after an analysis of cost efficiency. Support is provided only for the portion of the investment which cannot be recouped under market conditions. This methodology takes into account the support for electricity from renewable sources which is incorporated into the off-take price of such electricity, and only provides investment support to projects which cannot be recouped even when selling at such subsidised price.

The following financial support schemes exist in the electric power sector for promoting the use of electricity from renewable energy sources:

I. **EEOP 4.4. The scheme entitled “Renewable-based electricity generation, heat and electricity cogeneration and biomethane production:”** The goal of the scheme is primarily to support CHP production from renewables, which has a smaller environmental impact, or the production of only electricity from renewables. For the first time, the scheme makes it possible to support the production of biomethane

which can be fed into the natural gas network. Support is provided in the form of non-refundable grant. Grants awarded may range from a minimum of HUF 1 million to a maximum of HUF 1 billion. The extent of support ranges from 30 to 70 percent (depending on the beneficiary target group and the regional map) or from 10 to 70 percent for so-called income generating projects (based on aid intensity calculation).

Activities eligible for support: electricity generation from solar energy, using biomass for the generation of electricity or CHP, hydropower: installation and renewal of hydropower plants below 5 MW, installation and renewal of their power grid connections, biogas production and use, using geothermal energy, using wind energy, combining renewable energy sources.

II. Presentation of **combined calls for applications**

EEOP-2009-5.2.0/B Third-party financing: energy modernisation of buildings combined with renewable energy utilisation.

The goal of the scheme is to reduce the energy consumption associated with the performance of governmental duties in institutions funded from the governmental or municipal budget or belonging to foundations or churches and charged with the performance of such duties, and reducing the energy costs of such institutions by modernising their electric, lighting and heating systems and combining such modernisation with the use of renewable energy. Eligible applicants under the scheme are organisations providing so-called third party financing, as well as ESCO organisations, which themselves fund energy modernisation projects in such a manner that the service charge for using the project can be funded primarily from the savings achieved at the user of the service via such intervention. Support is provided in the form of non-refundable grant. Grants awarded may range from a minimum of HUF 3.5 million to a maximum of HUF 200 million. The extent of support available under this scheme, calculated against eligible costs, is 35 percent.

Activities eligible for support:

Modernisation, replacement, increasing the efficiency of, making controllable of heat and electricity generation, transport and conversion equipment, as well as technology upgrades combined with the use of renewable energy: use of solar thermal collectors, biomass, geothermal energy, geothermal heat pumps. Modernisation of electric systems and lighting, with the exception of projects to modernise street lighting, combined with the use of renewable energy: using solar panels to generate electricity for feeding into the grid or to satisfy own needs.

EEOP-2009-5.3.0/B Energy development of buildings combined with renewable energy utilisation

The scheme is designed to promote efficiency, energy saving and the use of renewable energy throughout the vertical energy sector, i.e. in the production, distribution, transport and – the aspect considered to be the most critical – end use of energy. Eligible applicants are businesses, bodies funded from the governmental budget and the institutions thereof, non-profit institutions and other business organisations.

The development project must be the registered seat, a site or branch of the applicant, located in Hungary; projects implemented anywhere in the country other than in the Central Hungary Region are eligible.

Support is provided in the form of non-refundable grants. Grants awarded under this scheme may range from a minimum of HUF 1 million to a maximum of HUF 500 million. The extent of support ranges from 30 to 80 percent (depending on legal form and activity) or from 10 to 80 percent for so-called income generating projects (based on aid intensity calculation).

Activities eligible for support:

- improving the heat technology properties of buildings, reducing heat loss over the entire building or buildings or groups of adjoining buildings being upgraded, combined with the use of renewable energy: the use of solar thermal collectors, biomass, geothermal energy, geothermal heat pumps,
- modernisation of the heating, cooling and hot water supply systems of institutions (modernisation of the not-for-production heating, cooling and hot water supply systems of organisations considered businesses under Community law), combined with the use of renewable energy: the use of solar thermal collectors, biomass, geothermal energy, geothermal heat pumps,
- the modernisation of lighting systems (relevant project components involving the use of renewable energy sources: using solar panels to generate electricity for feeding into the grid or to satisfy own needs.

CHOP-2009-3.3.3. – Increasing the use of renewable energy sources

The region of Central Hungary supports projects for increasing the use of renewable energy sources through its own operational programme, via a “mirror programme” corresponding to the renewables priorities of the EEOP.

Electricity, CHP and biomethane production from renewables: electricity generation from solar energy; using biomass for the generation of electricity or CHP; hydropower: installation and renewal of hydropower plants below 5 MW, installation and renewal of their power grid connections; biogas production and use; using geothermal energy; using wind energy.

Satisfying local heat and cooling demand from renewable energy sources: solar energy; biomass use; biogas and landfill gas from solid and/or liquid feedstock and the installation or extension of systems for meeting heating needs; using geothermal energy, installation of heat pump systems, satisfying cooling needs using renewable energy sources, combining renewable energy sources; installing community district heating systems using renewable energy sources or switching community district heating systems to renewable energy sources wholly or in part.

It is necessary to review and, if possible, increase the funds available under the CHOP, considering that more than one third of Hungary's population lives in the Central Hungarian region.

Hungarian Energy Efficiency Credit Fund (EECF)

The Hungarian Energy Efficiency Credit Fund offers low interest loans to support the implementation of energy efficiency projects and the use of renewable energy sources. The EECF was described in detail in chapter 4.2.3(i). The statistics of the “Energy Centre” Non-Profit Company show that 1013 projects have applied for low interest loans over the last 19 years and that the majority of projects were implemented in the industrial sector. The loans may be obtained simultaneously with other, non-refundable support. In the recent years the number of successful project has dropped from 60 to 5–10 annually. This scheme needs to be reworked and re-thought in order to ensure efficiency and economic feasibility.

National Energy Saving Programme (NESP)

The NESP was described in detail in chapter 4.2.3(i)

Green Investment Scheme (GIS)

Several schemes were announced under the GIS: the GIS Panel Subprogramme; the GIS Energy Efficient Household Appliance Replacement Subprogramme; GIS Energy Efficient Bulb Replacement Subprogramme. Applications could be submitted until 30 October 2010. Complex projects can also be implemented under the GIS scheme. The GIS EE was described in detail in chapter 4.2.3(i).

New Hungary Rural Development Programme

The NHRDP, co-financed by the EAFRD, provides support for renewable energy development projects in the agricultural sector through the following measures:

- **MARD Decree No 26/2007 (IV.17.) of the Minister for Agriculture and Rural Development** on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the purchasing of separate machines and technology not involving construction;
- **MARD Decree No 27/2007 (IV.17.)** on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the upgrading of livestock holdings;
- **MARD Decree No 71/2007 (VII.27.)** on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the establishment of perennial herbaceous energy crop plantations;
- **MARD Decree No 72/2007 (VII.27.)** on the detailed conditions of obtaining grants from the European Agricultural Fund for Rural Development for the establishment of plantations of ligneous energy crops with a short growing cycle;
- **MARD Decree No 78/2007 (VII.30.)** on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for meeting the energy demand of agriculture from renewable energy sources;

- **MARD Decree No 25/2008 (III.8.)** on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the upgrading of horticulture;
- **MARD Decree No 35/2008 (III.27.)** on the detailed conditions of obtaining grants from the European Agricultural Fund for Rural Development for the upgrading of horticultural facilities;
- **MARD Decree No 47/2008 (IV.17.)** on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for adding value to agricultural products;
- **MARD Decree No 44/2009 (IV.11.)** on the conditons terms of grants available from the European Agricultural Fund for Rural Development for the establishment of non-food low capacity plants for the production of raw alcohol and raw oil of vegetable origin.

4.3.2.1.1 Schemes for promoting electricity generation from renewable energy sources

a) *What is the name and a short description of the scheme? What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)*

EEOP, NHRDP and the related development programmes (EDOP, SROP, etc.) provide support in the form of non-refundable grants in the manner described above.

With regard to tax reductions, Act CXXVII of 2003 on the special rules for excise tax and the distribution of excise products decrees that the bioethanol portion of E85 fuel containing bioethanol is subject to an excise tax of HUF 0/litre as of 1 January 2007.

The MOT scheme was introduced under the EA to promote the use of electricity from renewable energy sources, electricity from waste and electricity from CHP generation.

Power plants generating electricity in the MOT scheme comprise a separate balance group (the MOT balance group), which was created and is operated by the transmission system operator (MAVIR). The EA requires all electricity dealers (including universal providers), production licence holders who sell directly to users – and therefore also the users they serve –, as well as all users importing electricity (hereinafter jointly referred to as the recipients) to accept a proportion of electricity from the balance group corresponding to the portion of electricity sold to their user(s), under the terms set forth in specific other legislation [EA Art. 10(4) and 13(1)].

The EA stipulates the maximum initial off-take price for electricity from renewable energy sources. The initial price includes an adjustment factor “k” (consumer price index), i.e. the off-take price is adjusted annually for the rate of inflation in the previous year. The currently ongoing transposition of the 3rd energy package includes the reworking of the method of calculation. The foreseen amendment repeals the provision stipulating that the mandatory off-take prices to be specified in a differentiated manner in legislation must be specified with regard to the maximum mandatory off-take prices specified in Art. 171(3) to (4) of the EA. The maximum price stipulated in the act made it difficult to develop flexible pricing that takes into account individual characteristics and thus hindered the spreading of certain technologies.

The EA makes it possible for the Government to apply differentiated purchase prices within this price range, depending on the specific renewable energy source, technology, size, and the purpose of heat from CHP operations (the date of entry into the market and the requirement for efficiency are used as eligibility criteria). Different price categories were set up based on the date of market entry (the date of obtaining a licence) in order to differentiate between the period before and after the MOT Decree became effective.

The EA charges the Office with the task of establishing the annual amount of mandatory off-take and the period of such off-take for each Recipient. Setting the

annual amount of electricity from renewable energy sources eligible for off-take at subsidized rates, as well as the period of such off-take ensures that the producer receives the subsidized prices only until the investment is recouped.

Pursuant to Article 8(4) of the MOT Decree the Office certifies that the electricity produced by the Seller and sold under the MOT scheme meets the requirements under the MOT Decree (certificate of origin).

The MOT balance group will be retained, but later its scope will become narrower: it will only cover plants generating electricity from renewable energy sources.

We plan to operate the MOT scheme under the following general terms:

- We plan to stipulate the base price for mandatory off-take and the method of indexation, the period of mandatory off-take and the maximum amount of mandatory off-take in legislation, meaning that they could only be amended subject to conditions set forth in the relevant legislation.
- We plan to make mandatory off-take possible both at market prices and at statutory prices.
- We plan to specify the rate of subsidisation under the MOT scheme, identify those eligible for subsidy, as well as the terms and manner of such support in legislation.
- Subsidy in the form of mandatory off-take can be provided no longer than the reasonable recoup period applicable to the investment characteristic of the individual production procedures.
- Following the expiry of eligibility for mandatory off-take, barring a new investment, the producer cannot be a party to a mandatory off-take procedure with respect to the power plant unit concerned. Both the current EA and the foreseen amendment allow purchasing at market prices, but not at subsidized prices, as allowed by the Community guideline on environmental government subsidies.
- In the event of producers incurring fuel costs, at least these costs should be covered via operational support to enable continued operation.

(b) <i>Is it a voluntary or obligatory scheme?</i>

The investment aid schemes are voluntary. The MOT scheme is planned to be voluntary for the producers but mandatory for the recipients of electricity, when introduced.

(c) Who manages the scheme? (Implementing body, monitoring authority)

Since July 2006, implementation of the EEOP has been supervised by the National Development Agency, more specifically, the EEOP Managing Authority. The NHRDP is being supervised by the Ministry of Rural Development as its managing authority. The MOT scheme is run by MAVIR (EA Article 10(4)).

The operation of the MOT scheme (compliance with specifications) is controlled by the Office (EA Article 12(2) and Government Decree No 389/2007). It is foreseen that the MOT scheme will continue to be supervised by the Office in the future.

(d) What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?

Funding of the development programmes providing the investment aid is secured from Community funds and the domestic national budget. Funding by the European Union is complemented by domestic co-financing; the relevant ratio is 85 percent to 15 percent. The Government undertook an obligation to fund the 15 percent of domestic co-financing when the Operational Programme was submitted; technically, the actual amount corresponding to the payment target figures for the relevant year is specified in chapter 19 – managed by the National Development Agency – of the budget act, which is passed annually. The amount required for the national co-financing of the NHRDP is stated in chapter XII of the budget every year. The operating costs of the MOT scheme are ultimately paid by the consumers. Therefore, no direct budgetary funds need to be provided.

(e) How is long-term security and reliability addressed by the scheme?

The Operational Programmes have been approved by both the Hungarian Government and the European Commission; the relevant period is 2007–2013. The implementation of the EEOP is broken down into shorter periods by the two-year action plans (and a three-year action plan for the last period, 2011–2013) adopted by the Government; for the applicants, detailed application criteria are specified in the calls for applications. The NHRDP was adopted with a 7-year framework programme.

The EA guarantees the security of investment into power plants [EA Article 171(2)]. Investment “aid” is provided until the amount of electricity specified in the decision of the Office has been taken off, and for no longer than the recoup period specified therein.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

In the case of the operational programmes, the action plans are adjusted at the end of the two-year action planning period and at the annual review of the action plans, causing the calls to be clarified and corrected as well. The NHRDP is being revised continuously; its mid-term review was completed in 2010. The NESP schemes are revised annually, while the GIS is planned to be revised following the first application cycle.

The operation of the MOT scheme has been revised and modified on several occasions since its introduction (2005, 2007, 2008, 2009). The changes were specific measures partly due to changes resulting from Community law (e.g. a new settlement system was introduced due to the elimination of the balance group for public utilities) and partly to eliminate issues with the operation of the scheme. Identification of the experience gained in the course of the operation of the scheme and the initiation of necessary modifications is based primarily on feedback from the participants. So far, the practice has been that the Office has investigated the issues which arose. The Office addressed the problem as specified by the law or using its own powers (e.g. by way of a decision), or referred the issue to the legislator (the legal successor of MTCE, i.e. the Ministry of National Development).

A revision of the system is planned to be carried out in 2011, building on the experience gained so far, and especially on the feedback and recommendations of the investors and market actors.

(g) Does support differ according to technology?

The EEOP, which provides investment aid, has no specific preferred technologies. The eligible technologies are determined in accordance with the chapter of the calls on eligible activities; all technologies are granted equal aid rates [see point (a) for individual technologies]. Differentiation is based on the categorisation of the applicant (for-profit or not-for-profit), its location (regional support map) and the missing funding. Grants provided under the NHRDP have an aid intensity in accordance with Council Regulation (EC) No 1698/2005. NESP and GIS do not differentiate between the various technologies.

In the MOT scheme, differentiation based on size and technology is foreseen, considering that certain renewable energy technologies (e.g. biogas) offer additional social benefits and that their socio-economic added value (employment aspects, CO₂ saving potential etc.) varies.

The subsidized off-take price is differentiated on the basis of technology, size and the starting date of eligibility. Differentiation for the date of obtaining eligibility for mandatory off-take is based on whether the producer became eligible prior to 1 January 2008 [i.e. under the old EA (Act CX of 2001) or later (i.e. under the new EA (Act LXXXVI of 2007)]. This is because the rules affecting subsidized off-take price (the rate of aid) cannot be applied to producers who became eligible prior to 1 January 2008. In the event of hydropower plants with less than 5 MW installed capacity the legislator does not differentiate between producers with respect to the subsidized off-take price based on whether eligibility for mandatory off-take was obtained under the earlier or the current legislation. Electricity produced by hydropower plants with more than 5 MW installed capacity is not eligible for subsidized off-take rates either under the former or the current legislation.

The current legislation stipulates differentiation between the following categories:

Based on the decision of the Office adopted after 1 January 2008 (except: hydropower plants with a capacity over 5 MW and other power plants with a capacity over 50 MW).	Generated by a solar plant
	Generated by a power plant with a capacity of 20 MW or lower (except: solar plants)
	Generated by a power plant with a capacity higher than 20 MW but not exceeding 50 MW (except: wind plants as of 30 November 2008, solar plants)
	Generated by a power plant with a capacity higher than 20 MW but not exceeding 50 MW after 30 November 2008.
	Generated by a power plant containing second-hand equipment

(h) *What are the expected impacts in terms of energy production?*

In the case of EEOP, the impact of the aid scheme is measured using indicators (e.g. electricity generation from renewables in GWh/year; reduction in the emission of greenhouse gases in kt/year, etc.), the targets for which are set forth in the Operational Programme and the Action Plans. It is expected that, as a result of the NHRDP schemes, the number of biogas plants attached to livestock holdings could increase significantly; numerous low capacity biofuel plants could appear; and the farming of ligneous or herbaceous energy crops could become more widespread.

The MOT scheme is expected to result in an increase in the proportion of using electricity from renewable energy sources.

So far the mandatory off-take scheme has resulted in Hungary meeting its obligation under Directive 2001/77/EC. As shown in *Figure 5*, the share of electricity from renewable energy sources has been increasing steadily since the introduction of the MOT scheme. This growth, however, comes primarily from power plant units which used to burn coal but have been converted to use mixed biomass fuel.

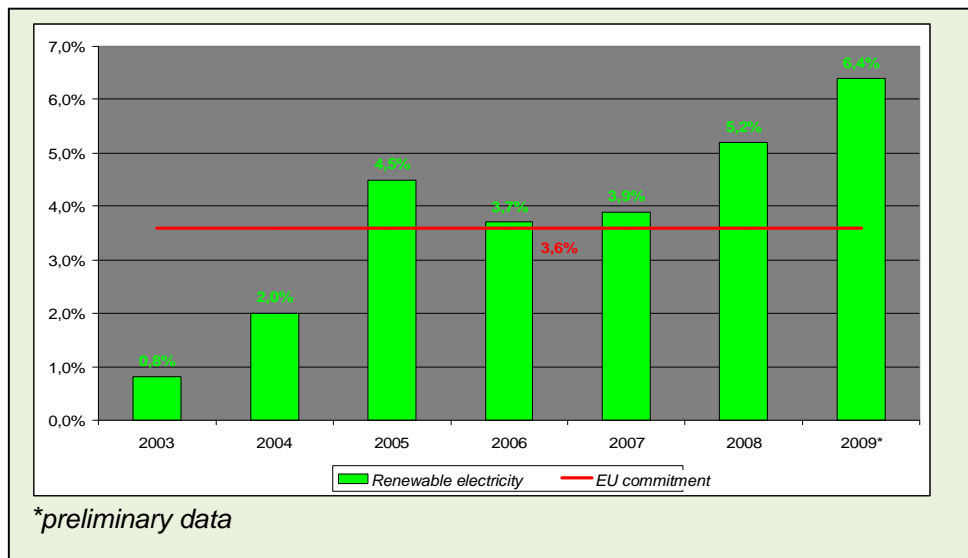


Figure 5: Electricity from renewable energy sources

(i) Is support conditional on meeting energy efficiency criteria?

In the investment grant scheme, a positive BMR is mandatory, which has an impact on efficiency; also, the scoring system takes into consideration the standard of technology.

We plan to incorporate energy efficiency criteria into the MOT scheme by stipulating a minimum energy efficiency requirement for each technology to ensure that the new capacities are as efficient as possible and use the best available technologies (BAT).

Facilities generating electricity from biomass or biogas which are granted eligibility for selling under the MOT scheme after 1 January 2008 are required to meet the efficiency requirements presented in the table below before they can start selling [MOT decree art. 6(11)].

Condensation technology	Efficiency requirements
Biomass fuelled plant unit	30%
Biomass fuelled plant unit using mixed fuel	32%
Biogas fuelled plant unit over a capacity of 500 kW	35%
Biogas fuelled plant unit below a capacity of 500 kW	32%
Biogas fuelled plant unit using mixed fuel	40%

Table 5: Efficiency requirements under the MOT scheme

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

I. Existing legislation governing the EEOP:

- Government Decree No 255/2006 (XII. 8.) on the fundamental rules of using subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 programming period, as well as the responsible institutions;
- Decree No 9/2010 (I. 21.) of the Minister for National Development and Economy on the detailed rules for using funds assigned to the priorities under the Environment and Energy Operational Programme, and certain support titles;
- Joint Decree No 16/2006 (XII. 28.) of the Minister Heading the Prime Minister's Office and the Minister of Finance on the general procedural rules for using subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 period;
- Government Decree No 281/2006 (XII. 23.) on the setting up of financial processing and control systems with respect to the receipt of subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 programming period.

II. Existing legislation governing the NHRDP (concerning the production of electricity):

- Act XVII of 2007 on certain aspects of the procedure relevant to agricultural, agro-rural development and fishing subsidies and other measures;
- Decree 23/2007 (IV. 17.) of the Minister for Agriculture and Rural Development on the general rules of using subsidies co-financed by the European Agricultural Fund for Rural Development;
- Decree No 27/2007 (IV. 17.) of the Minister for Agriculture and Rural Development on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the upgrading of livestock holdings;
- Decree No 44/2009 (IV. 11.) of the Minister for Agriculture and Rural Development on the detailed conditions of grants available from the European Agricultural Fund for Rural Development for the establishment of non-food low capacity plants for the production of raw alcohol and raw oil of vegetable origin;

III. Existing legislation governing the MOT scheme: presented earlier

(k) Is this a planned scheme? When would it be operational?

The EEOP and the NHRDP have been operational since 2007 (prior to that, investment aid for systems producing electricity from renewables was provided under the EIOP).

(l) What start and end dates (duration) are set for the whole scheme?

The EEOP and the NHRDP cover the budgetary planning period of the European Union from 2007 to 2013.

The MOT scheme is intended as a long-term scheme, maintained for each technology until the comparative disadvantage of renewable technologies is eliminated as a result of technical progress (in which case phasing out should be done gradually).

The mandatory off-take scheme was introduced on 1 January 2003 (when Act CX of 2001 became effective). The earlier ministerial decree on mandatory off-take [Decree No 56/2002 (XII. 29.) of the Minister for Economy and Transport] envisaged that the decree would remain in effect until the end of 2010. The new MOT decree [Government Decree No 389/2007 (XII. 23.)] is for an indeterminate period.

(m) *Are there maximum or minimum sizes of system which are eligible?*

Aid under the EEOP for electricity, CHP and biomethane production from renewables can range from HUF 1 million to HUF 1000 million.

As for the NHRDP, eligibility is usually tied to agriculture holding size (a minimum 4 units of European holding size), and the maximum grant amount is EUR 735 000.

The calls under the EEOP and NHRDP schemes in the upcoming period should be structured in a way to favour decentralised renewable energy generating systems of a local nature, focusing primarily on using self-generated renewable energy and the replacement of fossil energy.

As a first step, the MOT scheme is foreseen to be extended to producers with a capacity higher than household-scale micro plants (50 kVA). The mandatory off-take of electricity from household-scale micro plants is covered by other specifications (see item 4.3.2.1.2). We do not intend to set a maximum limit at this time, but the higher take-off prices would only apply to plants with a capacity of less than 50 MW (5 MW for hydropower).

Pursuant to the MOT Decree, the mandatory off-take of electricity from renewables does not apply to producers with a connection capacity of 50 kVA (household-scale micro plants). There is no upper limit specified with respect to mandatory off-take. With respect to off-take at subsidized rates, there is no upper limit for producers who obtained eligibility prior to 1 January 2008 (with the exception of hydropower plants). As for entrants who were granted eligibility after 1 January 2008, the maximum capacity for off-take at subsidized rates is 50 MW. Producers exceeding this capacity, as well as hydropower plants with a nominal capacity in excess of 5 MW are eligible for off-take at non-subsidized rates. Similarly, plants using second-hand equipment only receive non-subsidized “market rates” as defined by the MOT Decree, irrespective of the upper capacity limit.

(n) *Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?*

When drawing up the operational programmes, “demarcation” was given a priority in line with the provisions of Council Regulation (EC) No 1083/2006, and each operational programme includes a separate chapter dedicated to this issue. Other domestic or foreign funds may provide aid to the same projects, subject to Community and domestic regulations on the provision of so-called state aid on one

hand and the provisions of Government Decree No 292/2009 (XII.19.) on the operational rules of public finances on the other hand.

Demarcation between the NHRDP and the EEOP is also ensured by the Council Regulation (EC) No 1083/2006 as well as the provisions of Council Regulation (EC) No 1698/2005 on the proportion of sale revenues.

For the purpose of determining eligibility for mandatory off-take, investment aid – as a factor reducing the time needed for the return of the invested capital – is considered an important criterion.

Plants are allowed to obtain aid from other sources (e.g. Community or other national funds). In this case such aid is taken into consideration when determining the period of mandatory off-take and the amount of electricity covered, which are appropriately reduced [EA Art. 11(5)].

(o) <i>Are there regional/local schemes? If so, please detail using the same criteria.</i>

With a few exceptions, investors obtain aid from the centralised support schemes which have a national coverage. As far as we are aware, only a few municipalities have announced local support schemes. Such examples are Budaörs and the 18th district of Budapest, Pestszentlőrinc, which have launched local support schemes. In Budaörs the municipal government published a call for applications for renewable energy and energy efficiency projects concerning “buildings constructed using traditional technology,” with a maximum aid intensity of 50 percent. The 18th District of Budapest has launched a scheme to promote energy efficiency and renewable energy projects.

The schemes in the upcoming period will clearly favour renewable energy projects based on the principle of added value and building on geographical and agro-ecological properties.

4.3.2.1.2 Mandatory off-take scheme for electricity produced in household-size micro plants

(a) <i>What is the name and a short description of the scheme?</i>

Electricity generated by household-scale micro plants (which connect to a low-voltage network and have a connection capacity not exceeding 50 kVA) is required to be accepted by the selling dealer or the universal provider at a given connection point [EA 13(2)]. The structuring of the legislation focuses on own use but would also allow commercial sale. Accounts would be settled on the basis of monthly, 6-month or annual balances (the difference between electricity fed into and taken off the grid). If the producer has a positive balance, the dealer should accept the excess kWhs at the mean electricity product purchase rate stipulated in the contract.

The EA introduces the concept of household-scale micro plants, defined as plants which connect to a low voltage network and have a connection capacity not exceeding 50 kVA. Electricity generated by such plants and not consumed by the producer is required to be accepted by the dealer or the universal provider selling

electricity through that connection point. The legislation was designed for satisfying own demand, rather than to promote commercial selling. Accounts between the electricity dealer or universal provider and the operator of the household-scale micro plant are settled on the basis of monthly, 6-month or annual balances (the difference between electricity fed into and taken off the grid). If the producer has a positive balance, the dealer is required to purchase the excess kWhs at the mean electricity product purchase rate stipulated in the contract.

(b) *Is it a voluntary or obligatory scheme?*

Introduction of the scheme was obligatory, as it was stipulated by an act (EA). Participation is not obligatory for the operators of household-scale micro plants, but it is for the transmission system operator and the Recipients. Producers generating electricity from renewable energy sources, waste or CHP operations may decide not to sell in the framework of the MOT scheme [MOT Decree, Art. 8.(3)].

(g) *Does support differ according to technology?*

The off-take price (and the aid incorporated in such price) is not differentiated by technology.

(h) *What are the expected impacts in terms of energy production?*

The number of renewable units producing electricity to satisfy own demand and for self-sufficiency will increase. The aid scheme facilitates decentralisation, the reduction of transmission losses and increases the efficiency of energy use. The revision of the aid scheme will ensure that renewable energy sources produced locally will be used locally.

(i) *Is support conditional on meeting energy efficiency criteria?*

No, it is not.

(j) *Is it an existing measure? Could you please indicate national legislation regulating it?*

Existing legislation. EA and EA Imp. Articles 4 to 5.

(k) *Is this a planned scheme? When would it be operational?*

The scheme is already operational.

(l) *What start and end dates (duration) are set for the whole scheme?*

Start date: 1 January 2008 (when the new EA becomes effective). The EA Imp. is effective for an indeterminately period.

(m) *Are there maximum or minimum sizes of system which are eligible?*

There is no minimum size; the maximum size is 50 kVA.

(n) *Is it possible for the same project to be supported by more than one support measure?
Which measures can be cumulated?*

Yes, this does not affect the mandatory off-take of “excess” electricity produced by the household-size micro plant as presented in point (a).

4.3.2.2. Specific questions concerning investment aid

(a) *What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)*

The investment aid granted is not refundable.

(b) *Who can benefit from this scheme? Is it specified for certain technology(/ies)?*

The EEOP, NESP and GIS grants are not technology-specific; NHRDP aid is tied to the relevant agricultural activity (e.g. in the case of a produce drier, to the purchase of a biomass boiler). In the case of related Operational Programmes (EDOP) it will be possible to apply differentiation by technologies in the future; the key criteria for this purpose will be environmental parameters, efficiency and state-of-the-art quality.

(c) *Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?*

From among the investment aid schemes, the NHRDP calls are usually periodical (with a submission period of 30–60); the criteria are stipulated in decrees on the support titles. The EEOP calls are announced continuously at the dates published on the web pages of the NDA. The NESP and GIS schemes are open until the available funds are depleted, subject to the call period specified by the competent ministry.

4.3.2.3. Specific questions for tradable certificates

There is no green certificate system in Hungary. The new EA makes it possible for the Government to introduce a green certificate scheme after consideration of international experience (under existing legislation, such a scheme could only apply to new plants entering after the scheme is introduced).

The Office is required to inform the Government on the feasibility of introducing green certificates (the report of 2008 did not recommend introducing a green certificate scheme).

With reference to the above facts, setting up and gradually introducing a green certificate scheme, while maintaining the MOT scheme, is among the long-term plans of the Government. A green certificate scheme could play a role primarily after the MOT support for a plant expires, in promoting continued production.

4.3.2.4. Specific questions for feed-in fixed tariffs and premiums

(a) <i>What are the conditions to get the fixed tariff?</i>
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The terms applying to the selling of electricity from renewable energy sources or waste under the MOT scheme are stipulated in the MOT Decree. It sets forth the following:

Electricity from renewable energy sources or waste may be sold under the MOT scheme if:

- (a) the capacity of the production plant exceeds 50 kVA; and
- (b) the producer's eligibility to mandatory off-take was established by the Office in a final decision prior to 1 January 2008, or
- (c) the producer's eligibility to mandatory off-take was established by the Office in a final decision after 1 January 2008, having regard to the fact that
 - (ca) the producer generates electricity only from renewable energy sources or from waste or from both, or
 - (cb) in the case of using mixed fuel, the share of renewable energy sources or waste is minimum 30 percent.

The mandatory off-take of electricity from household-scale micro plants is covered by other regulations (see point 4.3.2.1.2).

Additional conditions for selling under the MOT scheme:

- Selling under the MOT scheme is limited to the mandatory off-take period and to the amount of electricity stipulated in the decision of the Office.
- The producer needs to have joined the MOT balance group; the technical and procedural conditions for connection must be met (e.g. the connection point has been identified; the producer attached the documents – e.g. on investment aid, tax reduction, etc. – required for the validity of the connection application when the submission was made, and the seller has paid to the Office the administrative service charge payable for the procedure);
- No other condition of exclusion, as specified in the MOT decree (e.g. in arrears with public dues, aid used by non-eligible persons, criminal procedure) is met;
- In the case of biomass use, eligible electricity generation must use feedstock which originates from authorised logging and fall in a timber category inferior to sawmill trunk. When forestry biomass is used, the seller is required to give proof of the origin of such biomass in the form of a certificate of origin issued by the forestry authority or – in the case of forestry biomass originating from a third country – in the form of an FSC (Forest Stewardship Council) certificate; for other biomass, the seller is required to issue a statement that the biomass used is not suitable for human consumption. When biomass or biogas is used (new entrants) the seller needs to provide proof of compliance with the efficiency requirements under the MOT Decree.

(b) *Is there a cap on the total volume of electricity produced per year or of installed capacity that is entitled to the tariff?*

The cap for investment aid (EEOP) is at 20 MW_e. The foreseen revised MOT scheme is intended to include a cap on capacity to ensure that support is provided primarily to small and medium capacities and that small barrages are encouraged in the case of hydropower plants.

The MOT Decree allows power plants to sell the total amount of electricity for which they obtained eligibility under the MOT scheme in a continuous manner, without annual break-down; this means that they themselves get to decide (taking into account their technical and economic criteria) what portion of their total quota they “consume” in which year of the mandatory off-take period specified in the licence issued to them [MOT Decree, Art. 6(10)]. Once a producer has sold the total quantity specified in the decision of the Office for several years, it will no longer be possible for it to sell electricity under the MOT scheme, just as if it had produced an sold portions of the total amount in annual instalments.

(c) *Is it a technology specific scheme? What are the tariff levels for each?*

The MOT scheme is planned to be structured having regard to the production method and the size of the power plant, because the various technologies have varying return on investment rates and operating costs, and because the individual types of renewable energy sources contribute to the achievement of socio-economic targets (job creation, CO₂ saving etc.) to varying extents.

A summary of the off-take prices for electricity subject to mandatory off-take are presented in the table below.

Off-take prices for electricity subject to mandatory off-take (excluding VAT), HUF/kWh			As of 1 April 2010		
			Peak	Valley	Deep valley
Electricity generated using energy from <u>renewable energy sources</u>	Produced pursuant to a decision of the Office issued prior to (or on the basis of an application submitted prior to) 1/1/2008 (except hydropower plants with a capacity in excess of 5 MW) [MOT Decree, Art. 4(1)]	Produced by a solar plant and wind turbine [MOT Decree, Annex 1, Art. 1(b)]	29.28	29.28	29.28
		Not produced by a solar plant and wind turbine [MOT Decree, Annex 1, Art. 1(a)]	32.71	29.28	11.95
	Produced pursuant to a decision of the Office issued after 1/1/2008 ⁶ (except hydropower plants with a capacity in excess of 5 MW and other power plants with a capacity in excess of 50 MW) [MOT Decree, Art. 4(2) to (3), (6)]	Produced by a solar plant [MOT Decree, Annex 1, Art. 2(b)]	28.72	28.72	28.72
		Produced by a power plant with a capacity of 20 MW or less (except: solar plants) or by a hydropower plant with a capacity of 5 MW or less [MOT Decree, Annex 1, Art. 2(a)]	32.10	28.72	11.72
		Produced by a power plant with a capacity in excess of 20 MW but not exceeding 50 MW (except: wind turbines after 30 November 2008, solar plants) [MOT Decree, Annex 1, Art. 3(a)]	25.67	22.98	9.37
		Produced by a wind turbine with a capacity in excess of 20 MW but not exceeding 50 MW after 30 November 2008 [MOT Decree, Annex 1, Art. 3(b)]	32.10	28.72	11.72
		Produced by a power plant containing second-hand equipment ³ [MOT Decree, Annex 1, Art. 4]	19.96	12.77	12.77
	Produced by a hydropower plant with a capacity in excess of 5 MW or another power plant with a capacity in excess of 50 MW [MOT Decree, Art. 4(4), Annex 1, Art. 4]		19,96	12.77	12.77
Electricity produced using energy from <u>waste</u>	[MOT Decree, Art. 4(5), Annex 1, Art. 5]		30.11	20.74	10.83

Table 6: Off-take prices under the MOT scheme (net)

(d) Are there other criteria differentiating tariffs?

It is useful to differentiate tariffs within the day as well, to adapt to the national load curve. The tariff for technologies affected by the weather (e.g. wind, solar) should be the same for every time of the day, regardless of zone time. The tariff for controllable technologies should be differentiated according to zone times, but structured in a way that the mean tariff level is equal to that of non-controllable technologies.

The MOT Decree differentiates tariffs within the day as well to adapt to the national load curve. The tariff for technologies affected by the weather (e.g. wind, solar) is the same for every time of the day, regardless of zone time, provided that the relevant HEO decision is dated before the date the MOT Decree became effective. For decisions adopted after the decree became effective, the tariffs unaffected by zone time apply only to solar units with a capacity of less than 20 MW. The tariff for controllable technologies varies according to zone times, but the mean tariff level is usually equal to that of non-controllable technologies.

(e) For how long is the fixed tariff guaranteed?

To avoid excessive support, guaranteed tariffs should be provided until the investment is recouped, taking into consideration any investment aid for this purpose.

The Office specifies the amount of electricity eligible for mandatory off-take, as well as the relevant period on the basis of return on investment calculations based on the business plan submitted, in individual decisions for each project. The mandatory off-take period granted by the Office may not be longer than the period under which the investment is recouped; the period is reduced appropriately for any other aid. The power plant is guaranteed off-take until the total amount specified in the decision is sold, but no longer than until the end of the mandatory off-take period also specified in a decision.

The revision of the MOT scheme will ensure that in the future, the eligible quantity and the period of eligibility will be stipulated by legislation; this change will make the system more reliable and will eliminate the constant investor uncertainty.

(f) Is there any tariff adjustment foreseen in the scheme?

Tariffs should be adjusted on the basis of inflation and technical progress (adjustment for inflation should apply to every producer, while adjustment for technical progress should be periodic and apply to new entrants). Tariffs should be reviewed as required by technological progress, but every two years at the minimum.

The EA stipulates the maximum tariff for electricity from renewable energy sources, which is increased every year by the consumer price index for the previous year. Tariffs applicable to new entrants (producers obtaining eligibility after 1 January 2008) are calculated using the “k” consumer price index factor reduced by 1 per cent for the improvement of efficiency. The currently ongoing transposition of the 3rd energy package includes the reworking of the method of calculation.

The foreseen amendment repeals the provision stipulating that the mandatory off-take prices to be specified in a differentiated manner in legislation must be specified with regard to the maximum mandatory off-take prices specified in Art. 171(3) to (4) of the EA. The maximum price stipulated in the act made it difficult to develop flexible pricing that takes into account individual characteristics, and thus hindered the spreading of certain technologies.

The maximum price paid under the mandatory off-take scheme is stipulated in the EA. Only the Parliament has the power to amend the EA. The differentiated tariffs within the range up to the cap specified by the EA are stipulated by a Government decree, which may be amended by the Government.

4.3.2.5. Specific questions for tendering

(a) *What is the frequency and size of the tenders?*

Considering the technical characteristics of network regulation (in the interest of the security of supply), tender schemes should be introduced for wind turbines. Accordingly, the calls for applications should be announced on the basis of the controllability and secure operation of the electricity network, the changes in technical limitations over time, and the regulatory reserve.

Pursuant to Art. 7(2) of the EA, wind turbines may only be connected to the grid after 1 January 2008 via a tendering process. The first call in the field of wind power was announced in 2009, covering 410 MW [Decree No 33/2009 (VI. 30.) of the Minister for Transport, Communications and Energy]. The frequency at which calls are published is a function of the changes to the controllability and secure operation of the electricity system, as well as the technical limitations over time, and whether these changes make it possible to incorporate additional wind power capacities on the occasion of the periodic reviews of the electricity system.

(b) *Which technologies are specified?*

With respect to mandatory off-take, calls are only needed for wind power.

(c) *Is it integrated with grid development?*

The Office is required to carry out a comprehensive survey of the feasibility of incorporating additional wind power capacities in the electricity system annually. The survey should look at the ability to preserve system-wide stability, the network plan prepared annually, the reduction of transmission losses as a benefit of distributed production, as well as the expansion of the system-level services of the electricity system. The Office is required to make the findings of the survey public.

4.4. Support schemes to promote the use of energy from renewable resources in heating and cooling applied by the Member State or a group of Member States

One of the tools of the complex Governmental programme designed to promote the use of renewable resources is the “Re-tuning of the aid system to prefer heating applications.”

Excerpt from the New Széchenyi Plan, 28 July 2010

This subchapter presents the current grant schemes for promoting heat generation from renewable resources. The backbone of such aid is comprised primarily of the operational programmes valid for the 2003–2013 period, which are continuously being revised; it is expected that for the programming period of 2014–2020, a new operational programme for energy, adapted to the changing market needs, accommodating the actual economic and social circumstances to the maximum extent and aligned with the long-term strategic goals, will be announced.

Please follow the structure of point 4.3 and apply the questions to the support measures provided for renewable energy use in the heating and cooling sector. Please address the following additional points:

(a)*How are the support schemes for electricity from renewable energy sources adapted to encourage the use of CHP from renewable energy sources?*

The relevant details were presented in point 4.3.

(b)*What support schemes are in place to encourage the use of district heating and cooling using renewable energy sources?*

- EEOP-2009-4.2.0/B Satisfying local heat and cooling demand from renewable energy sources;
- EEOP-2009-4.3.0 and EEOP-2009-7.4.3.0 Regional development based on renewable energy;
- EEOP-2009-4.4.0. The schemes “Renewable-based electricity generation, heat and electricity cogeneration and biomethane production”

(c)*What support schemes are in place to encourage the use of small-scale heating and cooling from renewable energy sources?*

- EEOP-2009-4.2.0/B Satisfying local heat and cooling demand from renewable energy sources;
- EEOP-2009-4.3.0 Regional development based on renewable energy;
- EEOP-2009-7.4.3.0 Regional development based on renewable energy;
- EEOP-2009-4.4.0 Renewable-based electricity generation, heat and electricity cogeneration and biomethane production.

The NHRDP schemes encourage the use of heat energy in the individual agricultural subsectors (livestock, horticulture, produce drying); these were presented in detail in point 4.3.2.1.1(i).

(d)*What support schemes are in place to encourage the use of heating and cooling from renewable energy sources in industrial applications?*

- EEOP-2009-4.2.0/A and /B Satisfying local heat and cooling demand from renewable energy sources;
- EEOP-2009-4.3.0 Regional development based on renewable energy;
- EEOP-2009-7.4.3.0 Regional development based on renewable energy;
- EEOP-2009-4.4.0 Renewable-based electricity generation, heat and electricity cogeneration and biomethane production;
- EEOP-2009-5.2.0/B Third-party financing: energy modernisation of buildings combined with renewable energy utilisation;
- EEOP-2009-5.3.0/B Energy development of buildings combined with renewable energy utilisation.

4.4.1. Financial support schemes in the heating and cooling sectors

(a) What is the name and a short description of the scheme?

Name: EEOP priority 4 (Increasing the use of renewable energy sources); 3 calls (schemes).

Owing to its membership in the European Union, Hungary may spend EUR 26.3 billion on development in the framework of the New Hungary Development Plan (NHDP) between 2007 and 2013. This sum is increased by the funds of EAFRD, EUR 3.8 billion at the current rates, and by the funds provided by the European Fisheries Fund, which amount to EUR 34.3 million at the current rates.

Support for domestic energy projects is provided under two priorities of the Environment and Energy Operational Programme under the New Hungary Development Plan (NHDP), from the latter's total funds of approximately EUR 4916 million (approximately HUF 1348 billion at the rate of 274.32 HUF/EUR, applicable to the 3rd quarter of 2010): the priority "Encouraging the use of renewable energy sources" is assigned 5.15 percent of the total budget, while the priority "Efficient energy use," designed to encourage energy saving, is assigned 3.14 percent. The EEOP was described in detail in chapter 4.2.3(i).

The fields eligible for support under these schemes have already been presented. Residential projects are supported under the NESP and GIS grant schemes described above. Projects in the agricultural sector are supported under the NHRDP.

(b) Is it a voluntary or obligatory scheme?

The submission of applications is voluntary for the eligible beneficiaries meeting the conditions specified in the calls; if support is granted, however, the supporter concludes a support contract with the beneficiary, which stipulates the rights and obligations of both parties. Participation in the NHRDP scheme is also voluntary.

(c) Who manages the scheme? (Implementing body, monitoring authority)

Since July 2006, implementation of the NHDP, including that of the EEOP, has been supervised by the National Development Agency, more specifically, the EEOP Managing Authority. The Managing Authority has selected an organisation for working with the qualification system to gauge the institutional capacities and professional competence of potential organisations for the implementation of energy priorities: the "Energy Centre" Non-Profit Company.

The NESP is managed by the Ministry of National Development, with "Energy Centre" Non-Profit Company assisting in the task and managing the grant processes. The professional management of the GIS has been performed since July 2010 by the Ministry of National Development, with "Energy Centre" Non-Profit Company assisting in the task and managing the grant processes.

(d) What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?

Funding by the European Union is complemented by domestic co-financing; the relevant ratio is 85 to 15 percent. The Government undertook an obligation to fund the 15 percent of domestic co-financing when the Operational Programme was submitted; technically, the actual amount corresponding to the payment target figures for the relevant year is specified in chapter 19 – managed by the National Development Agency – of the budget act, which is passed annually. The funds required for the implementation of the NAP are taken into consideration when the annual budget is drawn up.

(e) How is long-term security and reliability addressed by the scheme?

The Operational Programme was approved by both the former Hungarian Government and the European Commission; the relevant period is 2007–2013. The implementation of the EEOP is broken down into shorter periods by the two-year action plans (and a three-year action plan for the last period, 2011–2013) adopted by the Government; for the applicants, detailed application criteria are specified in the calls for applications. The support contract is concluded with the beneficiary by the assisting organisation on behalf of the MA. The most important terms of the NESP and GIS (the rights and obligations of the applicants) are stipulated by legislation.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The action plans were adjusted at the end of the two-year action planning periods and at the annual review of the action plans, causing the calls to be clarified and corrected as well. The NESP is adjusted annually. As for the GIS, revision is planned at the end of each major application cycle.

(g) Does support differ according to technology?

The EEOP has no specific preferred technologies. The eligible technologies are determined in accordance with the chapter of the calls on eligible activities; all technologies are granted equal aid rates. Aid intensity under the NESP and GIS is not technology-specific.

(h) What are the expected impacts in terms of energy production?

The impacts of the support scheme is measured using indicators (e.g. electricity generation from renewables in GWh/year; reduction in the emission of greenhouse gases in kt/year, etc.), the targets for which are set forth in the Operational Programmes and the Action Plans.

(i) Is support conditional on meeting energy efficiency criteria?

Projects designed to improve energy efficiency are required to ensure that after the project is completed, the building concerned meets the heat transmission requirements specified on Table 1 of Annex 1 of Decree No 7/2006 (V.24.) of the Minister Without Portfolio on determining the energy parameters of buildings. Another condition of eligibility is that equipment using renewable energy may only receive support if the building at least falls into category “C.” An exception is when only

domestic hot water supply needs or the heat needs of an economic or production process are being fulfilled.

(j) *Is it an existing measure? Could you please indicate national legislation regulating it?*

- Government Decree No 255/2006 (XII. 8.) on the fundamental rules of using subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 programming period, as well as the responsible institutions;
- Decree No 9/2010 (I.21.) of the Minister for National Development and Economy on the detailed rules for using funds assigned to the priorities under the Environment and Energy Operational Programme, and certain support titles;
- Joint Decree No 16/2006 (XII. 28.) of the Minister Heading the Prime Minister's Office and the Minister of Finance on the general procedural rules for using subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 period;
- Government Decree No 281/2006 (XII. 23.) on the setting up of financial processing and control systems with respect to the receipt of subsidies from the European Regional Development Fund, the European Social Fund and the Cohesion Fund in the 2007–2013 programming period;
- Government Decree No 323/2007 (XII.11.) on certain rules for the implementation of Act LX of 2007 on the implementation framework for the UN Framework Convention on Climate Change and the Kyoto Protocol thereof.

(k) *Is this a planned scheme? When would it be operational?*

The new schemes, in addition to the existing ones, will be opened starting in 2011.

(l) *What start and end dates (duration) are set for the whole scheme?*

The EEOP applies to the budgetary planning period of the European Union from 2007 to 2013. The first calls were available from 19 September 2007. The applications are being processed continuously and the schemes are open to the applicants until the committed funds are depleted. The last payment request under the Environment and Energy Operational Programme should be submitted by 30 June 2015. This is the date by which the scheme has to be closed.

The beneficiaries and the organisations involved in the processing of the schemes are required to record all documents relevant to the projects separately and to assist in control measures at least until 31 December 2020. The NHRDP schemes were first opened in 2007 and are expected to be closed in 2013. The NESP was first opened in 2001 and is expected to be continued on the long term. The GIS was announced in 2009 and is expected to be continued for as long as quota revenues are available.

(m) *Are there maximum or minimum sizes of system which are eligible?*

Aid under the schemes for electricity, CHP and biomethane production based on renewable energy can range from HUF 1 million to HUF 1000 million. With respect to biomass, power plants with a capacity not exceeding 40 MW_{th} are eligible for aid. In the case of NHRDP, the lower project threshold is tied to the agricultural holding size, while the support amount is capped at EUR 735 000 for raw alcohol and EUR 1 million for raw oil plants.

<p>(n) <i>Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?</i></p>

When drawing up the NHDP operational programmes, “demarcation” was given priority, and each operational programme includes a separate chapter dedicated to this issue. Other domestic or foreign funds may provide aid to the same projects, subject to Community and domestic regulations on the provision of so-called state aid on one hand and the provisions of Government Decree No 292/2009 (XII.19.) on the operational rules of public finances on the other hand.

<p>(o) <i>Are there regional/local schemes? If so, please detail using the same criteria.</i></p>
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In addition to the operational programmes listed above, calls under the region-specific Regional Operational Programmes (ROP) should be mentioned.

4.4.2. Specific questions for financial support for investments in the heating and cooling sector

(a) *What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)*

In cases considered businesses activities under Community law: state subsidy in the form of non-refundable aid. In other cases: non-refundable aid. The NESP and the GIS provide non-refundable aid.

(b) *Who can benefit from this scheme? Is it specified for certain technology(/ies)?*

The EEOP has no specific preferred technologies. The eligible technologies are determined in accordance with the chapter of the calls on eligible activities. Eligible applicants include businesses, bodies funded from the governmental budget, not-for-profit organisations and other economic entities. Beneficiaries under the NHRDP are the agricultural producers and individual rural areas. The beneficiaries of the NESP and GIS schemes are usually individuals and apartment buildings.

(c) *Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?*

The submission and processing of EEOP applications is continuous; changes are recorded at the revision of annual action plans or during the relevant year, depending on the importance of such changes. Submission of NHRDP applications is periodical and conforms to the periods specified by legislation. Support under the NESP and GIS schemes may be applied for until the relevant funds are depleted.

4.4.3. Specific questions for tendering with respect to heating and cooling

(a) What is the frequency and size of the tenders?

In the programming period, action plans – to which the new calls may be assigned – are published every two years. The expected size of tenders is specified in the action plans, broken down by individual schemes. The NHRDP schemes are announced every 1 or 2 years. The NESP and GIS schemes are usually published annually.

(b) Which technologies are specified?

The following technologies are eligible for support with respect to heating (EEOP):

I. The use of solar energy

Eligible types of projects:

- meeting domestic hot water supply needs in full or in part;
- meeting domestic hot water supply needs in full and/or in part and meeting heating and/or cooling needs in full or in part;
- meeting the heat needs for a production process in full or in part (e.g. pre-drying);
- meeting heat needs by converting electricity generated by solar panels into thermal energy.

Activities eligible for aid: the purchasing and installation of equipment absorbing the energy in solar radiation, and related structural components, as well as devices and equipment required for connecting to a hot water supply and/or heating system and/or a production process or for operation within a system; necessary building modifications (e.g. solar panels and/or solar thermal collectors and the support structures thereof, control units for solar thermal collector circles, thermostatic control valves, expansion tanks, hot water and buffer tanks with heat exchangers, mechanical components of the heat transmission system, pump blocks, necessary mechanical parts).

II. Biomass use

1. Using solid or liquid biomass directly to meet heat needs

Activities eligible for aid: the purchase and installation of biomass boilers and devices, equipment and structures required for their connection to domestic hot water supply and heating systems and/or production processes, or for the preparation and storage of feedstock; as well as machinery and equipment exclusively for the handling of fuel, and investment items for preparing the remaining materials for use in agriculture.

2. Conversion of solid or liquid biomass into semi-processed (solid, liquid or gaseous) fuel for meeting own heat needs or for selling

Activities eligible for aid: the purchase and installation of devices, equipment and structures required for storing, preparing and processing feedstock, for storing and handling by-products, as well as boilers and equipment enabling the storing of heat or for connecting these to domestic hot water supply, heating and cooling systems; devices, equipment and structures required for storing the fuel produced, as well as machinery and equipment exclusively for the handling of fuel or for the use of the remaining materials.

3. The installation and expansion of utilisation systems for producing biogas, landfill gas or meeting heat needs from solid and/or liquid feedstock

Activities eligible for aid: Sorting, preparation, sterilisation and fermenting of organic matter; machinery and equipment exclusively for the handling of feedstock; collecting, storing and transport to the site of heat generation of the biogas and landfill gas produced, as well as the devices, equipment, structures and heat generation equipment required for such activities; investment items for preparing the remaining materials for use in agriculture.

III. Using geothermal energy

1. Support for thermal energy

Eligible types of projects:

- Boring new thermal wells, installation of systems for meeting the heat needs for producing domestic hot water or for heating, cooling or production processes or for connection to heat consumers; establishing a drainage system in line with the relevant regulations.
- Making an existing thermal well that is currently not used for heat extraction suitable for meeting the heat needs for producing domestic hot water or for heating or production processes, or its connection with heat consumers; establishing a drainage system in line with the relevant regulations.
- Increasing the capacity of an existing geothermal heat system, which involves increasing the amount of water extracted, with the connection of new consumers; establishing a drainage system in line with the relevant regulations. Increasing the efficiency of an existing geothermal heat system (on the production side) without increasing the amount of water extracted, the connection of new consumers and/or installing a cascade system, establishing a drainage system in line with the relevant regulations, if resulting in an increase in the domestic renewable energy use.

Activities eligible for aid: Installation of medium to low enthalpy deep thermal water systems for heat extraction, expansion of extracting systems or converting them into multi-level systems. The boring of new wells (including test bores), testing new wells and converting wells (spent CH wells) into water wells, or renewing wells; installation and expansion of fluid extraction systems or systems transmitting heat to the user; using accompanying gas for electric generation; establishing a drainage system in line with the relevant regulations. Connecting new consumers to a cascade system.

2. Installation of heat pump systems

Eligible types of projects:

- Connecting heat pump technology to existing geothermal heat or balneology applications for meeting the heat needs of new consumers, adapting to a thermal system.
- Installing new vertical or shallow horizontal heat pump technologies with closed probes based on shallow ground heat, or connecting such technology to new heat supply systems or existing heat supply systems which need to be modified.
- Installing heat pump systems based on an existing water base (e.g. lake, permanent watercourse, bored well, etc.) or connecting the same to new heat supply systems or existing heat supply systems which need to be modified.
- Installing other heat pump systems, provided it does not conflict with the provisions of chapter C2.

Activities eligible for aid: Installing low-heat heat pump systems (using the heat of air, ground, water or waste). Installing ground probes, connecting them to heat consumers (cooling systems), installing heat pumps, setting up systems, performing building modifications required for system installation.

IV. The use of wind energy

Eligible types of projects:

- Meeting heating or cooling needs wholly or in part by converting electricity generated using wind energy into thermal energy and connecting to the heat supply system.

Activities eligible for aid: Installation of electricity generation units, support structures and units for converting electricity into thermal energy, control systems, making the necessary building investments.

V. Installing communal district heating systems using renewable energy sources or migrating such systems to renewable energy sources wholly or in part, and Migrating the heat needs of existing district heating systems to renewable energy sources wholly or in part and installing new district heating systems based on renewables

Activities eligible for aid:

- conversion of existing heat generating units (e.g. from natural gas fuel to biogas fuel) or replacement thereof (e.g. from natural gas fuel to biomass fuel),
- installing and commissioning new production capacities based on renewables (provided that it involves reduced use of the fossil unit or additional needs are met from renewable energy sources; fossil units are not eligible for aid),
- units for the storage of fuel (e.g. heat tanks, gas tanks, buffer tanks, fuel storage, etc.).

VI. Regional development based on renewable energy

The following are understood as regional development impacts:

- increased employment, job creation;
- tangible increase of local income levels;

- resolution of local environment issues;
- improving the quality of life of socially disadvantaged regions and population groups through projects for the use of renewable energy;
- exploiting advantages of geography or settlement pattern;
- strengthening local communities, creating communal goals and contribution to the achievement of such goals.

Activities eligible for support:

(A) Mandatory components (at least one of the following must be selected):

- The generation of thermal energy and/or cooling energy from renewable energy sources.
- Electricity generation from renewable energy sources.
- CHP generation from renewable energy sources.

Allowed renewable energy sources: solar energy, wind power, hydropower, geothermal energy, biomass (direct and indirect applications), as well as biogas (including biogas from landfills and from sewage processing facilities).

(B) Optional components (any number of the following may be selected):

- Increasing energy efficiency, reducing energy consumption (primary and secondary systems).
- Creating appropriate conditions for purchases relevant to the production of feedstock.
- Setting up appropriate conditions for creating the user side for the energy produced (infrastructure, purchasing tools and equipment, training).

The following technologies are eligible for support in the field of cooling (EEOP):

Eligible types of projects:

- Meeting cooling needs by installing of absorption cooling systems using any type of renewable energy sources (see the section above for detailed project types)

NHRDP support focuses on biomass boilers, biogas power plants and the use of geothermal energy, but equipment for using solar energy or wind power may also be purchased.

The NESP and GIS schemes are basically focused on the type of equipment suitable for household use (solar thermal collectors, heat pumps, biomass boilers).

<p>(c) Is it integrated with grid development?</p>

The Operational Programme states that “Introduction and application of equipment and control methods facilitating the integration of renewable energy sources in electricity and other energy systems and addressing the capacity limits of the systems, having regard to the principle of supply security.” No such application can currently be submitted, however, because the competent national bodies did not indicate their need in this respect. Eligible costs under the call include equipment and

devices required for the creation of networks. The NHRDP, GIS and NESP schemes are not related to other grid development.

4.4.4. Preferential tariff for heat pumps and other equipment for the heat supply of buildings from renewable energy sources

(a) What is the name and a short description of the scheme?

Mandatory tariff for heat pumps and other equipment for the heat supplying heat to of buildings from renewable energy sources ("H" tariff). This is a preferential electricity tariff for the electricity used by consumers eligible to universal service [EA Art. 3(7)] to operate equipment (e.g. heat pumps, thermal solar collectors, circulation pumps, etc.) for the heat supply of buildings from renewable energy sources. The subsidized tariff is only available in the heating season.

Voluntary preferential tariff for heat pumps (e.g. "B" GEO tariff). One electricity provider created its own heat pump tariff in addition to the mandatory heat pump tariff, as part of controlled consumption.

(b) Is it a voluntary or obligatory scheme?

The "H" tariff is a universal obligatory scheme, as its introduction was set forth in a ministerial decree. Participation is voluntary for the consumers eligible to universal service, i.e. the operators of the equipment. The scheme is obligatory for the parties funding the subsidy, i.e. the users of universal services and all users of the electricity system.

Voluntary scheme: the service providers may create their own voluntary tariffs in addition to the obligatory ones.

(d) What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?

The difference between the energy tariff and the whole-day A1 energy tariff is financed by the users of the universal services; the system use fees are financed by all users of the system in the medium and long term, and (partially) by the distribution licence holders in the short term.

(g) Does support differ according to technology?

No, it does not differ according to technology.

(h) What are the expected impacts in terms of energy production?

It increases the share of renewables in household use.

(i) Is support conditional on meeting energy efficiency criteria?

Yes: the minimum requirement for heat pumps is a coefficient of productivity value of 3.

(j) *Is it an existing measure? Could you please indicate national legislation regulating it?*

- Decree No 44/2008 (XII. 31.) of the Minister for Transport, Communications and Energy on the pricing of universal services in the electricity market, and product packages to be provided in the framework of universal service provision;
- Decree No 119/2007 (XII. 29.) of the Minister for Economy and Transport on electricity network access fees;
- Decree No 117/2007 (XII. 29.) of the Minister for Economy and Transport on the financial and technical conditions of connecting to the public electricity network.

(k) *Is this a planned scheme? When would it be operational?*

The preferential tariff has been in effect since 16 April 2010; its first actual application took place on 16 October 2010, with the start of the heating season.

(l) *What start and end dates (duration) are set for the whole scheme?*

The start date is 16 April 2010. There is no end date specified for the preferential tariff.

(m) *Are there maximum or minimum sizes of system which are eligible?*

There is no performance cap for residential user and public institutions. For non-residential users, performance is capped at 3*63A.

(n) *Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?*

The scheme is independent from other forms of support.

4.5. Support schemes to promote the use of energy from renewable resources in transport applied by the Member State or a group of Member States

“Transport is an organic support component of the economy and society. ... At the same time it has various, uncompensated or only partly compensated, costs for society, which appear at community level. It is essential that we maximise the benefits of transport while minimising its burdens to society.”

Excerpt from the New Széchenyi Plan, 28 July 2010

This sub-chapter presents the regulation of the use of renewable energy sources in transport. One key element of such regulation is the new biofuel act, i.e. Act CXVII of 2010 *on the promotion of the use of renewable energy for transport purposes and the reduction of greenhouse gas emissions from energy used in transport (BFA)*, which serves various functions. On one hand, it sets forth the general conditions applicable to one of the most important incentives (mandatory admixture); and on the other hand, it introduces components for ensuring sustainability.

With respect to biofuels, Hungary's excellent agro-ecological characteristics give rise to a significant potential in domestic production. According to the estimate of the experts of the Hungarian Institute of Agricultural Engineering, over 10% of the estimated use for 2020 could be produced from first generation biofuels only, while ensuring that food and feed targets are met; the appearance of second generation biofuels could further increase this figure as the range of feedstocks widens.

The domestic use of biofuels is limited primarily by engine technology, as motor vehicles are not able to function correctly using fuels containing more than a certain percentage of biofuels. Therefore, more widespread use requires the spreading of vehicles that are able to use motor fuels with a higher biofuel component, or pure biofuel; we plan to promote the spreading of such vehicles through financial tools and indirect measures (green public procurement) primarily in the field of community transportation.

We also plan to promote the transport use of biogas in community transportation and in waste transportation.

It is especially important to support research and development concerning biofuels and to support efforts to develop second generation biofuels.

Please follow the structure of point 4.3 and apply the questions the support measures provided for renewable energy use in the transport sector. Please make distinctions according to transport modes (such as road transport, non-road land transport). Please address the following additional points:

(a) What are the concrete obligations/targets per year (per fuel or technology)?

The current requirement with regard to mixing biofuels into petrol and diesel is for a minimum of 4.8% v/v (in terms of energy content, 3.2% for petrol and 4.4% for diesel). The quantity and proportion in terms of total energy content is presented in Table F/12.

(b) *Is there differentiation of the support according to fuel types or technologies? Is there any specific support to biofuels which meet the criteria of Article 21(2) of Directive 2009/28/EC?*

Biofuels admixed to fossil fuels are not granted support or tax benefits; the former excise tax benefit was replaced by a distribution obligation in 2009. The Hungarian standards allow the distribution of E85 fuel, the bioethanol component of which is exempt from excise tax.

The rules in Article 21(2) of the RED on biofuels from waste and residues which should be doubled for the purpose of calculation will be incorporated into the decrees in the course of legal harmonisation; the possibility and extent of support will need to be examined simultaneously.

Questions from point 4.3 concerning transport, by subsections:

4.5.1. Regulations and legislation applicable to biofuels

Regulation can set target(s) and obligations. In case there is such an obligation please detail it:

(a) *What is the legal basis for this obligation/target?*

The tax benefit applicable to biofuels mixed into petrol and diesel was discontinued in 2009 and replaced by a distribution obligation (with non-compliance being sanctioned). The percentage that the producers, importers and distributors of fuels are required to put on the market is stipulated in Article 143/E of Act XXIX of 2004 on the amendment of certain acts related to Hungary's accession to the European Union, the repealing of certain legislative acts and the stipulation of certain legislative acts; detailed rules are set forth in Government Decree No 138/2009 (VI. 30.) on the implementation of these legislative provisions.

These provisions required fuel distributors to put on the market a volume of biofuels or other renewable fuels equal to a certain percentage of the fuels they sell. Such mandatory biofuel volumes need to be sold on a monthly basis. The relevant percentage figures are regulated by Government Decree No 138/2009 (VI. 30.) on the rules of implementing certain provisions for promoting the use of biofuels in transport. The minimum percentage figures, expressed in terms of energy content, now harmonise with the 4.8% v/v biocomponent percentage stipulated in the relevant act: the relevant percentage for petrol is 3.1% of the volume sold, expressed as energy content, while for diesel, the relevant percentage is 4.4% of the volume sold, expressed as energy content.

Appropriate record-keeping and reporting obligations were stipulated to allow compliance with the mandatory biofuel percentages. Compliance with the obligations is controlled by the customs authority, as set forth in the Government Decree. The authority levies fines for non-compliance with the mandatory admixture percentages or the record-keeping and reporting obligations. The amount of such fines (which is based on the energy content of the missing biofuel and the purchase price of the biofuel) is an appropriate incentive to ensure that distributors comply with their obligations.

(b) *Are there any technology-specific targets?*

The obligation applies to fuel used in road transport. Currently there are no requirements applicable to other fields of transport.

(c) *What are the concrete obligations/targets per year (per technology)?*

It is obligatory to mix in 4.8% v/v biofuel in both petrol and diesel or to sell a volume of biofuel corresponding to 4.8% v/v of the fuels sold to be used in transport. Fuel distributors may also meet this obligation by selling E85 fuel while not mixing biofuel into certain fuel qualities.

(d) *Who has to fulfil the obligation?*

The regulations require the producers, importers and other distributors of fuel to put the required volume of biofuel on the market.

(e) *What is the consequence of non-fulfilment?*

The competent authority determines the energy content of the volume which should be put on the market by the fuel distributor under the regulation. A distributor that has not fulfilled this obligation is fined by the authority for 35 HUF/MJ on the energy content of the unsold volume.

(f) *Is there any mechanism to supervise fulfilment?*

The legislation mentioned in point (a) contain detailed provisions on reporting obligations, with respect to their frequency and their content. Reports are submitted to the customs authority (which has been merged with the tax authority). Failure to submit a report incurs a fine, while if documents are not appropriate, the relevant volume of biofuel is not taken into account for the purpose of fulfilment.

(g) *Is there any mechanism to modify obligations/targets?*

There is no pre-determined period of modification or other mechanism. In general, the regulation is reviewed annually, and any modification is introduced at a time agreed upon with the relevant stakeholders and fuel distributors, allowing sufficient time for preparation.

4.5.2. Financial support in transport

Financial support can be classified in various ways. Examples are financial support for investment, capital grants, low interest loans, tax exemptions or reductions, tax refunds, tender schemes, renewable energy obligations with or without green certificates (tradable green certificates), feed-in tariffs, feed-in premiums, voluntary schemes.

(a) What is the name and a short description of the scheme?

The tax benefits granted under the legislation have a narrow scope, applying to E85 fuel and the use of pure biodiesel in machinery, but not in transport.

The Ministry of Agriculture provides support for the establishment of low capacity (1 to 10 kt/year) plants for the production of raw alcohol or raw oil under the rural development programme.

In the future we plan to support the purchasing of mass transportation vehicles able to use fuels with a high biofuel content.

Support might also be provided to electric vehicles, with the potential areas of support being the establishment of an environmental category, financial support schemes for zero emission (purely electric) vehicles, as well as the establishment of a recharging network.

(b) Is it a voluntary or obligatory scheme?

The scheme is voluntary, it is not obligatory to claim the benefits. Not meeting the mandatory admixture proportion is sanctioned.

(c) Who manages the scheme? (Implementing body, monitoring authority)

The implementing body is the customs authority of the Republic of Hungary (which has been merged with the tax authority); the investment aid scheme is managed and operated by the NDA.

(d) What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?

The mandatory admixture system does not require budgetary resources. The current share of E85 fuel barely exceeds 2% of petrol sales and does not require significant funds.

(e) How is long-term security and reliability addressed by the scheme?

No specific period has been stipulated for the benefits. Reliability is ensured by the target indirectly, emphasizing that the core element is the mandatory admixture system, which we intend to maintain in the long term. We intend to specify the mandatory admixture proportion for 3 years in advance, which allows sufficient time

for preparation for the distributors, and sufficient time for biofuel producers to make the necessary investments.

(f) *Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?*

There is continuous consultation between the affected distributors, the biofuel producers, the ministry responsible for the budget, as well as the tax and customs authority; revision is performed on a case-by-case basis based on such consultations.

(g) *Does support differ according to technology?*

Yes, the extent of support differs according to the types of biofuel. Judging by the changes in the share of biofuel use, the support is sufficient and proportional.

(h) *What are the expected impacts in terms of energy production?*

The tax benefits are a temporary form of support, facilitating the transition to a higher mandatory admixture percentage or possibly the introduction of a new type of biofuel. The core component, however, is mandatory admixture; this is what constitutes the majority of biofuel use.

(i) *Is support conditional on meeting energy efficiency criteria?*

Support is currently not conditional in energy efficiency. Also, in the next few years, we only foresee sustainability criteria as a support condition. We consider that the 50% GHG saving after 2015 will partially contribute to energy efficiency as well, especially in combination with the FQD Directive.

(j) *Is it an existing measure? Could you please indicate national legislation regulating it?*

The excise tax benefit for E85 fuel and pure biodiesel is regulated in Art. 52(2)(a) of act CXXVII of 2003 on the special rules for excise tax and the distribution of excise products.

(k) *Is this a planned scheme? When would it be operational?*

The tax benefit is already in effect and operational.

(l) *What start and end dates (duration) are set for the whole scheme?*

The scheme has been operating in its present form since 2009. No end date has been specified.

(m) *Are there maximum or minimum sizes of system which are eligible?*

No maximum or minimum sizes have been specified. The collateral arrangements and the requirements under excise legislation indirectly exclude producers of very slight volumes, though.

(n) *Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?*

There is currently no cumulative support. With respect to second generation biofuels and biofuels indicated in Article 21(2) of the RED, however, support from multiple sources may be considered, at least temporarily.

(o) *Are there regional/local schemes? If so, please detail using the same criteria.*

We are currently not aware of such schemes.

4.6. Specific measures for the promotion of the use of energy from biomass

“Our goal is to create versatile agriculture, environmental and landscape management, which can produce healthy and safe food with the lowest possible impact on the environment, as well as local energies and various resources, while preserving our soils, drinking water resources, wildlife and our natural treasures.”

Excerpt from the Programme of National Cooperation, 22 May 2010

Hungary's agro-ecological characteristics are excellent for the competitive production of biomass. Hungarian agriculture is able to produce biomass suitable for energy production in excess of meeting food and feed needs in the long term, in a sustainable manner and at competitive prices.

Energy recovery from biomass is more than simply a question of energy production: biomass can be instrumental to the multifunctional development of and a breakthrough field of development for rural areas. Consequently, we intend to base the use of biomass for energy generation on new premises. Rather than large power plant capacities, we wish to support biomass use for the local generation of thermal energy; with respect to electricity, low to medium capacity plants with a local regional development impact should be supported. The goal is to ensure that to the extent possible, biomass is used near its place of production and that new small to medium power plants are established through close cooperation between micro-regional players. All this is intended to serve the central policy objective of making the agricultural and forestry sectors, as well as rural players, the unambiguous beneficiaries of biomass use for energy generation and to ensure that a larger proportion of the commercial benefits (profits) from energy generation makes it to their income. Additionally, we attach special importance to the application of a lifecycle-based approach in the production and use of biomass for the generation of energy, as well as to ensuring a positive energy balance and the preventing of negative environmental impacts.

Within the significant biomass potential we intend to promote the use of by-products and residues both for biogas and for incineration applications. In the process of producing and collecting biomass it is especially important to enforce the criteria of sustainability, environmental protection and conservation, as only thus can long-term sustainability and the preservation of environmental values be ensured.

Biomass has an important role as primary energy in all the three sectors: heating and cooling, electricity and transport. National biomass strategy is crucial to plan the role and the interaction of uses between the energy end uses and interaction with other non-energy sectors. Therefore Member States are required to assess their domestic potential and increased mobilisation of domestic and imported biomass resources. The impact on and the interaction with other non-energy sectors (as the food and feed industry, pulp and paper industry, construction industry, furniture industry etc.) should be analysed.

The domestic potential with respect to renewable energy sources is described in detail in point 4.6.1.

4.6.1. Domestic supply of biomass feedstock; applications

Under this point Member States should assess the supply of domestically available biomass and the need for imports.

There should be a distinction between biomass (A) from forestry – (1) direct and (2) indirect supply; (B) from agriculture and fisheries — (1) directly provided and (2) by-products/processed crops; and (C) from waste — (1) biodegradable fraction of municipal solid waste, (2) biodegradable fraction of industrial solid waste and (3) sewage sludge. Data is required for the above-mentioned first subcategories, while more detailed information is optional. However the aggregated figures shall reflect the following categorisation and give information in the units of Table 7. The role of imports (EU and non-EU) and exports (if possible, EU and non-EU) must be reflected.

Please note that wood chips, briquettes and pellets can be either from direct supply or from indirect supply from forestry. If information on pellets is included in the table, it should specify whether the raw material comes from direct or indirect supply.

In the case of biogas and biofuels the amount of raw feedstock should be detailed in Table 7, not the amount of processed feedstock. It is understood that for imports and exports the amount of biomass feedstocks for biofuels is more difficult to ascertain, and estimations may be necessary. Alternatively, if the information on imports is given on the basis of biofuel imports, it must be specified in the table.

The following information is provided to complement the item in tables F/7 and F/7a on biomass from waste:

Biomass supply in 2006

Table F/7

Sector of origin		Resource quantity	Imported		Exported	Net quantity	Primary energy production PJ/year
			EU	Non-EU	EU/non-EU		
(A) Biomass from forestry:	From which:						
	1. Direct supply of wood biomass from forests and other wooded land for energy generation	3 028 000 m ³ firewood	100 000 m ³	100 000 m ³	100 000 m ³	3 128 000 m ³	22.5
	2. Indirect supply of wood biomass for energy generation	300 000 m ³	-	-	-	300 000 m ³	2.23
(B) Biomass from agriculture and fisheries (1):	From which:						
	1. Agricultural crops and fishery products directly provided for energy generation	68 000 t	N/A	N/A	N/A	68 000 t	0.8
	2. Agricultural by-products/processed residues and fishery by-products for energy generation	234 000 t	N/A	N/A	N/A	234 000 t	1.38
(C) Biomass from waste:	From which:						
	1. Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas	1 969 000 t (from which: solid: 1 828,000 t landfill gas: 141 000 t)	-	-	-	1 969 000 t	N/A
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)	1 860 000 t	16 000 t	-	48 000 t	1 828 000 t	N/A
	(3) Sewage sludge	261 000 t	-	-	-	261 000 t	N/A

⁽¹⁾ Includes the raw feedstock of biogas and bioliquids pursuant to point 4.6.1 of Commission Decision 2009/548/EC establishing a template for National Renewable Energy Action Plans under Directive 2009/28/EC of the European Parliament and of the Council.

Estimated biomass domestic supply in 2015 and 2020

Table F/7a

Sector of origin		2015		2020	
		Expected domestic sources	Primary energy production PJ/year	Expected domestic sources	Primary energy production PJ/year
(A) Biomass from forestry:	1. Direct supply of wood biomass from forests and other wooded land for energy generation	3 100 000 m ³ (estimate)	22.32	3 300 000 m ³ (estimate)	23.74
	2. Indirect supply of wood biomass for energy generation	400 000 m ³	2.14	500 000 m ³	2.9
(B) Biomass from agriculture and fisheries (1):	1. Agricultural produce and fishery products directly provided for energy generation	1 500 000 m ³	15.1	3 000 000 t	30.14
	2. Agricultural by-products/processed residues and fishery by-products for energy generation	2 100 000 m ³	12.14	2 850 000 t	17.17
(C) Biomass from waste:	1. Biodegradable fraction of municipal solid waste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas	2 100 000 t	N/A	2 100 000 t	N/A
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)	1 500 000 t	N/A	N/A	N/A
	3. Sewage sludge	499 000 t	N/A	N/A	N/A

Current agricultural land use for production of crops dedicated to energy in 2006

Table F/8

Current agricultural land use for production of crops dedicated to energy	Area (ha)
1. Land used for short rotation trees (willows, poplars, etc.)	401
2. Land used for other energy crops such as grasses (Miscanthus) and sorghum	2122

The range of potential crops is very wide; in fact, an optimal energy crop can be found for any type of production site, and certain energy crops have a very wide tolerance range. The equipment required for the growing and harvesting of energy crops are, in the case of herbaceous energy crops, in part available; the purchasing of machinery lines for harvesting ligneous energy plantations and for the handling and processing of energy crops (e.g. pellet and briquette makers) can be ensured in the medium term. Potential is therefore limited by the size of available land, the sustainability criteria, as well as other food and energy demands (e.g. biodiesel, bioethanol).

4.6.2. Measures to increase biomass availability, taking into account other biomass users (agriculture and forest-based sectors)

Mobilisation of new biomass sources:

(a) Please specify how much land is degraded.

The definition of “severely degraded land” is provided in point 9 of Annex V to the RED, which stipulates that “‘severely degraded land’ means land that, for a significant period of time, has either been significantly salinated or presented significantly low organic matter content and has been severely eroded;”

In Hungary the detailed designation of areas, the aggregation of such data and the related surveys are still in progress.

(b) Please specify how much unused arable land there is.

The information requested is not available either from the land register or the land use records. Therefore, we present the data of the Research Institute of Agricultural Economics: the area of unused arable land (fallow) in Hungary was 103 774 hectares in 2005 and 94 371 hectares in 2009.

Currently the size of land used for field crops is between 4 300 000 and 4 500 000 hectares, while the size of grasslands is 1 060 000 hectares. The majority of professional workshops and advocacy groups is of the opinion (cereal balance, export data, market analysis, etc.) that the traditional production structures can be maintained profitably on approximately 3 300 000 to 3 400 000 hectares of land. This means that a different – non-food – utilisation should be found for at least 1 000 000 hectares in the medium term. A change in land use is also made necessary by the fact that a portion of the relevant arable lands has unfavourable characteristics (below 17 gold crowns, prone to high water table, etc.) and cannot support profitable food crop production but could support profitable energy crop production.

Deducting the land to be used for biofuel feedstock from the 1 000 000 hectares, 200 000 hectares of land – currently used for intensive cultivation – could be converted for the production of solid biomass in the short term (3–5 years).

Planting ligneous energy plantations could extend the range of energy biomass on offer, which would widen the range of forestry biomass on offer; also, the new crops could allow rational crop use, i.e. using crops better suited to the production site. In addition to the various herbaceous and ligneous energy plantations, special attention should be paid to the collection and use of by-products and waste (straw, stem, vine etc.).

(c) Are any measures planned to encourage the use of unused arable land, degraded land, etc. for the generation of energy?

With a view to ensuring that certain comprehensive national economy goals are achieved, the Green Economy Development chapter of the New Széchenyi Plan reflects a high priority governmental effort to promote the efficient use of renewable energy sources from agriculture and forestry, to improve the security and diversify the sources of domestic energy supply, as well as to promote sustainable development, increase rural employment, improve the liveability of villages and small towns, having regard to the criteria of replacing fossil energy sources and promoting environmental protection and conservation – in order to increase the profitability of agricultural production.

Considering the natural endowments of the country, biomass could play a decisive role within renewable energy sources. The potential range of feedstocks is very wide and may be broken down into the following categories:

- biomass from forestry;
- energy crops specifically grown for this purpose (herbaceous and ligneous energy plantations);
- agricultural by-products and waste;
- other by-products and waste.

The following table presents the potential volume of biomass which can realistically be produced or collected in the individual categories in the medium term (7–15 years), as well as the amount of energy which can be generated.

Description	Realistically produced/collected (million t/year)	Energy content (PJ/year)	Electricity* (GWh/year)
From forestry	3.25	45.5	2.275
Produced for this purpose	5.6	74.16	6.180
Agric. by-product, waste	5.4	62	5.100
Other by-product, waste	0.55	6.6	550
Total	14.8	188.26	14.105

Table 7: Quantities of biomass which can potentially be secured for energy generation in the medium term

A note on methodology: for the purpose of calculating electricity potential, 60% of forestry resources and of ligneous energy plantations grown for this purpose were considered to be potentially useful for electricity generation; the corresponding figure for the other categories was 30%.

The availability, production and use of solid biomass plays an important role in promoting renewable energy sources. This also means that progress in the field of renewable energy sources will increase the value of rural areas; agriculture could become an energy producing sector, sales channels can grow, and the income generating ability of producers can improve.

Additionally, it is an agricultural policy goal that agriculture and the rural areas should be the unambiguous beneficiaries of the growth of the new green energy sector, and that a significant portion of the profits derived remain in the agricultural sector, at the rural actors. Therefore, the measures are intended to encourage not only the production of feedstock, but also the primary processing of such feedstock by the producers, and local use.

In addition to promoting the use of renewable energy sources on a national level (medium-sized and larger electric power plants), the promotion of local applications (municipal governments and their institutions) is especially important.

By facilitating local cost-efficient use employing optimised solutions, by promoting environmentally friendly energy sources in rural regions, by eliminating the notion of “energy is there but is unused” and by promoting local processing, the volume of resources used can be increased while energy dependency can be reduced.

By 2020 the increasing demand for biomass (and wood cuttings) can only partially be satisfied from the current forestry products even if logging waste is collected at an increased rate. It is therefore desirable to compile a “biomass mix,” recommending a balanced composition – having regard to capacities, possibilities and needs (which could vary by area and type of user) – which is capable of supplying the required amount of biomass.

It is estimated that 7.8 to 8 million tonnes/year of biomass will be required to satisfy the growing renewable energy demand up to 2020. To satisfy this demand we need to rely on the current forests, new plantations (2010–2015), the firewood and logging waste derived from these, agricultural by-products, herbaceous and ligneous energy crops, by-products and waste. A significant portion of this volume is available from the public and private forests of Hungary.

Biomass type	Volume (thousand t/year)	Share (%)
Forestry product	2.114	27.17%
Wood processing by-products used for energy generation	231	2.97%
Energy crops	1.914	24.60%
Agricultural by-products and waste	3.522	45.26%
Total	7.781	100%

Table 8: Estimated biomass mix 2020

The primary goal is to ensure that appropriate crops are produced in poorer quality areas, while observing the key principle of “secure food supply first, energy crops second,” as good soil requires the production of healthy foods, while less fertile lands offer an excellent opportunity for growing alternative energy crops. Consequently it is intended that the lands used for energy generation are lands which cannot profitably

be used otherwise, such as sandy and flood areas, areas designated for recultivation, protective strips along roads, etc., by promoting the planting of ligneous (fast-growing) energy plantations.

The various ligneous energy crops often have a wider tolerance scale than “traditional” food crops. Subject to certain conditions, they could allow profitable farming on less favourable lands as well, generating positive economic, social and energy impacts. The key to success is to choose the optimal crop for the specific land and market conditions. The growing of energy crops therefore serves a dual purpose: to widen the range of crops available and to supply the necessary feedstock.

(d) *Is energy use of certain already available primary material (such as animal manure) planned?*

Of the total use of renewable energy in Hungary, nearly 80 percent is derived from biomass and 50 percent is derived from firewood. The biomass produced, as a dominant component of renewable energy sources, can be a basic pillar for growth. A significant volume of biomass suitable for energy recovery is produced both in forestry and in agriculture, the energy recovery from which is not or only partially resolved. The sustainable use of such reserves and the production of biomass dedicated to energy generation could supply a significant volume of renewable energy sources. Lands released from agricultural production allow the production of large quantities of biomass (energy tree plantations, other energy crops), while traditional forestry allows the production of dendromass suitable for energy generation.

Various measures within the New Széchenyi Plan are designed to promote energy recovery from agricultural and forestry by-products and waste.

The measures foreseen include:

- optimal processing and energy recovery from forestry and agricultural biomass,
- supporting the plantation, processing and use of ligneous energy plantations grown for this purpose;
- installing biomass fuelled district heating centres to replace the heating of individual gas-heated homes and community buildings,
- improving the energy efficiency of institutions funded by the municipal governments and converting them to use renewable biomass as their energy source;
- establishing a system of biomass-fuelled small-scale power plants for the generation of electricity and the simultaneous use of waste heat produced,
- implementation of small-capacity biomass-fuelled (agricultural and forestry by-products, biomass production) power plant and heating plant projects along with related agricultural (e.g. horticultural) projects,
- setting up energy farm systems in order to exploit the synergistic benefits of harmonizing the integrated systems of bioethanol, biogas, livestock farming and field crop production;
- replacing existing gas-fuelled district heating centres and gas-fuelled heat centres supporting industrial or agricultural technologies with biomass-fuelled heating blocks and micro power plants,

- replacing cogeneration heat centres with biomass-fuelled heating plants/small power plants where the conditions are suitable, along with establishing an appropriate legislative and support background (shifting support under the green electricity off-take scheme in favour of renewables and new green energy projects),
- installing energy supply systems based on solid biomass in settlements not connected to the gas pipe network.

Another important field of using primary materials is biogas production. Hungary has an extensive natural gas system: 90.8 of the settlements have access to gas from the pipeline, and combustion plants are predominantly modern and well-regulated. Despite solidly increasing gas prices and periodic supply issues, switching to an alternative energy source is difficult. Promoting the establishment of capacities suitable for the production of biogas of appropriate quality and the integration of such capacities into the existing natural gas network, however, holds significant potential for the national economy. The following measures are foreseen to promote energy recovery from the currently available primary materials (biodegradable household waste, sewage sludge, animal manure, etc.):

- Implementing heat use capacities to use waste heat from biogas plants;
- Construction of biogas plants, connecting biomethane systems to the national network, promoting mass transportation using biogas fuel;
- Electricity and thermal energy generation in pyrolysis micro power plants at the site of consumption from locally produced communal waste to replace the current landfill methods.

One of the key goals of these measures is that agriculture should transcend the production of base feedstock and move further along the phases of processing and use. Their multifunctional presence in the product line could generate added revenue and increased added value for farmers and those who are actively participating in the process.

Job creation and the preservation of jobs will have an impact primarily in agriculture and in rural areas; the collection of biomass and energy crop farming can offer employment for a significant number of unskilled workers. There are various ways for using biomass – depending on the form it takes and the purpose for which it is used –, such as combustion, biogas or biofuels. Of these, special attention should be given to the ones that can achieve a more substantive impact on the national economy and society. At the same time, using biomass for energy generation allows project implementation in the framework of an integrated system, by linking several project components (solid biomass product line approach).

(e) Is there any specific policy promoting the production and use of biogas? What type of uses are promoted (local, district heating, biogas grid, natural gas grid integration)?

The Ministry of Rural Development provides support for the establishment of biogas plants attached to livestock holdings under an NHRDP scheme (ÁTK) announced in Decree No 27/2007 (IV.17.) of the Minister for Agriculture and Rural Development.

The energy policy concepts for promoting the use of biogas are formulated as part of the strategy on renewable energy sources. Currently there is no central policy or separate plan proposing measures specifically for biogas.

In addition to the measures outlined in point (d), a separate biogas action plan is intended to be drawn up in the future in order to review the entire sector and to adopt incentive measures covering all segments of the sector in the framework of an integrated "Biogas Action Plan."

(f) What measures are planned to improve forest management techniques in order to maximise the extraction of biomass from the forest in a sustainable way? How will forest management be improved in order to increase future growth? What measures are planned to maximise the extraction of existing biomass that can already be put into practice?

The current techniques and forestry procedures, which serve sustained forest management, should not be modified in order to increase the amount of biomass extracted. An argument which is often raised is that the wood burnt in power plants could be used to produce more value; however the interests of forestry companies are clear: as careful managers they strive to maximise the extracted value and to avoid selling at lower prices sawn goods and other materials which can be sold at higher prices in the market.

The high quality portion of extracted wood is not burnt in the power plants, as the price of logs suitable for the sawmill or wood board industry is a lot higher than that of firewood. Once mature for logging, the quality of wood left unlogged in the forest deteriorates and becomes impossible to use as a higher value product (what is more, the greenhouse effect of methane produced in the forest from the natural decomposition processes of wood is 21 times higher than that of the carbon dioxide taken up in the course of photosynthesis). Decaying trees can become a host to parasites and insects which can destroy healthy forests as well if left to proliferate. Considering the long production cycles, striving for higher revenues is not only in the commercial interest of forestry companies but is also their professional and moral obligation. The unsuitability of forestry feedstock used for energy generation for processing by the sawmill industry is supported by well-established parameters.

Forest owners and forest managers sort the materials on the basis of parameters specified by the European and Hungarian standards and the purchasing usances developed along the line of such standards. Under the current legislation, forestry products used for energy generation must be products which are not suitable for any other use due to their quality or size parameters, the market needs or the relevant legislation.

Article 10(2)(c) of Act LXXXVI of 2007 on electricity stipulates that the mandatory electricity off-take scheme cannot provide support to electricity generation that uses wood categorised as sawmill log or higher as a source of energy.

Pursuant to Article 7(2) of Government Decree No 389/2007 (XII. 23.) on the mandatory off-take and off-take price of electricity generated using energy produced from renewable energy sources or waste and cogenerated electricity, whenever electricity is generated from biomass, the power plant is required to give proof – in

accordance with the provisions of the separate act on forests – that such biomass is obtained from sustainable forestry, by presenting a certificate of the forestry authority for forestry biomass originating from the territory of the European Community, or by presenting an FSC certificate or, in the future, a certificate under the Programme for the Endorsement of Forest Certification (PEFC) for forestry biomass originating from a third country.

Under Article 90(1) of Act XXXVII of 2009, the forest manager or the personnel authorised by the forest manager is required to issue a certificate (“transport note”) on the origin and for the transport of any wood extracted from forests. This note is based on the forestry operational sheet. The person transporting the wood is required to keep the transport note with him and present it to the representative of the authority upon request. The details recorded on the transport note must be recorded throughout the commercial operations involving such wood, in line with the law on the implementation of the act.

Hungary’s “Forest Act” is one of the oldest and strictest forest protection laws in Europe. Any wood extraction from a forest must comply with the provisions of the Forest Act and must be authorised by the Central Agricultural Office (CAO). Even under the strict regulations above, only 70 percent is extracted of the 10 million cubic metres of wood which could be sustainably extracted a year in Hungary, meaning that the country’s living wood stock is increasing each year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Allowed by the forest plan	9 183	9 298	9 444	9 857	10 130	10 078	10 235	10 160	10 384	10 508
Actual extraction	7 287	7 011	7 013	7 086	7 095	7 167	7 005	6 609	7 024	6 773

Table 9: The volume of wood allowed to be extracted from domestic forests under the regional forest plans and the volume of wood actually extracted on the basis of authorisations issued by the forestry authority in 2000–2009

Source: CAO, Forestry Directorate Centre; Unit: thousand m³

The size of forested land in Hungary (2 million hectares) increased even after the power plants were converted to using wood as fuel (in 2005), and has been increasing ever since. The scale of wood extraction remains below the levels authorised by the forestry authority. It stays steadily around 7 million cubic metres and shows no increasing tendency. In 2009 the volume of forest wood products used for energy generation reached 3.5 million cubic metres, which is 50 percent of the authorised extraction volume.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Forest cuttings	4	3	3	7	5	14	31	50	151	151
Thick firewood	1 621	1 494	2 092	2 472	2 356	2 774	2 869	2 550	2 588	3 012
Thin firewood	241	196	303	302	311	348	346	279	396	363
Firewood total	1 866	1 693	2 398	2 781	2 672	3 136	3 246	2 879	3 135	3 526

Table 10: Forest wood products used for energy generation, 2000–2009

Source: CAO, Forestry Directorate Centre; Unit: thousand m³

Figure 6



Source: Hungarian Energy Office – Control of biomass used in power plants, 2008

While the annual aggregate level of wood extraction is nearly stable, the share of the firewood category is typically increasing, although at varying rates. One important reason for this is that the price of firewood slowly caught up with the price of various industrial categories (pulp, paper, third-grade sawmill log, etc.) and that demand also grew due to the use of firewood for energy generation. The dynamic increase in the volume of forest cuttings indicates that the increased demand did not result in increased extraction of wood but – in addition to the transformation of the

structure of categories – the appearance and fast growth of a new category instead.

From the surveys and the details presented above, the current level of firewood use does not jeopardize the forests. Even though the use of forestry products (logs, firewood, cuttings, etc.) for the generation of green electricity is subject to strict regulations, there has been concern that sawmill logs are classified as firewood and used in the power plants. This issue will be looked into in detail in the future.

Of the gross volume of 7 million m³ of wood extracted a year, approximately 1.4 to 1.5 million m³ of wood takes the form of logging waste (branches, twigs, bark, chippings from cutting, trunks, etc.) and is left unused.

<i>Category</i>	Share (%)	Volume (thousand m³/year)
Log for the wood board industry	2.4%	140
Log for the sawmill industry	18.4%	1 096
Other base material for the sawmill industry	8.6%	512
Paper wood	5.0%	300
Pulp wood	8.9%	532
Other industrial wood	3.5%	211
Firewood	53.1%	3 164
Total	100%	5 955

Table 11: Category percentages

A smaller portion of the logging waste is collected by the population for firewood but the majority is currently left in the forest. The additional demand for wood for energy generation may encourage forest managers to collect logging waste more efficiently, but there are technical and economic limits to this as well.

Collecting logging waste is labour-intensive and can therefore provide seasonal employment locally at smaller rural settlements. It is therefore appropriate to link such collection to the local public employment schemes, which has already been started in 2010.

Apart from forest biomass, the greatest potential lies in by-products and waste. It is estimated that approximately 700 000 m³ of wood industry waste (refuse, wood chips, waste from furniture manufacturing, etc.) is produced annually. Some of this waste is currently used for other applications (e.g. chipwood, plywood, etc.) or locally for energy recovery or otherwise (e.g. as litter for small animals, poultry, etc.), which makes the potential of this segment limited. Wood industry waste is also optimal for pellet and briquette making and is highly sought after in this segment.

It is estimated that approximately 250 000 tonnes of wood industry by-products are available annually for energy recovery. A significant portion is used to heat wood industry plants; about 50–60 % appear in the energy market.

In growing energy crops, special emphasis must be placed on environmental and conservation criteria. Invasive species should be avoided. In addition to spatial limitations, the increasing of energy crop land can also be limited by conservation considerations. It is obvious that in conservation areas (e.g. National Parks) the conservation functions come first and the growing of energy crops must be limited to species and methods which accommodate such functions.

The key issue with respect to ensuring sustainable management is the traceability of extracted wood industry base materials and products, which the forest managers are obliged to ensure also under the current Act XXXVII of 2009 (the Forest Act). The forest manager or the personnel authorised by the forest manager is required to issue a certificate ("transport note") on the origin and for the transport of any wood extracted from forests. This note is based on the forestry operational sheet. The person transporting the wood is required to keep the transport note with him and present it to the representative of the authority upon request. The details recorded on

the transport note must be recorded throughout the commercial operations involving such wood, in line with the law on the implementation of the act.

It is foreseen that a new accreditation and control body – to act as an industry-specific authority and a background institution of the Hungarian administration system – will be established to ensure a more comprehensive and stricter control over the process of wood extraction and use. The CAO or the ARDA, both belonging under the Ministry of Rural Development, may be suitable for the introduction of such procedures and for performing such controls provided that the required expert staff and funding is made available.

Impact on other sectors

(a) How will the impact of energy use of biomass on other sectors based on agriculture and forestry be monitored? What are these impacts? (If possible, please provide information also on quantitative effects.) Is the monitoring of these impacts planned in the future?

The CAO Forestry Directorate Centre monitors fulfilment of the criteria of sustainable forestry; any wood extraction from forests, irrespective of the intended use, must be done in a sustainable manner, taking into consideration the environmental aspects. The Research Institute of Agricultural Economics continuously monitors the production and use of biofuel feedstock and the relevant balance as well as the balance of import and export processes.

(b) What kind of development is expected in other sectors based on agriculture and forest that could have an impact on the energy use? (E.g. could improved efficiency/productivity increase or decrease the amount of by-products available for energy use?)

I. Primary biomass: (cultivated crops and natural vegetation)

- Forestry main products and by-products (products from traditional and intensive forests)

Forestry production is based on strict ecological planning and licensing, whereby the annual extractable volume is determined. The volume of extracted wood determines a category composition, which depends on the tree species and the growing site. Fifty to sixty percent of the extracted volume is wood in stacked cubic metres, a significant portion of which is firewood. The actually extracted portion of the ecologically extractable volume is determined predominantly by the economic and market conditions. If a category cannot be sold profitably in its market, the total extracted volume will be significantly lower than the theoretical volume. To bring the actually extracted volume up to the potential volume requires the development of primary wood processing, as this will not only increase the volume of firewood from forestry but also the volume of by-products from sawmill industry processing suitable for energy recovery. In the furniture industry, a shift toward mass production from lower value base materials can be observed, which produces less by-products, reducing the amount of by-products available for energy recovery. In the paper industry the rate of recycling is expected to increase further, increasing the quantities available for energy recovery.

- Natural vegetations (e.g. nature conservation sites, natural parks, biotope network components, etc.)

In this regard, no or only a slight change is foreseen: as a result of rewarding biodiversity, the amount of biomass available in some areas less favourable for biomass production may decrease.

- **Food crops (cereals, vegetables, fruits, etc.)**

The domestic food industry is currently undergoing a difficult time. The strategy documents circulating in professional circles are nearly univocally committed to increasing added value, which would directly result in a higher proportion of use. The other potential line of “use” is to export the base materials; while the extent of such operations are difficult to foresee, the growth of global population and the change in consumer habits foreshadows an increase in demand volume.

- **Crops and products for industrial use (rape, maize, medicinal herbs)**

Trends are expected to be basically similar as with food crops.

- **Crops and products for energy use (Miscanthus, energy grass, rape biodiesel, maize ethanol, etc.)**

This is a priority field within the rural development programme. Several support schemes are designed to promote these crops. The production of fuels and combustion feedstocks is also a priority from the point of view of the national economy.

- **Agricultural by-products (e.g. straw, maize stem, sunflower stem, etc.)**

A situation similar to that of natural vegetations may occur, especially in areas with a high landscape and/or biodiversity value. Even so, agricultural by-products hold the highest currently known potential as energy feedstock. The annual volume of by-products and waste exceeds 20 million tonnes, a significant portion of which could be used for energy recovery. In the process of using by-products, special attention should be paid to maintaining soil fertility.

II. Secondary biomass:

- **By-products from animal husbandry (manure, slurry)** The traditional use of by-products is for soil fertilisation and soil improvement. In the future, a shift towards energy recovery will take place.

- **Waste from animal husbandry (animal carcasses)** In Hungary, ATEV collected a total of 190 000 tonnes of waste of animal origin in 2008. Their use comprises neutralisation, then preparation, followed by energy recovery.

III. Tertiary biomass: (by-products from the processing of primary and secondary biomass)

- **Organic waste from the industrial sector** (whey, waste from meat industry, slaughterhouses, brewing, sugar industry, etc.)

- **Organic waste from the service sector** (green waste, catering waste, hospital waste)

- **Sewage, sewage sludge**

- **Communal waste**

- **Selectively collected waste** (metal, paper, plastic, glass etc.)

- **Recycled waste** (recycled plastic, recycled paper products, built-in inert waste materials, other products from recycled base materials).

They can be used directly for burning or for the production of biogas.

The environmental industry in Hungary has undergone dynamic development since the 1980s, with some branches, such as the water and waste (sub)sectors, representing a significant contribution to the national economy and to employment.

The environmental industry includes the production of machinery, equipment and other products, building and installation activities as well as the provision of services used to measure, prevent, control, minimise or repair damages affecting waters, the air or the soil, or to contribute to reducing waste production or noise emission or to promote the protection of landscapes and nature.

Environmental services, products and technologies are services, products and technologies which in some way reduce environmental risks, minimise the emission of pollutants or the use of resources.

The amount of waste produced in Hungary has significantly decreased since 2000 (e.g. the amount of industrial waste has decreased by about 40%). This was partly due to the global economic crisis unfolding in 2008, which also affected the amount of waste produced.

The biodegradable component of municipal solid waste was 1 827 868 tonnes in 2006, while the quantity of landfill gas (methane) was 140 821 tonnes. No municipal solid waste was imported or exported in 2006.

Energy recovery from municipal solid waste is performed at the Waste Facility of Budapest (F•városi Hulladékhasznosító M•); in 2007 the facility burnt 3 310 385 GJ worth of waste at an energy efficiency rate of 0.63 percent. About 38.8 percent of the waste burnt is biodegradable.

The biodegradable component of municipal solid waste will amount to about 2100 tonnes in 2015 and the order of magnitude of this figure will not change by 2020. As far as we are aware, the capacity of the Waste Facility of Budapest will not change in the coming years; a change to this figure could be due to incineration at cement factories.

The biodegradable component of industrial waste amounted to 1 860 000 tonnes in 2006 (including food industry, CA branch under the TEÁOR); export is estimated at 47 800 tonnes, import at 16 250 tonnes.

The production of industrial waste is decreasing every year. If this trend continues, the biodegradable component will drop to 1.5 million tonnes by 2015; no realistic prognosis can be given for 2020.

In 2006 261 445 tons (dry matter) of sewage sludge was produced. The quantity of sewage sludge in 2015 will be approximately 499 048 tonnes; no realistic prognosis can be given for 2020.

As for the quantity of landfill gas or the quantity biogas from the degradable component of industrial waste within primary energy production, no information is available to us.

Approximately 30% of the waste produced in 2008 in Hungary was put to use; the share of energy recovery was 3.4 %, the remaining waste was mostly deposited at landfills. Of all material recovery, nearly half comprises waste, mostly metal (predominantly iron and steel) from industry and services, as well as paper. Energy recovery from municipal solid waste takes place in the Waste Facility of Budapest.

In line with the Directive 2008/98/EC on waste and repealing certain Directives, material recovery is favoured over energy recovery with respect to the processing of waste. The selective collection of waste suitable for recycling is functioning appropriately in Hungary.

In line with the extended responsibility of manufacturers, the product fee scheme, introduced in and developing since 1995, has contributed to ensuring that Hungary fulfilled the Community requirements concerning the material and energy recovery from waste from certain products (packaging, rubber tyres, paper for advertising, batteries, other mineral oil products, electrical and electronic equipment). The operation of the system has resulted in an increase in the volume of waste which was selectively collected and subjected to material recovery, as well as in the setting up of numerous new businesses in the field of waste trade and processing. The professional operations of these businesses meets the European standards.

The environmental industry appeared in order to satisfy the statutory environmental requirements, which also cover waste management; the industry has been developing at a fast pace. Waste is collected and handled primarily by the businesses in the environmental industry.

The CSO published the following figures concerning the environmental industry in the 2009/163 volume of Statisztikai Tükör:

- Based on the data provided by the monitored organisations, the net revenue from the sale of products and services by business organisations in the environmental industry amounted to HUF 406 billion in Hungary, nearly HUF 36 billion more than in the previous year.
- The net revenue from the provision of services for eliminating direct pollution amounted to HUF 344 billion in 2008 (at comparative prices, this is 7% up from 2007).
- Export sales in the environmental industry amounted to HUF 92 billion in 2008.
- Within the environmental industry for the elimination of direct pollution, three fields of environmental operations stand out in terms of net revenue. Business organisations involved in the treatment of sewage and used water had a share of 30%, while both those involved in the recovery of solid waste and those involved in the collection, treatment and neutralisation of non-hazardous solid waste had a share of 28% in the aggregate sale revenues of the environmental industry involved in controlling direct pollution. The sale revenue from the collection, treatment and neutralisation of hazardous solid waste is also significant, amounting to about HUF 30 billion in 2008, while sale revenue from the collection, treatment and neutralisation of municipal liquid waste was close to HUF 12 billion. Business organisations involved in the recovery of solid waste produce nearly 70% of all export revenue in the environmental industry.

- The sale revenue from the environmental industry activities of organisations classified as involved in the field of sewage treatment, waste treatment and pollution elimination, respectively, amounted to more than HUF 167 billion in 2008, approximately 48% of which was derived from the collection, treatment and neutralisation of non-hazardous solid waste.
- A total of 19 522 individuals were employed by business organisations in connection with their environmental industry operations in 2008.

Future measures and expected developments in the environmental industry and waste industry

In the upcoming years, development of the domestic environmental industry and especially waste management will need special attention. The goal should be to reduce the amount of waste produced, to recycle as much waste as possible, and to minimise the waste deposited in landfills. It is essential to establish and make sustainable a modern domestic waste management system, as well as to meet the waste management requirements of Community law, as indicated below:

- **reducing the amount of waste deposited in landfills** while reducing the biodegradable component of such waste as required by the relevant Community legislation. This requirement was transposed into Hungarian law by way of Act XLIII of 2000 on waste management, stipulating that by 1 July 2016 the biodegradable organic component of municipal solid waste deposited in landfills should be reduced to 35% percent of the biodegradable organic component of municipal solid waste produced in 1995 on a national level.

- **promoting the use and recycling of waste, fulfilling the relevant provisions of Community legislation.** In line with Directive 2008/98/EC on waste and repealing certain Directives, material recovery is favoured over energy recovery in the hierarchy of waste procedures.

The following recommendations, to be implemented in the environmental and waste industry, will contribute to the fulfilment of the tasks and targets quantified in Directive 2008/98/EC:

- § developing and operating a separate waste collection system by 2015 at least for the following: paper, metal, plastic and glass;
- § increasing the rate of preparation for re-use and of recycling to at least 50% on the average, in terms of mass, of at least paper, metal, plastic and glass waste from households and, if possible, also of waste from other sources for streams similar to those specified for households, by 2020;
- § increasing the rate of preparation for re-use, of recycling and of other material recovery to at least 70%, in terms of mass, of non-hazardous construction and demolition waste.

The goal with respect to waste use is to encourage solutions which employ innovation-based technology to allow the treatment of a wide range of waste materials, causing minimum emission and achieving maximum reduction of volume, while producing energy and/or other useful products.

One alternative could be biogas technology for the treatment of agricultural sewage, waste from animal husbandry or municipal sewage sludge, and pyrolysis for unselected municipal waste, after suitable pre-processing. As a result, waste produced and stored should be considered a valuable asset rather than an issue, and its treatment waste asset management, which can have a significant impact on job creation, on the revenues of the environmental industry and on employment.

Using biogas produced from sewage for the cogeneration of heat and/or electricity or feeding it to the natural gas pipeline would contribute to the reduction of greenhouse gas emission and the consumption of fossil fuels.

Conscious effort should be made, through targeted support, to develop the Hungarian waste industry and to promote the production of products based on recycled waste. Specifically, the issue of better handling of (inert) waste from construction and demolition, which is produced in large quantities, as well as waste from industrial production (sludge, scale) needs to receive special attention.

The future measures in the field of the environmental and waste industries and the fulfilment of Community requirements concerning the depositing and use of waste can be expected to result in a significant reduction in the volume of waste deposited in landfills, an increase in the quantity of waste undergoing material or energy recycling, the growth of the environmental industry, including the number, capacity and workforce of waste businesses, as well as the appearance and operation of new technologies for waste use.

4.7. Planned use of statistical transfers between Member States and planned participation in joint projects with other Member States and third countries

“We will establish new types of regional cooperation with our leading foreign economic and investment partners, including countries and economies along the Danube. The most promising regional cooperation is the reconstruction of the Carpathian Economic Area.”

Excerpt from the Programme of National Cooperation, 22 May 2010

Hungary is essentially endeavouring, in accordance with the Forecast Document and point 4.7.2, to primarily fulfil the renewable targets set out on the basis of the NAP from national resources, but it also welcomes opportunities for facilitating cooperation between countries, and it is therefore planning, while taking into account national assets, to participate in joint projects and to engage in statistical transfers that comply with the flexibility mechanisms. The creation of a regional market, the coordination of energy generation and utilisation between Member States and the establishment and expansion of a cross-border energy infrastructure could be of fundamental interest to the Central-Eastern European region. Based on the model of the initiatives and projects carried out in the field of gas and electricity (e.g. the Békéscsaba–Nádab–Oradea power line or the bidirectional Baumgarten Cross-Border gas capacity), there are also good opportunities for the creation and coordination of a regional green energy market in the field of renewable energy sources (e.g. hydropower in Romania, wind energy in Hungary, construction of biomass power plants along the border, feeding into the cross-border network, etc.). Regional cooperations are greatly influenced by the availability of regional resources and direct resources from Brussels.

Under this subchapter the expected use of cooperation mechanisms between Member States and Member States and third countries has to be described. This information should draw on that provided in the forecast document referred to in Article 4(3) of the Directive 2009/28/EC.

4.7.1. Procedural aspects

With a view to achieving the national renewable energy targets set out in the RED, Member States have the option to engage in cooperation, the methods of which are described in Articles 6 to 11 of the Directive. These flexibility mechanisms enable Member States whose renewable potential is lower (or more expensive to exploit) than the percentage value specified in their targets to take over renewable energy produced in other Member States whose renewable potential exceeds their target (or where renewable energy production is relatively cheaper) by various means, which will then count towards the target of the receiving Member State (while lowering the renewable ratio of the selling, i.e. producing, Member State). The flexibility mechanisms, i.e. statistical transfers between Member States and joint projects (which are also possible with third countries outside the EU) therefore assist Member States in achieving their renewable targets, but the EU only provides guidelines in this respect, and leaves their actual implementation to the Member States.

(a) Describe the national procedures (step by step) established or to be established, for arranging a statistical transfer or joint project (including responsible bodies and contact points).

Hungary has not yet established a national procedure for statistical transfers and joint projects, but should any statistical transfers arise, the taking of the necessary steps will be a task that will have to be solved in the upcoming period.

(b) Describe the means by which private entities can propose and take part in joint projects either with Member States or third countries.

Interest groups and professional organisations involved in the matter currently have the opportunity to express their opinions concerning future-forming measures at the professional workshops operated by the competent ministries. The Hungarian Government has already carried out the extension of cooperation with professional organisations and the acceleration and intensification of close professional consultations under the new national development document, the New Széchenyi Plan, one of the basic pillars of which is the development of a green economy. It is a fundamental objective of the Government to launch community projects that will not only produce effects within Hungary's borders, but also at the level of the Member States. One of the marginal conditions of this is the implementation of the goals and community projects laid down in the recently adopted Danube Strategy.

The competent ministry is planning to also establish the systems for the notification of the accounting of the joint projects in an institutionalised form in the future, following bilateral talks with the individual Member States.

(c) Give the criteria for determining when statistical transfers or joint projects shall be used.

No detailed studies have been prepared about a system of criteria as yet. Renewable energy surplus, the time horizon of the projects to be implemented and the resources required for implementation will have to be taken into account. The detailed elaboration of this will be one of the professional tasks for the following period.

(d) What is going to be the mechanism to involve other interested Member States in a joint project?

We are planning to involve Member States in joint projects in the light of earlier bilateral and multilateral cooperations and the interests of countries with similar capabilities, similar to European cross-border, transnational, interregional cooperations, the fundamental framework of which in the period between 2007 to 2013 is the European Territorial Cooperation (ETC), and which have already served as good examples so far.¹⁸

¹⁸ Its target is to enhance cross-border cooperation through joint local and regional initiatives, trans-national cooperation through measures related to community priorities leading to integrated regional development, and interregional cooperation and exchange of experience on the respective regional level, in the case of the implementation of community research and development, educational and renewable energy consortium projects.

(e)*Are you willing to participate in joint projects in other Member States? How much installed capacity/electricity or heat produced per year are you planning to support? How do you plan to provide support schemes for such projects?*

Within the framework of its cooperations, Hungary is also planning to join the projects of other Member States. Support for this could be provided by available EU ETS auction revenues. All this will require knowledge of the Member States' intentions in order to be able to launch Community programmes. This could be greatly facilitated by the coordination of Member States' Action Plans.

4.7.2. Estimated excess production of renewable energy compared to the indicative trajectory which could be transferred to other Member States

Export and import opportunities could arise in respect of electricity and biomass. We present below the cooperative situation planned for the future in connection with these.

- Hungary is not planning imports in the field of green energy production, but it will be willing to export in the case of agreements concluded with partner countries, especially in “deep valley” periods.
- Wood (and biomass in a broader sense) is both exported and imported by Hungary. If the planned developments are implemented, future supply will require a significant increase in energy crop growing or in the collection of by-products for energy purposes, and thus the fulfilment of domestic needs is a strategic objective. With appropriate agricultural energy development, and with the balancing of raw material production and utilisation, Hungary will not require imports, and future international trade will probably be negligible in this field as well, but the possibility for international trade in processed biomass (e.g. pellets and briquettes) could still arise in the future.
- As regards biofuels, Hungary is in a different situation in respect of bioethanol and biodiesel.
- In bioethanol production of first, but more likely, second generation, Hungary will only be able to engage in exports in the future, in addition to fulfilling domestic demands, if the necessary developments have been implemented and the economic environment provides favourable conditions. The extent of our export capacity cannot be planned in advance, as it will depend on trends in agricultural production and the implementation of investments that can be taken into account.
- As regards biodiesel, the primary objective is to fulfil domestic demands, but rape seed exports will probably still be maintained in the future.
- Hungary is willing to engage in statistical transfers in respect of renewable energy sources produced in excess of the mandatory target on the basis of agreements with other Member States.
- Considering that the utilisation of renewable energy sources also serves economic policy purposes, Hungary is willing to undertake the abovementioned statistical transfers in the framework of a jointly financed project.

In summary of the above, Hungary is open to exporting biomass end-products (pellets and briquettes) in excess of the requirements of the RED on the basis of cooperations with other Member States. Trade in raw materials for liquid energy sources (e.g. rape and maize) is expected to continue. In the case of bioethanol, the primary goal will be to ensure domestic supply and admixture. In addition to this, any remaining surplus quantities could be exported. Hungary is also open to implementing joint cross-border projects in order to strengthen cooperation and economic collaboration with neighbouring countries, should specific opportunities present themselves. Should such demand arise, Hungary will support the implementation of projects of this nature.

4.7.3. Potential for joint projects

The Directive offers full freedom in the implementation of the flexibility mechanisms, and Hungary will thus have the option to only allow joint projects to be carried out in certain segments (where, based on agreements, the generated green electricity or renewable-based heat fully or partially count towards the target of the investing Member State), the long-term benefits of which (job creation, reduction of GHG emissions, etc.) remain in the country.

It could be beneficial for Hungary to promote the creation of joint projects in areas and with regard to technologies where the investments concerned could not be realised under the current national and EU aid schemes. Hungary will endeavour to participate in reasonable and economical joint projects in the future. No preliminary plans are currently available in this regard.

(a)*In which sectors can you offer renewable energy use development in your territory for the purpose of joint projects?*

Hungary encourages the implementation of projects for renewable electricity generation, heat generation, transport (in the field of public transportation), network development and the creation of cross-border regional networks, and the production of biofuels and alternative fuels.

(b)*Has the technology to be developed been specified? How much installed capacity/electricity or heat produced per year?*

Specific technologies have not yet been specified; the selection of these will also depend on demand on the part of the Member States.

(c)*How will sites for joint projects be identified? (For example, can local and regional authorities or promoters recommend sites? Or can any project participate regardless its location?)*

Hungary intends to prepare the joint projects and draw up the related plan next year.

(d)*Are you aware of the potential for joint projects in other Member States or in third countries? (In which sector?) How much capacity? What is the planned support? (For which technologies?)*

We know of the potential for joint projects with other Member States or third countries from prior cooperations and the Member States' action plans.

(e) Do you have any preference to support certain technologies? If so, which?

We support the application of technologies that take account of regional assets, are environmentally sound, sustainable, and assist in job creation. Aid provided for renewable energy sources could contribute greatly to the purchase, development and practical dissemination of modern technologies. Technologies used in renewable energy segments are constantly developing. It is clearly in the interest of Hungary to think in terms of a complete product chain in respect of the spreading of renewable energy sources, i.e. to also realise domestic end-use and the application of qualified domestic workforce in addition to domestic technological development and production.

4.7.4. Estimated demand for renewable energy to be satisfied by means other than domestic production

Hungary is generally aiming at self-sufficiency in increasing the use of renewable energy sources, and only a slight utilisation of means other than domestic production can be estimated in advance.

Estimated excess and/or deficit production of renewable energy compared to the indicative trajectory which could be transferred to/from other Member States in Hungary (ktoe)

Table F/9

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimated excess in forecast document	0	0	0	0	0	0	0	0	0	0	0
Estimated excess in the action plan	0	547	283	323	267	280	274	516	464	679	325
Estimated deficit in forecast document	0	0	0	0	0	0	0	0	0	0	0
Estimated deficit in the action plan	0	0	0	0	0	0	0	0	0	0	0

5. Assessment of the National Action Plan

“Hungary must adapt in such a way that the greatest possible economic and social benefit can be achieved for all citizens.

Renewable energy sources essentially represent a future alternative industry and breakthrough point for agriculture, the countryside, and the entire national economy.”

Excerpt from the New Széchenyi Plan, 28 July 2010

The assessment in this chapter is a summary of the National Action Plan, its purpose being to evaluate the various segments of renewable energy, placing emphasis on their comparative advantages and fields of application. Taking into account Hungary’s capabilities, the “indiscriminate” use and spreading of almost all types of renewable energy sources is justified. Keeping this in mind, in the next ten-year planning period renewable energy sources should be diversified and segmented as much as possible within our capabilities, taking into account the principles of lowest costs and highest efficiency of use. In 2010, 81% of our renewable energy sources was biomass. This area will continue to be one of the definitive renewable segments in the upcoming period, but the increase of the share of other renewable energy sources from 19 to 39 percent will even out the fields of application. This will result in an increasing number of individual and community actors enjoying the benefits of the new industry at the scale and extent that is the most optimal and economical to them.

This chapter also intends to present areas that could not or could only partially be described elsewhere due to compliance with the format for the National Action Plan specified in Decision 2009/548/EC.

5.1. Total contribution expected of each renewable energy technology to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity, heating and cooling and transport

This sub-chapter gives account of the specific targets planned to be reached by 2020 with regard to the individual types of renewable energy sources. It presents the available possibilities, as well as the structure and solutions through which the targets are planned to be reached.

In addition to the promotion of the spreading of renewable energy sources, the technological background, i.e. the domestic production base, enabling the utilisation of renewable energy sources is of special importance as part of the development of a green economy. The development of the domestic green economy must be managed in a complex system, together with renewable energy sources.

The following text in borders contains the explanatory text of the Template.

The contribution of each renewable energy technology to the trajectory and 2020 targets in the electricity, heating and cooling and transport sectors should be estimated giving a possible future scenario without necessarily establishing any technology target or obligation.

For the electricity sector, both the expected (accumulated) installed capacity (in MW) and yearly production (GWh) should be indicated by technology. For hydro, a

distinction should be made between plants of less than 1 MW, between 1 and 10 MW, and over 10 MW installed capacity. For solar power, details should be given separately for contributions from photovoltaic solar and concentrated solar power. Wind energy data should be indicated for onshore and offshore separately. For biomass, a distinction should be made between solid, gaseous and liquid biomass for electricity.

When assessing the heating and cooling sector, estimates of both installed capacity and production should be given for geothermal, solar, heat pumps and biomass technologies, with a breakdown for the latter category for solid, gaseous and liquid biomass. The contribution from district heating plants using renewable energy sources should be estimated.

The contribution from different technologies to the renewable energy target in the transport sector should be indicated for ordinary biofuels (both bioethanol and biodiesel), biofuels from wastes and residues, biofuels from non-food cellulosic material or from ligno-cellulosic material, biogas, electricity from renewable energy sources and hydrogen from renewable energy origin.

In case you have estimations on developing the use of certain technologies by regions, could you please indicate that after the table?

The development of the individual types of renewable energy sources is planned as follows (naturally, with advancements in technology, the target values could change considerably).

Solid biomass

Hungary has excellent agro-ecological conditions for a competitive production of biomass that is sustainable in the long term. In rural regions biomass is one of the most readily available cheap energy sources, and its use for energy purposes thus goes beyond energy policy objectives, representing an important means of agricultural and rural development as well. The use of biomass for energy purposes contributes to the implementation of bioeconomics, an economic development model which is based on agricultural by-products and enables the substitution of fossil raw materials, while possessing a significant potential for job creation. It thereby contributes to the expansion of agricultural sales channels, while the multi-purpose utilisation of raw materials (pharmaceutical industry, chemical industry, etc.) not only ensures a more independent energy supply for rural regions, but also provides a new source of income. Accordingly, in terms of volume, it will be the use of solid biomass for energy purposes that will show the greatest growth by 2020 (with an increment of nearly 19 PJ) (see Figure 7).

In the case of biomass collection, a maximum collection radius of 20 km could be justified. This would result in an increase in local employment and a significant reduction of transport distances (and consequently, the reduction of emissions).

Besides the encouragement of improving the efficiency of high-capacity power plants, the targets set are best served by utilisation for local heat generation purposes and, in the case of electricity, the establishment of low to medium-capacity local power plants with regional development potential. It is important to note that a significant percentage of renewable energy sources are available cheaply, and at the same time, regions in the countryside could be able to fulfil a considerable part of

their own energy demand from own resources, in an environmentally sound way and at lower costs.

Ratios of biomass raw materials are expected to shift in favour of energy crops specifically grown for this purpose (lignaceous and herbaceous energy crops), but even more so towards by-products and wastes. The share of the latter in the biomass mix may reach as much as 50 percent by 2020. During the production of biomass for energy purposes, particular attention must be paid to environmental protection and nature conservation aspects.

In respect of biomass-based electricity generation, however, it is an important structural change that we intend to achieve this improvement through the installation of local, small-settlement-level combined power plants with a maximum installed power of 20 MW_e. The use of such plants could represent an important means of integrated rural development in the future, and could reinforce microregional cohesion and economic cooperation. Power plants with a maximum installed power of 25 MW_e could be justified in cases where it is required by heat demands (e.g. district heating systems in large cities).

Biofuel

As with solid biomass, Hungary also has exceptional agro-ecological conditions for the production of biofuel, both in respect of raw materials for first generation, and especially second generation biofuels. In the following 10 years Hungary will endeavour to use raw materials the production of which does not represent competition for food production, especially in the field of liquid biofuels. Production systems utilising cellulose and lignocellulose will play an especially important part. The encouragement of the establishment of small-scale facilities with an annual capacity of 5 to 10 thousand tonnes in connection with the development of agriculture and, more specifically, the animal husbandry sector, is a special Hungarian model; the raw material quantities required for the operation of such facilities can be supplied from local resources, from a maximum distance of 40 km.

Cost-effectiveness and sustainability are particularly important considerations in all cases, and therefore, priority can be accorded to projects that are certified to be able to produce a positive balance of materials and energy, and sustainable production and generation. The set of sustainability criteria in the already adopted biofuels act and its implementation decree currently being drafted also serve to facilitate this.

As regards the use of biofuels, with direct admixture and the current technological limitations, the spreading of vehicles capable of utilising engine fuels with high biofuel contents will be essential. This must be supported especially in the field of public transportation. To this end, the infrastructure, vehicle fleet and production capacities facilitating the promotion of green public transport will require development in the following years. An opportunity for the spreading of green public transport will be provided by the fact that the vehicle fleet used in public transportation is old, and will need to be replaced in the following 10 years. During the replacement of the vehicle fleet, it will be possible to promote the acquisition of an increasingly large percentage of new buses that are capable of using pure biofuel through appropriate regulatory (green public procurement) and financing measures.

With regard to the contradiction between biofuel and food production, Hungary's clear intention is to ensure a secure food supply. Second generation bioethanol and biodiesel could be provided with a secure market through the EU's long-term objectives regarding biofuel admixture, and their national adaptation. This is supported by the EU condition that if they comply with sustainability criteria, the use of second generation biofuels counts double towards the fulfilment of biofuel commitments.

Similar to biomass, the production of biofuels is not only an energy issue, but also one of agriculture and rural development. Hungarian biomass production could contribute to the stabilisation of agricultural product chains and the market introduction of products of a higher level of processing. Taking into account its production capacities, Hungary has a realistic chance of achieving the 10 percent biofuel admixture ratio specified by the EU through the use of domestic raw materials.

Besides biofuel, the use of alternative fuels is also important, including the establishment of electric, hybrid and hydrogen-based systems and their economic and infrastructural background. There is intensive research and development being conducted in this field, as a result of which these alternative fuels could represent a tangible, competitively available energy source for future transportation by 2020. The launch of an electromobility programme (electric cars, establishment of recharging stations in city centres, free parking and other benefits, launch of an alternative means and vehicles training module) could become timely over the next decade.

Biogas

The spreading of biogas applications is not only justified by energy considerations; several other factors also particularly justify progress in this field (environmental technology). Through the management of production wastes, agricultural by-products and other organic materials, biogas production contributes to the achievement of environmental targets, and, through the reduction of methane emissions, represents an important means of climate protection. On the basis of biogas plants, biomethane production plants are expected to also appear in Hungary in the near future, and will enable the use of purified biogas equivalent to natural gas for transport purposes by feeding it into the gas pipe network. Biogas production is expected to double by 2020. The achievement of this target is justified, first of all, by the fact that we predominantly generate energy from waste; secondly, it would also provide a solution for disposing of large amounts of waste that is harmful to the environment, and thirdly, the technologies known to us today do not pollute the local environment at all.

With regard to biogas, increasing attention will need to be paid to dual-purpose use and the increase of added value in the following years. Besides green electricity generated through biogas production, green heat generated for direct use of sales will also have priority. This could directly result in an improvement of cost-effectiveness, related industries could be involved, and in addition to the use of by-products and the disposal of waste, new jobs could be created.

In the field of transportation, the role of biogas is expected to increase in the future, primarily in those rural towns where “biogas” can be obtained (refuelled) from within a reasonable distance. The simplification of the authorisation of CNG filling stations in a system similar to LPG could be a very important aspect of the development of the domestic biogas industry. The adaptation and application of LNG technology could open up new opportunities in the field of bioenergy and vehicle drive developments.

Geothermal energy

As regards geothermal energy, the geothermal gradient in Hungary is almost one and a half times as high as the world average, and represents one of the country's natural treasures. In accordance with sustainable resource management, particular attention must be paid to the preservation of this resource when building new capacities, and this usually requires reinjection.

The use of geothermal energy for heat supply could specifically serve the heating of buildings, domestic hot water supply, water and heat supply of baths, heat supply of greenhouses, etc. The individual investments should involve as complex a utilisation of heat as possible. Among our goals the heat supply of buildings represents a priority task.

The water and heat output of thermal wells enables the heat supply of larger groups of buildings and the district heating of smaller or larger settlements. In the upcoming period we must primarily focus on the economical use of existing thermal energy capacities, especially in those areas where there is a demand for heat, while geological conditions are favourable and new wells can also be constructed. In the case of several existing wells there is a lack of attitude to rational and optimal utilisation.

Based on the above, the planned use of geothermal energy could primarily serve heat generation (district heating, heating of residential buildings owned by public institutions and local governments, gardens, etc.). From the existing high basis, the use of geothermal energy for heating purposes could more than triple by 2020. One aspect of this is the bath reconstruction and development programme combined with medical tourism opportunities. In addition to direct heat utilisation, the use of geothermal resources for electricity generation is expected to be introduced by 2020, with an installed power of approximately 57 MW_e.

Heat pumps

This is one of the most widely applicable type of renewable energy sources in Hungary. On one hand, it can be universally utilised for heating and cooling, and on the other hand it can also be used well in built-in, urbanised areas. Heat pumps are appropriate means for utilising terrestrial heat (ground heat, hydrothermal and aerothermal energy), which, although at low temperatures, is available almost everywhere in the country. The use of terrestrial heat can be expanded significantly in a decentralised way especially in housing areas with single-family houses, without limitations imposed by natural conditions. Consequently, a rapid development is expected in the field of heat pumps, and the installed capacity could grow to thirty-eight times as much as the current amount by 2020.

Cooling, as a separate industry, will play an increasingly important part in the following years, and therefore, an increase in heat pump cooling is expected.

Wind energy

The main characteristic of wind turbines is that they are weather-dependant, and with their electric output depending on wind speeds, they provide zero output below certain values. It is this characteristic that determines the evaluation of their electric output, the primary energy saving achievable through them and their pollution reduction potential. In the case of the wind turbines that are currently installed in large numbers, the nominal wind speed (at which they are capable of producing nominal output) is within the range of 10–14 m/s. This corresponds to measured wind speeds of 36–50 km/h. As it is well known, wind speeds of 70 km/h already take the form of damaging storms in Hungary, and rarely occur. These same types of wind turbine do not produce electrical output at wind speeds below 2 m/s, which on the other hand is a frequent occurrence. In the light of meteorological data per region, experts possess data about the ratio between actual annual average and nominal output values for planned wind turbines, which is essential for planning.

Due to the unpredictable variations in wind speeds, wind turbines are not always at the disposal of consumers. From the perspective of the electricity distribution system, this can be expressed as wind turbines and fossil power plants of identical installed electric power not being of identical value for supplying customers. The national electricity distribution system can only operate with sufficient reliability if, while drawing power from wind turbines and supplying it to consumers, it also possesses the same amount of free (non-wind-dependent) power plant output or freely available imports as unused reserves. The reason for this is that in cases where wind intensity drops, these capacities need to be involved.

In conclusion, one of the barriers to development is the ability of the network to receive weather-dependent, non-controllable electricity. The electricity network is capable of receiving a total of approximately 740 MW_e of wind power. If network developments will result in an improvement in the controllability of the system, then the establishment of further capacities will be possible. Of the 750 MW planned wind energy capacity, 740 MW_e is the output of wind farms and 10 MW_e the total output of autonomous, small-scale household wind turbines.

Solar energy

There are two ways of actively utilising **solar energy**: thermal use and use for electricity generation. A widespread and typical way for the thermal use of solar energy is through solar collectors installed on the sunlit surfaces (roofs) of buildings. Considering that the surface area of solar collectors currently installed in Hungary is only a fraction of the surface considered suitable for installing solar collectors in the country, significant development is expected in this area.

Installation utilising solar energy for thermal purposes are capable of doing so most cost-effectively by producing domestic hot water (DHW); in doing so they utilise solar energy at an annual average efficiency of 30–50%. In the most sunlit periods the

efficiency of seasonal utilisation can reach as much as 90%, and the greatest potential for utilisation (hot water production, pool heating) lies in seasonally operating facilities. However, complex thermal utilisation (hot water production, heating assistance, combination of renewable energy sources) could be an energy source that can be used effectively throughout the year. The annual average thermal energy yield of solar energy technologies currently used in Hungary is approximately 1500 MJ/m^2 , of which $1080\text{--}1260 \text{ MJ/m}^2$ can be utilised during the five warmest months (May to September). Energy storage plays a significant role in solar energy systems. The storage of energy is typically realised in heat-insulated reservoirs in the form of hot water.

A significant portion of existing district heating systems in Hungary could be supplemented by DHW producing sub-systems employing solar collectors. In summer operation these would be capable of fulfilling the hot water needs of the housing blocks supplied while resulting in considerable energy savings. At the same time, they would provide the opportunity for a summer shutdown of the traditional-energy-based heating plant that supplies the entire system, without a loss of convenience.

In respect of electricity, one trend is represented by photovoltaic solar cells, which directly convert solar radiation into electricity. The other trend is represented by various solar thermal power plants, which are based on the thermodynamic cycle of converting thermal energy to mechanical energy applied in traditional thermal power plants.

The use of photovoltaic solar cells has been undergoing intensive development around the world recently, while the amount of installed photovoltaic capacity in Hungary is very low. The calculated theoretical domestic potential allows significant growth, but the limiting factors of technical and economic potential, as well as comparative advantages and disadvantages against other renewable technologies, must be taken into account during the development of the area. In the field of solar energy utilisation equipment prices are expected to decrease while their output and efficiency is expected to increase in the following years due to technological development, and thus, photovoltaic systems will become increasingly competitive products on the market.

In the field of the thermal use of solar energy, it will primarily be the hot water supply of single-family houses, public institutions and local government facilities that will be given the greatest preference, while with regard to photovoltaic solar cell systems it will be dual-purpose use, i.e. the most important goal will be to ensure own energy production, which could be supplemented by the sale of excess green energy. The photovoltaic procedure could continue to primarily serve the supply of areas without access to electricity (roads, farmsteads) in the future, as in such areas autonomous solar power sources could overall be cheaper than grid connection. Simultaneously, with the decrease of the prices of PV systems, the first solar power plants could be constructed in Hungary.

Hydropower

Hungary's conditions for hydropower generation are only partially favourable, as there are few mountainous regions, there are spatial and temporal differences in the distribution of rainfall in the country, and our rivers that have high water yields have a low descent. In order to utilise hydropower, dams would need to be constructed. As regards theoretically usable potential, due to the scattered nature of hydropower assets it is justified to exploit the benefits of low-capacity hydropower instead of constructing larger dams.

Taking this into account, we are primarily planning to achieve an installed power of 66 MW through the construction of small-scale hydropower plants under 5 MW, which can be installed into already existing dams, and through flow-through turbines installed in river beds. Installed power will thereby increase by 29 percent compared to the 2010 value by 2020. The various types of dwarf hydropower plants (e.g. plants in river dams, submerged generators, etc.) could best facilitate microregional energy supply, and the energy generated could best be utilised at local level. The use of household-scale power plants must be encouraged (e.g. micro-hydro: 5–100 kW, pico-hydro: <5 kW). In addition to the above, hydropower generation is possible in Hungary both in a water-level-difference-based, flow-through turbine system and as a storage of energy.

The trends and volume of changes in renewable energy sources are illustrated in the following figure:

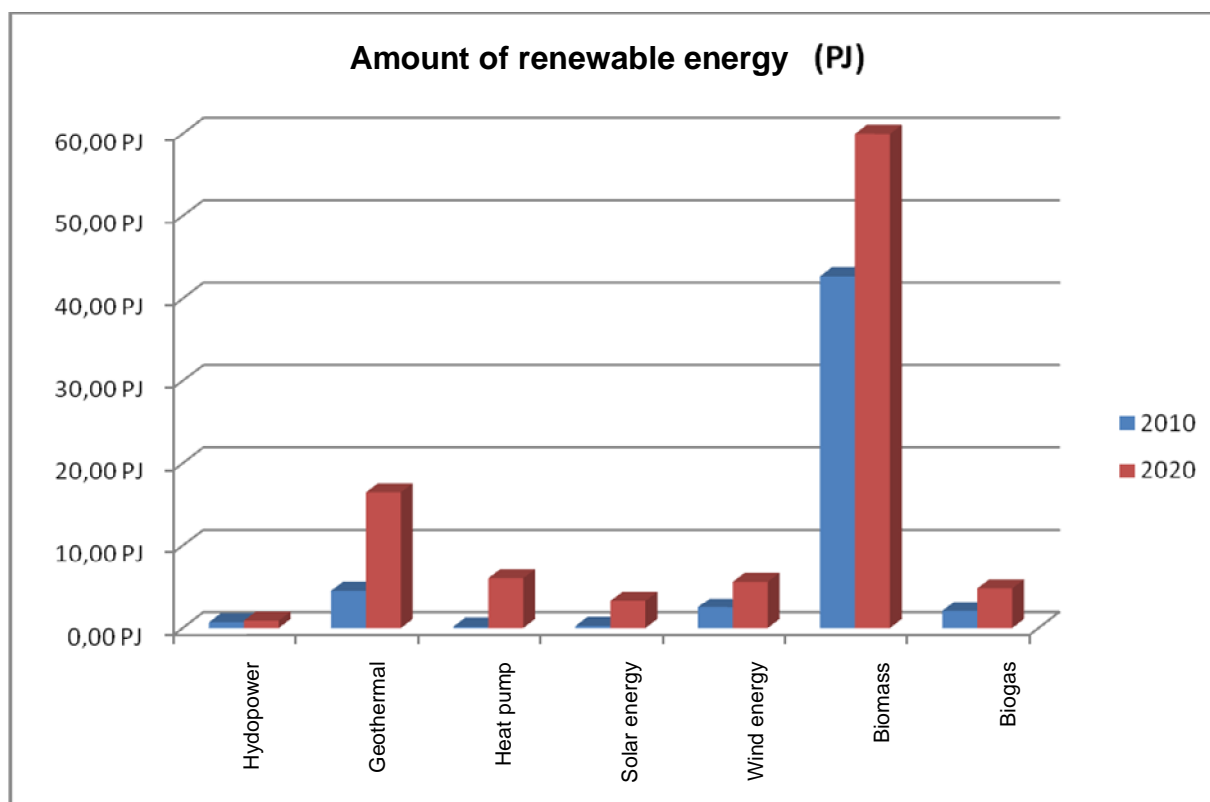


Figure 7: Forecast of renewable energy amounts

As a result of the above changes, renewable energy source structure will become more diversified. Biomass use will increase in volume, but its share will decrease,

from the 81 percent in 2010 to 62 percent. The greatest relative increase will be in the use of geothermal and solar energy and heat pumps.

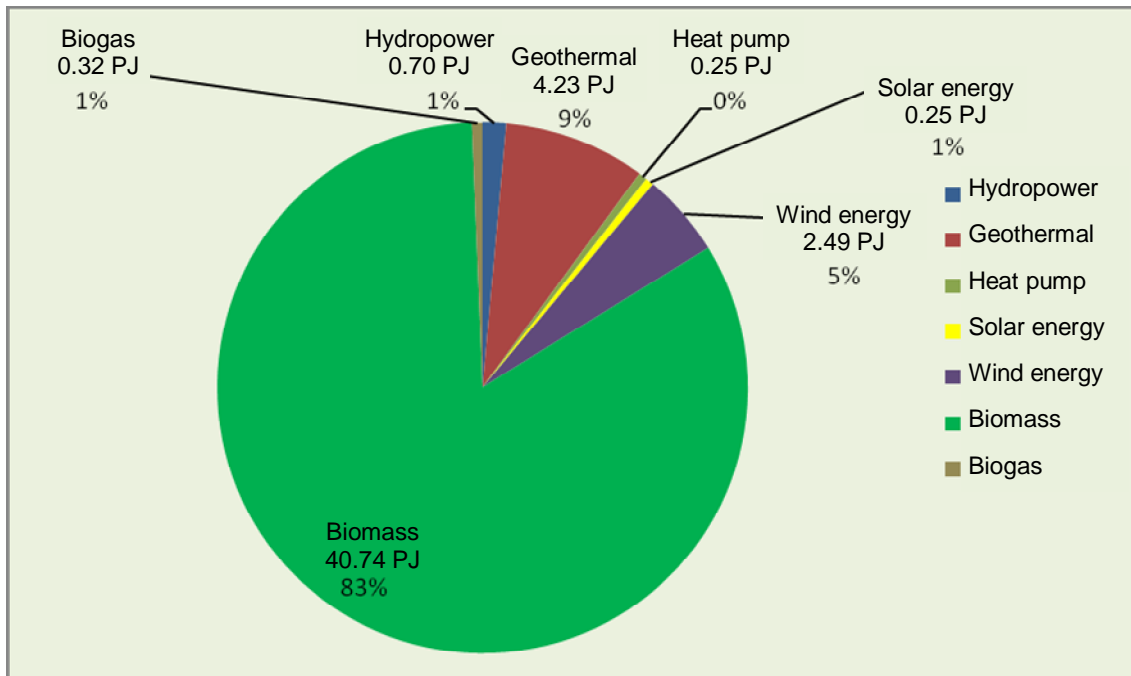


Figure 8: Distribution of renewable energy sources used in the electricity and heating and cooling sectors (2010)

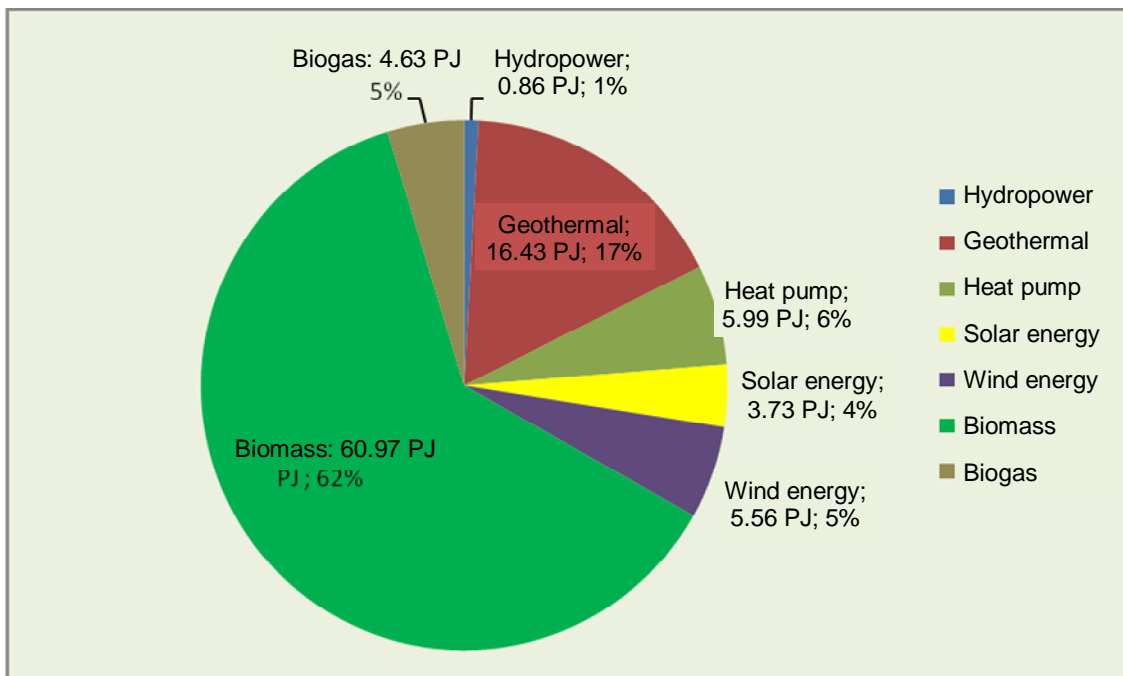


Figure 9: Distribution of renewable energy sources used in the electricity and heating and cooling sectors (2020)

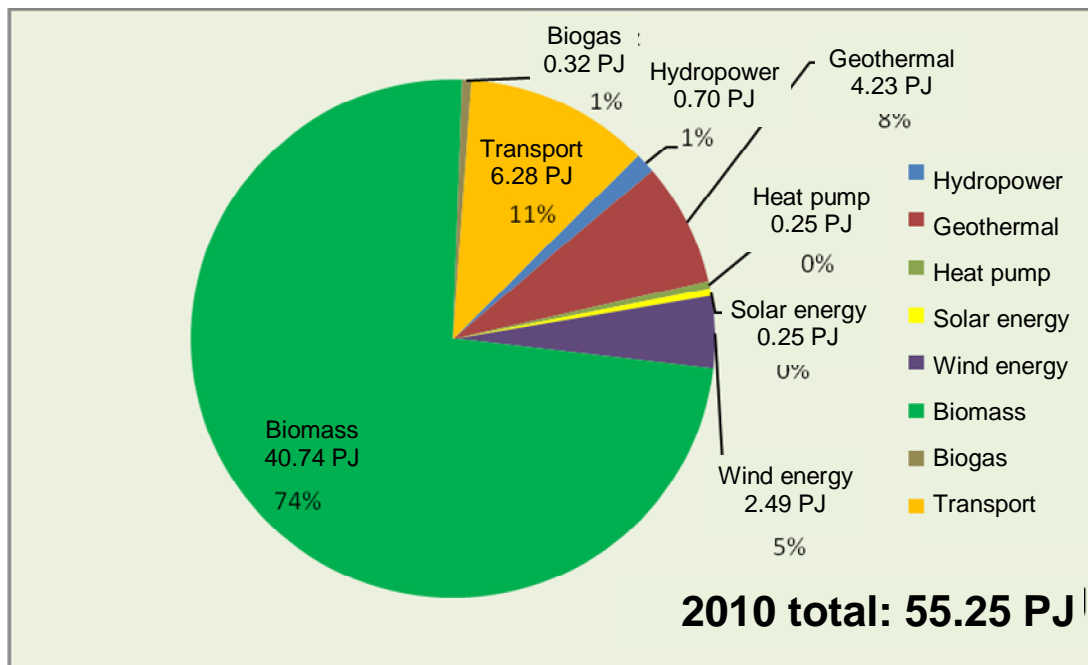


Figure 10: Distribution of renewable energy sources used in the electricity, heating and cooling and transport sectors (2010)

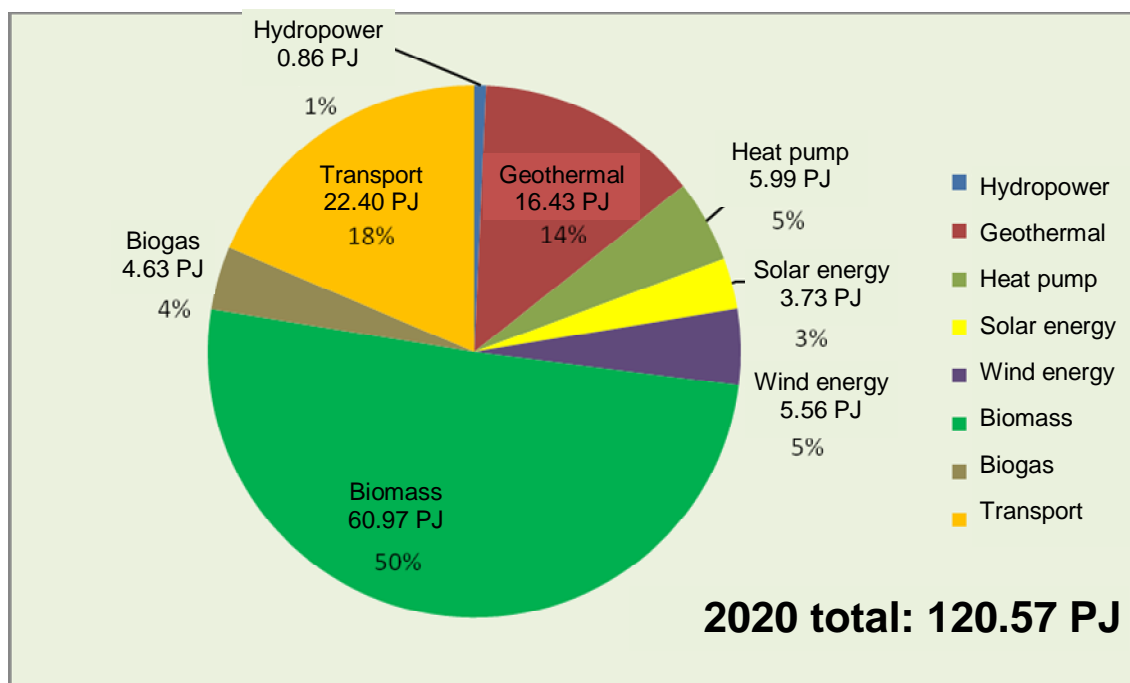


Figure 11: Distribution of renewable energy sources used in the electricity, heating and cooling and transport sectors (2020)

It is important to stress that the above ratios represent the planned national average. Ratios in certain regions or microregions could, depending on local conditions, differ significantly due to the exploitation of comparative advantages (e.g. in the Southern Great Plain the share of geothermal energy will probably be higher, while in Western Transdanubia solid biomass will be predominant).

Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Hungary to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity 2010–2014

Table F/10.a

		2010		2011		2012		2013		2014	
		MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydropower		51	194	51	194	51	194	51	194	51	194
	Hydro plant under 1 MW	3	5.4	3	5	3	5	3	5	3	5
	Between 1 MW and 10 MW	9	30.4	9	30	9	30	9	30	9	30
	Hydro plant over 10 MW	39	158.2	39	158	39	158	39	158	39	158
	Of which pumping	-	-	-	-	-	-	-	-	-	-
Geothermal energy		0	0	0	0	0	0	4	29	4	29
Solar energy		0	2	2	5	6	9	9	14	14	20
	Photovoltaic solar energy	0	2	2	5	6	9	9	14	14	20
	Concentrated solar energy	0	0	0	0	0	0	0	0	0	0
Tide, wave, ocean		-	-	-	-	-	-	-	-	-	-
Wind energy		330	692	393	692	445	929	552	1 150	568	1 303
	Onshore wind energy	330	692	393	692	445	929	552	1 150	568	1 303
	Offshore wind energy	-	-	-	-	-	-	-	-	-	-
BIOMASS		374	1 955	377	1 971	381	1 995	399	2 097	472	2 525
	Solid	360	1 870	360	1 870	360	1 870	373	1 942	439	2 328
	Biogas	14	85	17	101	21	125	26	155	32	196
	Liquid biofuels										
Renewable-based electricity total		755	2 843	823	2 862	882	3 127	1 015	3 484	1 109	4 069
Of which combined heat and power		20	110	22	126	25	142	44	258	74	437

Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Hungary to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity 2015–2020

Table F/10.b

		2015		2016		2017		2018		2019		2020	
		MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydropower		52	196	56	209	60	221	61	223	67	238	66	238
	Hydro plant under 1 MW	4	8	4	8	4	8	5	10	6	13	6	12
	Between 1 MW and 10 MW	9	30	13	43	18	55	18	55	22	67	22	67
	Hydro plant over 10 MW	39	158	39	158	39	158	39	158	39	158	39	158
	Of which pumping	-	-	-	-	-	-	-	-	-	-	-	-
Geothermal energy		4	29	8	57	8	57	57	410	57	410	57	410
Solar energy		19	26	25	33	32	42	41	54	52	67	63	81
	Photovoltaic solar energy	19	26	25	33	32	42	41	54	52	67	63	81
	Concentrated solar energy	0	0	0	0	0	0	0	0	0	0	0	0
Tide, wave, ocean		-	-	-	-	-	-	-	-	-	-	-	-
Wind energy		577	1377	588	1404	701	1450	719	1483	730	1504	750	1545
	Onshore wind energy	577	1377	588	1404	701	1450	719	1483	730	1504	750	1545
	Offshore wind energy	-	-	-	-	-	-	-	-	-	-	-	-
BIOMASS		420	2 250	329	1 750	460	2 492	536	2 935	578	3 192	600	3 324
	Solid	377	1988	266	1362	387	2041	455	2434	484	2595	500	2688
	Biogas	43	262	63	389	73	451	80	501	94	596	100	636
	Liquid biofuels												
Renewable-based electricity total		1 072	3 878	1 006	3 453	1 262	4 262	1 414	5 105	1 483	5 410	1 537	5 597
Of which combined heat and power		120	719	225	1307	332	1947	432	2611	472	2863	493	2990

Estimation of total contribution (final energy consumption) expected from each renewable energy technology in Hungary to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling 2010–2020 (ktoe)

Table F/11

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Geothermal		101	108	120	131	143	147	194	238	289	337	357
Solar energy		6	9	14	17	22	31	43	53	64	73	82
Biomass		812	817	802	796	801	829	953	1060	1145	1210	1277
	Solid	812	793	778	771	774	800	919	1019	1099	1160	1225
	Biogas	0	24	24	25	27	30	34	41	46	50	56
	Liquid biofuels											
Heat pumps		6	7	8	9	22	37	51	64	97	118	143
	aerothermal	0	0	0	0	1	2	3	3	5	6	7
	geothermal	5	5	6	7	16	28	38	48	73	88	107
	hydrothermal	1	1	2	2	4	7	10	13	19	24	29
Renewable thermal and cooling energy production total		949	941	944	955	990	1049	1248	1421	1600	1743	1863
Of which district heating		3	5	18	40	69	111	152	272	410	516	613
Of which biomass in households		610	611	606	604	605	606	626	721	781	849	918

Estimation of total contribution expected from each renewable energy technology in Hungary to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector 2010–2020 (ktoe)

Table F/12

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bioethanol/ bio-ETBE	5	34	71	82	88	93	106	108	129	173	214	304
Of which biofuels Article 21(2)	0	0	0	0	0	0	0	0	0	0	0	0
Of which imported			0	0	0	0	0	0	0	0	0	0
Biodiesel	0	110	122	135	138	142	144	163	181	182	185	202
Of which biofuels Article 21(2)	0	18	18	18	18	20	20	20	22	22	22	22
Of which imported	0	0	0	0	0	0	0	0	0	0	0	0
Hydrogen from renewables	0	0	0	0	0	0	0	0	0	0	0	0
Renewable electricity	0	6	7	9	10	14	15	16	18	21	22	24
Of which road transport	0	0	0	0	0	0	0	0	1	1	1	2
Of which non-road transport	0	6	7	9	13	14	15	16	18	20	21	22
Other (biogas in public transport and waste transport)	0	0	0	0	0	1	1	2	2	3	4	5
Of which biofuels Article 21(2)	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	150	200	226	236	250	266	290	330	379	425	535

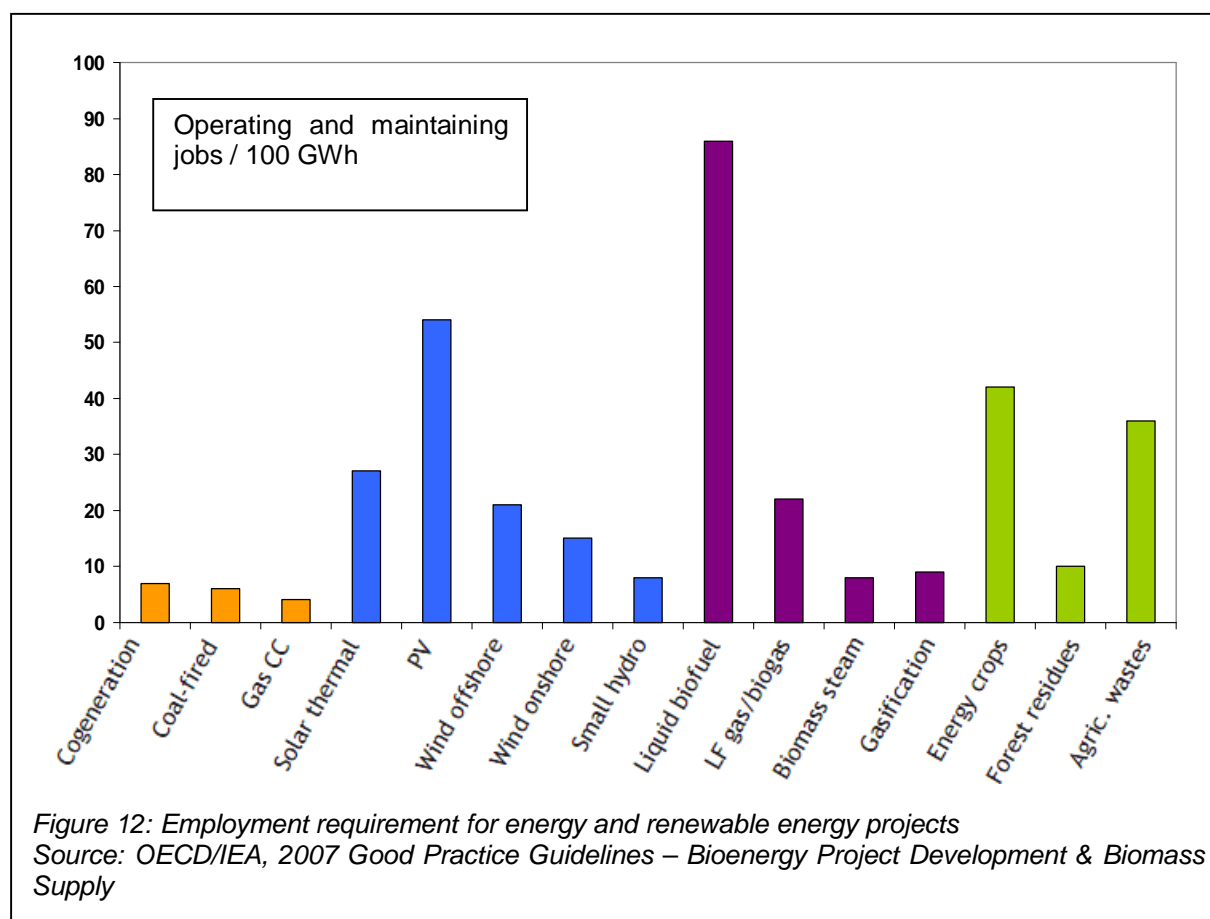
Effects of the increase of diversified renewable energy use on employment

In terms of employment potential, the renewable energy industry has infinitely greater significance than the fossil or nuclear power industries. Although the use of renewable energy is as old as humanity itself – as opposed to the fossil industry, which goes back a few hundred years, and the nuclear industry, which is only a few decades old – the establishment of a renewable energy industry that meets the requirements of the modern age has only just begun in Hungary.

A pre-requisite for the development of the green economy and green industry, including the renewable energy industry, is the development of available human resources in this area, as well as the increase of the number of employees in the green economy, in so-called green collar jobs. Employment programmes related to the development of the green economy must be drawn up in such a way as to encourage small and medium-sized production units, which have a greater job creation potential and are better adapted to local resources and demands, as well as the generation of energy at the highest possible efficiency, and environmental use that is sustainable in the long term. In the past few years, the economic crisis affecting Hungary also made itself felt on the labour market. The number of jobs decreased both in the industry and in agriculture, and people who have lost their jobs earlier have become unemployed in the long-term. The increase of employment in the energy sector can only be maximised if the development of a green economy is realised in households and small family enterprises, and through the cooperation of microregions. These small and medium-sized enterprises could play a very important part in increasing the ability of certain rural regions to retain their population, and in ensuring the continuous development of these areas.

One of the steps planned in order to achieve the job creation target of **one million jobs within ten years** set by the Government is the launch of green employment programmes, since in the green economy, job retention (and gradual job creation) processes can be triggered, which are **expected to result in the creation of 150–200 thousand new, long-term jobs (including approximately 70–80 thousand in the renewable industry)**. Thus **the renewable energy industry** would contribute to the mitigation of the negative effects of the economic crisis and to the creation of jobs that are sustainable in the long term.

The increase of green employment can be maximised if energy efficiency, energy saving and the use of alternative and renewable energies, as well as the green industry and agricultural energy, are all given appropriate emphasis and are established in a complex way, along the entire product chain during the development of the green economy. All of the areas listed have a significant potential to increase employment, especially in rural areas, through the creation of new capacities and manufacturing and assembly facilities, as well as through their stimulating effect on the construction industry, while the increase of employment must also be accelerated through the extension of (green) public employment programmes.



In the field of renewable energy sources there is an opportunity for the creation and retention of a large number of low-qualification jobs, primarily in agriculture and forestry, as well as in disadvantaged regions, through the collection of biomass and farming on energy plantations. The implementation of the agricultural energy programme in accordance with rural development measures also has a high job creation potential (e.g. horticultural nurseries). There are several possible uses for biomass, depending on its form and purpose (e.g. combustion technology, biogas, biofuels), and the development of these must be encouraged within the framework of programmes that enable the greatest possible benefit for the national economy and society to be achieved.

In forestry, permanent or seasonal job opportunities will open up for tens of thousands of citizens – particularly those with low qualifications in rural areas – in afforestation, forest rehabilitation and cultivation, the growing of propagating material used in forestry, as well as the creation and logging of energy plantations, and the collection and processing of other types of forest biomass. It is therefore justified to extend the public employment programme already announced for state-owned forests to private forests as well.

In the field of renewable energy sources, the production of solar energy systems (solar cells and collectors), combustion technology equipment (boilers and pelleters), as well as certain parts (e.g. turbine blades) will have one of the highest job creation

potentials in the long term. With the spreading of renewable energy sources, the demand for them will rise both at home and abroad. Through favourable regulatory and incentive measures Hungary could create a green industry that would transform it from an importer to an exporter of green technology already in the medium term.

Within the green economy, the environmental industry, and in particular, the use of the communal waste “deposited” over the decades for energy production, will not only be important for the reduction of greenhouse gas emissions and the protection of the environmental state of the country, but also for the creation of new jobs in the environmental industry and in waste recycling. This could mean the creation of up to tens of thousands of jobs in a ten-year perspective.

The areas and means of green employment are the following:

- Ø the launch of a complex programme for the combination of the energy modernisation of buildings and renewable energy sources;
- Ø employment support for newly founded green enterprises or enterprises that have become green by changing their activities;
- Ø support for the creation of jobs related to green investments;
- Ø the launch of a green public employment programme;
- Ø support for jobs created within the framework of and as a result of the establishment of an energy consultancy and mentoring network.

The launch of a complex programme for the combination of the energy modernisation of buildings and renewable energy sources: The application of renewable installations for energy purposes in buildings has one of the highest employment potentials. Here it is primarily the field of heat utilisation (solar collectors, heat pumps, biomass boilers, etc.) where a large number of jobs will or could be created, but we must not forget about the green collar jobs created through electricity utilisation (solar cells, household-scale wind turbines, etc.) either. These can, of course, also have a significant effect on reducing heating/cooling and electricity demands currently being met through domestic fossil energy sources in themselves, but if their utilisation is realised together with a complex building energy, engineering and insulation programme, then a considerable (up to 40 percent) reduction in energy demand could be achieved in this field.

Employment support for newly founded green enterprises or enterprises that have become green by changing their activities: Through supporting newly established green enterprises and ones that have been created through a change of their activities, the employment of working-age persons who are having difficulties in finding employment in the primary labour market must be facilitated, in accordance with local employment strategies, in order to ensure that by drawing upon the resources of the region concerned, the implementation of the projects can be beneficial for the entire region. The programme will enable young career-starting entrepreneurs and micro-, small and medium entrepreneurs newly entering the green economy to create white-collar and blue-collar, full-time or part-time jobs through wage subsidies and tax benefits.

The programme could also have a significant effect in the agricultural sector, as agriculture gains a point of entry into this more competitive industry. Additionally, the cheap waste heat generated by the operation of mini-plants generating renewable or

alternative energy is suitable for agricultural use, such as for the heating of greenhouses and polyhouses and the cooling of cold stores in summer. There is significant agro-economic potential in the development of greenhouses and polyhouses in Hungary. It is well known that the competitiveness of the horticultural sector is determined by conscious water management, energy costs and the efficiency of live workforce, and the agricultural use of renewable energy sources could benefit the employment of the rural population, the reduction of unemployment and the improvement of the way of life and job retaining ability of the countryside.

Support for the creation of jobs related to green investments: This incentive system will provide micro-, small and medium-sized enterprises active in new green industrial activities and services with favourable opportunities for the application, production and distribution of new and existing green technologies through green investments aimed at the establishment or expansion of business activities. These activities open up the possibility for the long-term employment of a large number of employees, contributing to the reduction of labour emigration from the region.

Launch of a green public employment programme: Under the green public employment programme, local governments will/can create value-creating jobs, thus providing an opportunity for workforce being involved in employment (who were previously unemployed in the long-term) to return more easily to the world of work, even after the completion of the public employment programme. Public works will thus also enable employees' work morale, work discipline and work culture to rise to an appropriate level and stabilise. Participants in the programme will/would perform activities required for the production of renewable and alternative energy. This will enable, through the involvement of local workforce, the collection, processing, and use in institutions and facilities maintained by local governments, SMEs and the industry, of currently unused (waste) energy sources (resources) produced in the surroundings of villages and small towns within a maximum radius of 30 km (natural, agricultural, forestry, industrial and communal waste).

In conclusion, the increase of renewable energy utilisation will induce a significant growth in employment, which will considerably exceed the number of jobs in the fossil energy industry that will become obsolete as a result. The present Action Plan foresees the creation of 70–80 thousand green collar jobs in the field of renewable energy by 2020, thereby contributing to a significant degree to the achievement of the job creation targets set by the Government.

5.2. Total contribution expected from energy efficiency and energy saving measures to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity, heating and cooling and transport

The requested data is presented in Table F/1.

5.3. Assessment of the impacts (Optional)

Estimated costs and benefits of the renewable energy policy support measures

Table F/13

Measure	Expected renewable energy use (ktoe)	Expected cost (in million EUR)* 2010–2020	Expected greenhouse gas emission reduction in 2020 (million t CO _{2eq} /year)	Expected job creation
Measures 1–23 and 27–29	2344	2 381	4.91	51 200
Measures 25–26	535	73	0.74	

*at the official ECB exchange rate of 1 January 2010

Effects of the Action Plan on emission trading revenues, and the effects of emission trading on the implementation of the NAP

The increase of renewable energy use foreseen by the NAP will have a significant effect on the reduction of domestic CO₂ emissions and on the resulting quota revenues, and vice versa: quota revenues, considering the current EU rules, will constitute significant resources for renewable energy development projects. However, we must stress that the determination of incomes from carbon dioxide emission reduction quotas expected until 2020 is a complex process influenced by factors that currently cannot be predicted.

The sales process must be divided into at least two separate periods due to differences between the valid regulations:

I. Until 31 December 2012:

According to the National Allocation Plan approved by the European Commission, Hungary may sell approximately 2.5 million emission allowance units (EUA) within the framework of the ETS. If we manage to establish the framework for sales (legislative, equipment and staff requirements), we will be able to sell allowances in several parts by the end of 2012. A potential revenue of approximately **HUF 6 to 8 billion** could probably be gained from these sales by the end of 2012. According to current EU legislation, these amounts can be used for climate policy purposes (including national and international emission reduction, and thus also for renewable energy projects).

II. For the period between 2013 and 2020:

Under the 2008 climate and energy package, the European Union has already established a new climate policy framework up to 2020 alongside the ETS (ESD; Effort Sharing Decision), in which Hungary could obtain significant annual revenues if it continues its stable decarbonisation processes.

The ESD system covers those sectors which have so far been left out of the EU's Emission Trading System, which has been in operation since 2005 (e.g. transport, agriculture, the residential sector, SMEs). Under the ESD system, Hungary will receive 10% more quotas in these sectors compared to the 2005 emission level in 2020. Hungary will be able to sell unused emission allowances.

Since the NAP took into account a pre-crisis (2008) base value (TPS value) of 1126.3 PJ, and calculated with a value of 1256 PJ by 2020 in case of an unchanged trajectory (BAU path), the target of increasing renewable energy use from the 2010 value of 60 PJ to 120 PJ by 2020 will make the same amount of fossil fuel combustion unnecessary, i.e. it will result in carbon dioxide quotas in that amount.

Through the trading of those emission units Hungary could, depending on the prevailing quota exchange rates, obtain potential revenues of up to one hundred billion forints by 2020, a significant percentage of which will probably need to be spent, similarly, on climate policy, i.e. green economy development objectives, pursuant to the EU regulations to be adopted later.

The amount of EUA units Hungary will be able to sell under the ETS in this period cannot be forecast at this point, as it will depend on several factors, including national strategic decisions taken between 2011 and 2012, and stock exchange and market processes that do not even have a precise framework yet. Thus, there could be a difference of as much as 50–80% between the potential and actual amount of quotas that could be sold after 2012.

The revenues that can be realised will be greatly influenced by the operation of the carbon market. In the case of a reduction of the total EU amount – if a higher target is set by the EU – prices could increase significantly, and would thus likely result in higher government revenues despite the lower amount of quotas allotted to Hungary.

Overall, it can be said that it is difficult to provide a professionally well-founded, accurate forecast of the expected quota sales revenues received by 2020 due to external influencing factors, but if the system operates according to expectations, in a sound and effective manner, then it could become a significant source of financing for domestic green economy and renewable energy development.

5.4. Preparation of the National Action Plan and the follow-up of its implementation

(a) How were regional and/or local authorities and/or cities involved in the preparation of this Action Plan? Were other stakeholders involved?

The organisations listed in the introduction were involved in the preparation of the NAP, and discussions were held concerning the finished NAP in the form of consultations with the participation of several actors of society, professional bodies and interest groups.

(b) Are there plans to develop regional/local renewable energy strategies? If so, could you please explain? In case relevant competences are delegated to regional/local levels, what mechanism will ensure national target compliance?

In the following years, the drafting of regional strategies will be indispensable. As a first step, our goal is to ensure the implementation of regional energy concepts through appropriate professional coordination at regional level. Furthermore, there will be a need for the creation of microregional energy strategies in the medium term, which could constitute the basis of programming and support in the upcoming period. The establishment of the **energy consultancy network** presented earlier – which will consist of a national energy agency with an extended scope of activities, and a network of county, and later town and microregional energy experts under its direction – and an **online platform based on a professional information database** – which will enable decision-makers, the consultancy network, economic actors, local governments and the population to be supplied with up-to-date information – will facilitate the early achievement of the national target.

(c) Please explain the public consultation carried out for the preparation of this Action Plan.

Social consultations for the Action Plan took place in multiple phases. In the first step, two professional fora were organised during the drafting of the Action Plan, with the participation of 35 to 40 professional and civil organisations on each occasion. The second step consisted of the discussion of the topic in a preliminary social consultation with the involvement of 26 civil and social partners. Subsequently, the National Action Plan was published on the website of the Ministry of National Development for the purpose of conducting a social debate.

(d) Please indicate your national contact point/the national authority or body responsible for the follow-up of the Renewable Energy Action Plan.

The main body responsible for the implementation of the NAP is the Ministry of National Development; organisations involved in its execution, follow-up and monitoring are the Hungarian Energy Office and the Energy Centre Non-Profit Ltd.

(e) Do you have a monitoring system, including indicators for individual measures and instruments, to follow-up the implementation of the Renewable Energy Action Plan? If so, could you please give more details on it?

The current follow-up system has been established in relation to the support measures. Our plans for the future include the creation of an integrated renewable energy monitoring system, which would provide an indication of the extent of renewable energy source utilisation, its regional distribution, the percentage share of the use of the different types of renewable energy, and user groups (the population, SMEs, local governments, etc.), and with that, the rate of development of renewable energy in Hungary. This would also contribute to the follow-up of the development paths outlined in the National Action Plan.

CONCLUSION

“By building upon our natural, cultural economical-social and geopolitical situation, we must turn our assets into an advantage.”

Excerpt from the Programme of National Cooperation, 22 May 2010

The utilisation and spreading of renewable energy sources could represent one of the breakthrough points for Hungary's economy. Hungary has excellent comparative assets in certain areas of energy sources, the exploitation of which will enable, in addition to the fulfilment of energy and climate policy objectives, economic development, job creation and the sustainable development of the countryside. The Government considers progress in renewable energy sources a part of complex green economy development, which is an integral part of the expansion of related industries (the environmental industry).

Hungary's National Renewable Energy Action Plan has been drawn up in the spirit of the above, announcing that in **2010 a new era has begun in Hungary in the field of energy policy as well.**

The objectives of the NAP have been determined on the basis of our assets, realistically achievable possibilities and the considerations of economic development and job creation. Based on these, significant progress can be expected in all segments of renewable energy sources; **by 2020, gross renewable energy source use will double** compared to the 2010 level. Significant progress can be expected in all segments of renewable energy sources.

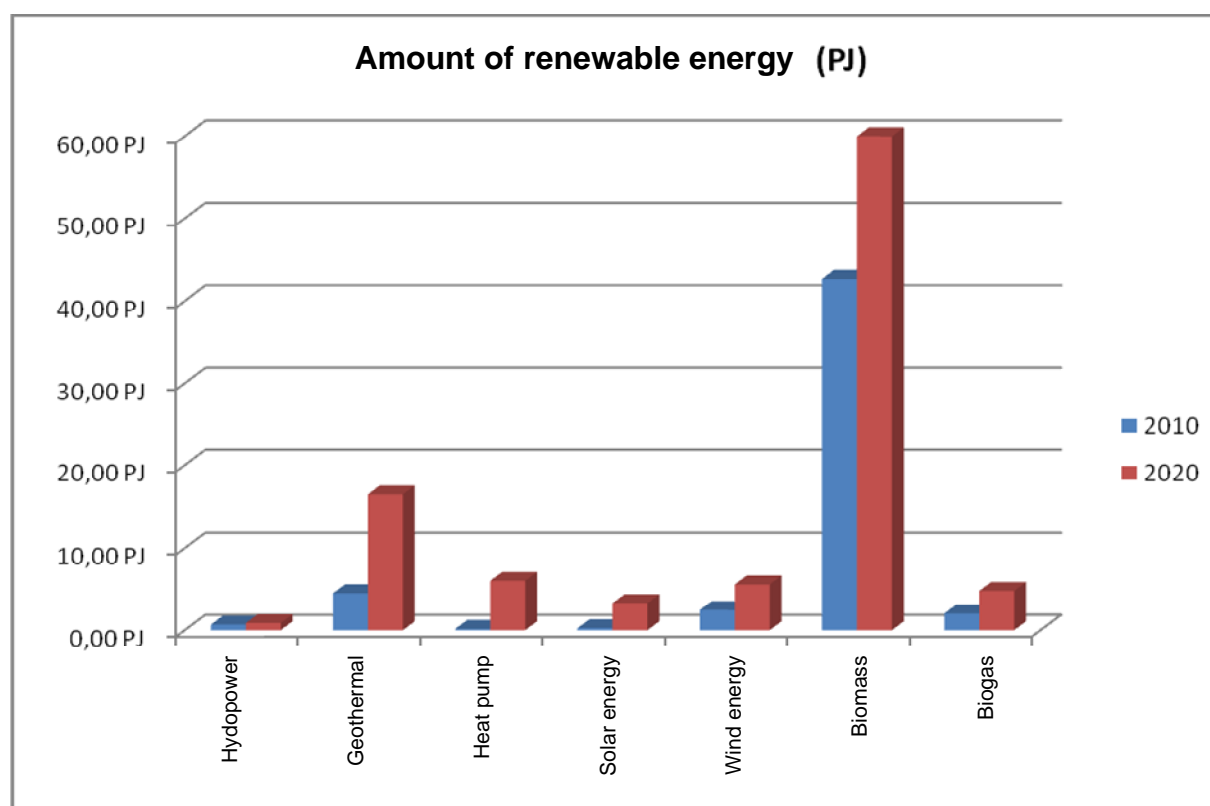


Figure 13: Forecast of renewable energy amounts

The development between 2010 and 2020 will also pave the way for further progress after 2020, creating the conditions for long-term, low-carbon green energy management. Renewable energy sources will constitute an integral, indispensable part of energy management, and will be its most important element in the long term.

Taking into account the importance of green economy development for the national economy and its effects on employment, the creation of at least 150–200 thousand jobs, including 70–80 thousand in the renewable energy industry, could be a realistic target over the next ten years, and will be based on domestic value creation and the increase of employment primarily in rural areas.

We intend to achieve our targets through several measures, which will be implemented as part of the green economy development priority of the New Széchenyi Plan.

Some of the measures are based on the improvement of the efficiency of, and adaptation of, already existing support programmes, but **the vast majority are new initiatives**, which have been urged or rightfully expected by the market for a long time (e.g. the reduction of authorisation procedures or the simplification of legislative regulations). The planned measures are summarised in the table below.

No	Description
Support measures and programmes	
1	Investment support between 2011 and 2014
2	Launch of a new, independent operational programme for energy in 2014
3	Investment programmes financed from the EU ETS
4	More active participation in programmes under direct Community financing and other types of Community financing
5	Development of a green economy
Other (market, budgetary) financial incentives	
6	Green financing (green bank or targeted refinanced loans)
7	Research and development in renewable energy sources
8	Support for the off-take of green heat from 1 October 2012
9	Mandatory off-take of electricity (MOT)
10	Benefits for heat pumps, geo-tariffs
11	Specification of mandatory biofuel admixture
Regulatory incentives	
12	Drafting of a new act on sustainable energy management
13	Relaxation of the conditions for biogas feed-in through a legislative amendment
14	Review and simplification of the regulatory and authorisation system
15	Review of spatial plans, creation of regional energy concepts

16	Specification of a mandatory renewable energy source ratio in new building energy legislation (EU obligation)
Programmes and other measures	
17	Integrated information and awareness-raising programme
19	Creation of an energy consultancy network, development of a green economy information database (online platform)
20	Energy programme for the buildings of public institutions
21	Green employment (public employment programme) for low-qualification workforce
22	Training programme for highly qualified workforce
23	Programmes with short training time requirements
24	Training programmes with medium-term time requirements
25	Programmes with higher education time requirements
26	Facilitation of the use of biofuels in mass transportation
27	Agricultural energy programme
28	Creation of a standard information document providing a comprehensive and transparent description of the new, simplified regulation of authorisation procedures, and making it available on the websites of administrative bodies
29	Preparation of the administration participating in authorisation procedures for the application of amended legislation on those procedures

ACKNOWLEDGEMENTS

We would like to thank all those who participated in the drafting of the National Action Plan. We extend our gratitude to all contributing experts, workgroup members, organisations and professional associations for their professional support, and for making this work successful. We would specifically like to thank the international consortium set up by the EBRD, the members of which contributed to the creation of this document with their prior experience in conducting analyses on renewable energy use, in policy-making, and in the drafting of National Action Plans.

Index of abbreviations

ULH –	Upgrading of Livestock Holdings
BAT –	Best Available Techniques
BREF –	BAT Reference Documents
CE –	Central Europe Programme
CIP –	Competitiveness and Innovation Framework Programme
CNG –	Compressed Natural Gas
CO_{2eq}	The CO _{2eq} (equivalent) represents greenhouse potential expressed in the effect caused by CO ₂ .
DSO –	Distribution System Operator
E85 –	Products under tariff heading 3824 90 99, which were produced for fuel purposes and contain at least 70% but no more than 85% bioethanol produced exclusively from raw materials of agricultural origin from the Community
EBRD –	European Bank for Reconstruction and Development
EDMC –	Energy Demand Management Committee
EECF –	Hungarian Energy Efficiency Credit Fund
EAGF –	European Agricultural Guarantee Fund
EAFRD –	European Agricultural Fund for Rural Development
ENSTO-E –	European Network of Transmission System Operators for Electricity
ESCO –	Energy Service Company
ESD –	Decision No 2009/406/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (Effort Sharing Decision)
ETS –	Emission Trading Scheme
FP7 –	Seventh Framework Programme for research and technological development

template –

The format of the National Action Plan follows that of the template published in Decision 2009/548/EC of the European Commission. The NAP is divided into chapters in accordance with the template, and the numbering of the chapters corresponds to those of the template. In order to ensure unambiguous identification, the tables of the template have been numbered in an F/... format.

FSC – Forest Stewardship Council

FQD – Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC

GDP – Gross Domestic Product

GSA – Act XL of 2008 on Natural Gas Supply

EDOP – Economic Development Operational Programme

Green X Model A programme of energy and economics developed by the European Commission's Directorate-General for Research (DG Research) and the Vienna University of Technology. It is a methodology that the competent bodies of the European Union also consider appropriate and valid. Its goal is to lay down the foundations of a support strategy for aiding the production of electricity from renewable energy sources.

Office – The Hungarian Energy Office

RC – Ripple Control

DHW - Domestic Hot Water

IEE – Intelligent Energy Europe Programme

JPI – Joint Programming Initiative

MOT Scheme – Mandatory off-take scheme for electricity

EEOP – Environment and Energy Operational Programme; one of the operational programmes of the NHDP for supporting energy investments

MTCE –	The former Ministry of Transport, Communications and Energy
EIOP –	Environment and Infrastructure Operational Programme
CSO –	Hungarian Central Statistical Office
MEW –	The former Ministry of Environment and Water
LNG –	Liquid Natural Gas
LPG –	Liquefied Propane Gas
MAVIR –	Hungarian Transmission System Operator Company Ltd. (Magyar Villamosenergia-ipari Átvételi Rendszerirányító ZRt.)
MePAR –	Hungarian Agricultural Land Parcel Identification System; an electronic system for the individual identification of agricultural lands and the registration of their data in relation to application for agricultural aid
CAO –	Central Agricultural Office
HTLO –	Hungarian Trade Licensing Office
LMF –	Hungarian Labour Market Fund
ARDA –	Agricultural and Rural Development Agency
NAP –	National Renewable Energy Utilisation Action Plan
NSDS –	National Sustainable Development Strategy
MND –	Ministry of National Development
MNE –	Ministry of National Economy
NEEAP –	National Energy Efficiency Action Plan
NESP –	National Energy Saving Programme
NCCS –	National Climate Change Strategy
NTC –	Net Transfer Capacities (for market trade)
NEF –	National Employment Foundation
OKJ –	National Qualifications Register
NTPCR –	National Town Planning and Construction Requirements

NSPA –	Act XXVI of 2003 on the National Spatial Plan
MLR –	The former Ministry of Local Governments and Regional Development
PEFC –	Programme for the Endorsement of Forest Certification
PRIMES Model –	A modelling system that simulates the equilibrium of supply and demand on the energy market in relation to EU Member States. The model determines the state of equilibrium by finding the prices of each form of energy at which the quantity producers find best to supply exactly matches the quantity consumers wish to use. PRIMES is a general purpose model, and has been conceived for forecasting, scenario construction and policy impact analysis. PRIMES can be used to model medium and long-term processes.
RED –	Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC
ROP –	Regional Operational Programmes
RTU –	Remote Terminal Unit
SCADA –	System for supervisory control and data collection; data storage/sorting centre of the ÜRIK system (for measured data)
SEE –	South East Europe Transnational Cooperation Programme
SROP –	Social Renewal Operational Programme
TEN –	Trans-European Networks
MWP –	Minister Without Portfolio
TPS –	Total primary energy source use
RDA –	Act XXI of 1996 on Regional Development and Spatial Planning
TSO –	Transmission System Operator (the current TSO in Hungary is MAVIR ZRt.)
UCTE –	Union for the Co-ordination of Transmission of Electricity; association of electricity systems in Western and Central Europe
NHDP –	New Hungary Development Plan (a programme based on Council Regulation 1083/2006/EC)

NHRDP –	New Hungary Rural Development Programme (a programme based on Council Regulation 1698/2005/EC)
ÜRIK –	IT system for the technical and regulatory operation of the transmission grid
GHG –	Greenhouse gas
EA –	Act LXXXVI of 2007 on Electricity
GIS –	Green Investment Scheme; a climate protection tender scheme based on emission trading revenues
GIS EE –	Green Investment Scheme – Energy Efficiency Sub-Programme

Units of measurement:

CO_{2eq}	carbon dioxide equivalent the amount of CO ₂ that would have an effect equivalent to the increase in the greenhouse effect caused by a particular greenhouse gas
J	joule the SI unit of energy 1 GJ = 0.2778 MWh = 0.0239 toe
toe	tonne of oil equivalent standard unit based on the caloric value of one tonne of crude oil 1 toe = 41 868 GJ = 11 630 kWh
VA	volt-ampere the unit of apparent power $S^2 = P^2 + Q^2$, where S is apparent power, P is real power and Q is reactive power
W	watt the SI derived unit of power 1 W = 1 J/s
Wh	watt hour a widely used, non-SI unit of energy 1 GWh = 3 600 GJ = 85.9845 toe

SI prefixes used in the units of measurement:

k	kilo = $\times 10^3$
M	mega = $\times 10^6$
G	giga = $\times 10^9$
T	tera = $\times 10^{12}$
P	peta = $\times 10^{15}$