Issue 4, Europe, June 2006
Find more information about AUDITAC:
www.energyagency.at/projekte/auditac.htm

AUDITAC NEWSLETTER

The AuditAC project is about to enter its final semester, and the first tangible outputs of our work are already available: two technical guidelines – Vol. 2 : Energy Auditing of Air Conditioning Systems and the EPBD: What does the new regulation say? and Vol. 4 : "An AuditAC proposed preliminary audit procedure for Air Conditioning facilities – as well as the Eurovent data base of certified equipment can now be accessed by any of you: please, visit our website and have a direct look at these documents!

But this is just the beginning of what we hope will be a rich and helpful collection of tools and materials: two other guidelines are already near completion, that will address the issues of understanding the factors affecting the energy efficiency of existing AC systems, and producing an inventory of the equipment in place, by a walkthrough inspection and by gathering the existing documents.

It is our opinion that a successful inspection, followed by a detailed audit and by energy saving investments, strongly depends on the availability of reliable energy consumption / performance data, and on the methods employed to process them. And these are actually the two major paths on which the AuditAC work is being developed.

I would like to make some comments on the first issue: data collection. Here stands the main difference between making an energy audit of a pure heating system in comparison with an air conditioning one. In the former case, primary energy is usually provided by fossil fuels, the consumption of which is straightforward to measure; furthermore, methods for determining the combustion efficiency and the useful heat delivered to the system are well documented by technical standards and accurately implemented in commercial instrumentation.

In air conditioning systems, on the contrary, the energy input is normally in the form of electricity, for which aggregated data are often available; separating the energy consumption of chillers, pumps and fans from a global value (including lighting, office equipment and miscellaneous appliances) is difficult and often not justified in contractual schemes in which the building owner bears the cost of electricity. The other aspect is quantifying the performance of the main components of the AC system, i.e. the cold generating equipment and the fluid handling / distributing components.

The data published by Eurovent Certification, that documents the testing activity carried out since 1995, will certainly help inspectors and auditors in gathering performance data that otherwise would be almost impossible to determine by direct field measurements.

Marco Masoero, Italy AuditAC Co-ordinator

The Eurovent certified equipment database: An innovative help for air-conditioning renovation.

By: Daniela Bory, Mines de Paris

The AuditAC project is now reaching its maturity and the first results are available. The inclusion of Eurovent Certification as a partner allowed the project to create a very important tool: a database containing the past directories of equipment certified by Eurovent starting from 1995 certified until nowadays. This database is now accessible from Internet and freely consultable as an effort of Eurovent in the AuditAC project. This will partly answer to the increasing demand of data by inspectors and auditors

The data are published on the Eurovent Certification site http://www.eurovent-certification.com/, in the "Consultants" section and are classified by year of certification.

The database can be used to find the certified characteristics of a various types of equipment depending on the programme of certification, the manufacturer and the model number. The testing conditions are fully described in the Eurovent Certification site in the "Programmes" section.

The database contains the past directories of certification with past information about:

- Comfort Air Conditioners < 12 kW
- Comfort Air Conditioners 12 – 45 kW
- Comfort Air Conditioners 45 – 100 kW
- Close Control Air Conditioners
- Fan Coil Units
- Liquid Chilling Packages

The programmes have been started in different periods so not all the directories are available for all the years (i.e. liquid chilling packages started in 1996, so the directory for 1995 is empty but most of '95 models were still sold in '96).

(next page)

If you want to be informed about AUDITAC – send an EMAIL to georg.benke@energyagency.at to register for information and the AUDITAC NEWSLETTER.

This database will be helpful in audit and inspection procedures because it allows easy access to the performance level of the existing equipment in use in the audited building and its main characteristics.

The auditor will be able to see whether the system is obsolete compared with present equipment, then advise retrofitting with new technologies or a more recent system with a better EER. This will result in energy savings and lower running costs.

There is the possibility to download the data of each directory, allowing auditors or services to build statistics on the performance for a system type in relation with the year of certification, its capacity etc.

The Eurovent site is also a quick link with the sites of the certified manufacturers and it provides easy access to research documents and commercial information.

Eurovent/Cecomaf

The Eurovent Certification Company is a subsidiary company of Eurovent/Cecomaf, the European parent organisation of the HVACR Industry based in Brussels. Nearly 1000 manufacturers from 11 different countries are represented through 15 national associations. The main task of this non-profit making organisation is to represent the interests of the European HVACR Industry through workgroups on both a European and worldwide level. The objective is to promote key issues of interest to the HVACR Industry such as the environment, energy efficiency, alternative refrigerants and performance certification. Practically, this means participation in the development of European and international standards, the publication of technical guidelines/documentation and the certification programmes of the Eurovent Certification Company.

The purpose of Eurovent/Cecomaf is:

- To represent the European ventilating, air conditioning and refrigeration manufacturers with national trade associations on international and European issues
- To keep members informed of relevant legislation emanating from the European Union or other bodies
- To develop a reliable global statistic reporting system
- Through the Eurovent Certification Company, develop product certification programmes for our industry
- To assure participation in international and European standardisation
- To improve communication on general issues such as refrigerants, energy or indoor air quality
- To publish guides and technical application manuals
- To develop co-operative pre-competitive research
- To prepare the Association as an organisation that can self regulate the industry.

Performance testing in the scope of Eurovent Certifications is carried out by independent laboratories, under contract with Eurovent.

Customer advising tool:
the combination of case studies, benchmarks and advice generation
The work of WP6-WP7-WP8 in AuditAC

Philippe ANDRE and Jean LEBRUN
with input from José-Luis ALEXANDRE and Ian KNIGHT

The purpose of the audit of a HVAC system is to advise the customer about the energy performance of the system and to suggest modifications and improvements to be carried out. Different levels of audit are possible, ranging from a basic observation of the energy bills up to more advanced approaches involving realisation of measurement campaigns and detailed calculations. In this respect, modern simulation tools are a valuable resource that can help in improving the information gained from the audit. Such tools can be used at two levels in the context of an audit. First, upstream of the audit procedure in order to calculate the expected performance of a given system or of a family of systems. This process is called "benchmarking" as its objective is to provide reference performances for the system under investigation. This approach efficiently relies on the information gained from Case Studies. Then, simulation can be used during the audit procedure in order to complement the information obtained from observation or measurements and to extrapolate the performance of the system and, more important, the change of performance which could be obtained by submitting the system to some modifications (in the design and/or in the operation).

The "Customer Advising Tool" is one of the main deliverables of the AuditAC project. It is based upon the lessons obtained from a selection of Case Studies and on Benchmark Performances calculated by simulation models. This tool is devoted to the audit and inspection of A/C systems, from the viewpoint of both the customer or the inspector. It is a tool that is considered of great importance to make the auditing procedure more efficient and able to produce results in line with the requirements of the European Building Performance Directive.

From a general viewpoint, the Customer Advising Tool includes the following components:

- A Case Studies centred database
- An advising method
- A set of performance benchmarks.

Advising tool

The advising tool under development by the AUDITAC project will synthesise the best aspects of the various current or proposed A/C inspection methodologies in Europe. The aim is to produce a tool which will lead the user through a methodology tailored to meet the situation they face in a particular building.

The heart of this tool is proposed to be the database, which contains Case Studies of real actions undertaken in real systems, and the savings that were obtained. The database also contains the results and findings from modelling exercises undertaken on the various system types, right down to component level.

Using the tool to tailor the methodology to the actual system to be inspected/audited, will enable both building/system owners and experienced inspectors to, amongst other things:

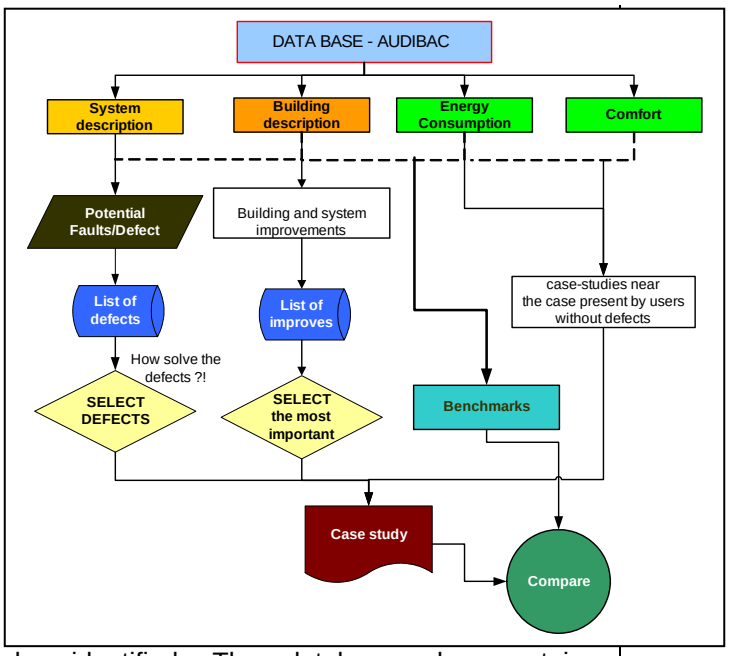
- Identify the A/C system types they have installed in their buildings
- Identify the specific equipment installed, through linking into the information available from Eurovent
- Identify whether the A/C systems installed meet typical benchmarks for that type of system.
- Identify whether the system as installed appears to have room for improvement, and where that improvement might be made.
- Identify the common defects to be found for the identified A/C system type, typical remedies, and the typical energy and cost savings to be made from rectifying the defects.
- Identify real world Case Studies which have achieved energy savings in systems and buildings related to the situation being audited.

The tool is intended to be designed to minimise the time taken to appraise a specific situation by removing all guidance which is superfluous for that situation, and by then leading the user through a methodology designed to provide as much useful information as quickly as possible.

It is anticipated that the tool will be both web-based and downloadable, to enable it to be run as a stand-alone programme on a laptop while on site.

Case Studies database

The database contains information about the building and the associated system.Therefrom, a list of potential defects and improvements may



be identified. The database also contains information about energy performance and thermal comfort. In a typical Customer Advising process, the first step consists in finding in the database a corresponding case to which the building submitted to the audit can be compared. Different variations to the reference (ie existing) configuration can be simulated, either during the audit process or a priori for the examples populating the database.

Benchmarks

Benchmarks are therefore a vital part of the advice to be generated, but they need to be seen to be reliable and adaptable to the specific case considered.

To establish suitable benchmarks for the range of building and A/C system types considered by the AUDITAC project, the crucial question to be answered is: what should be the range of consumption(s) for such buildings and A/C systems, in such a climates, with such occupancies, such internal loads and such actual indoor environments?

The performance index used for generation of the benchmarks can be:

- The actual comfort conditions (in that case, the "reference" are the requirements);
- The building energy demand (reference = projected data);
- The Air Conditioning system energy consumption (reference = energy consumption of a comparable case)

While, in an audit procedure, the field evaluation or identification of the end use of the building demand is not that straightforward (heat/cool counters are not very often installed in buildings), calculation of the theoretical demands of a building appears logically at the start of a design process as well as in an "a posteriori" evaluation procedure. In an audit procedure, where time and information are lacking, a relatively expedient method has to be carried out. For the AUDITAC project it is currently proposed that this procedure will be based on the use of "simplified" models, in which the description of the building is aggregated into a small set of parameters. Although simplified", the method has still to be able not only to evaluate the performance of a building as it is, but also to predict its potential performance after retrofit. Consequently, the simulation environment has to be "sensible" to those potential alterations.

As a conclusion, answering to the question "*what will be the benefit (in energy and/or financial terms) of the application of such improvements in a specific project?*" is one of the objective of the AuditAC project.

What do YOU know about article 9 of the EPBD ?

By Georg Benke

The article 9 of the EPBD requires that AC systems (>12 kW) are regularly inspected with a focus on energy efficiency and the correct sizing of the AC system. Within the EIE project, we are working on this field to support you. During the last months, we have published several papers about this topic and presented them to international conferences. If you want to get a better overview of the current situation, the problems and solution, you should take a look at our papers. They can be found on our Webpage:

www.energyagency.at/projekte/auditac.htm

There you will find also the first versions of technical guidelines, which should support the implementation of the inspection on the European market. The title of the two guidelines, which are already available are:

- Volume 2: Energy Auditing of Air Conditioning Systems and the Energy Performance in Buildings Directive: what does the new regulation say
- Volume 4: An AUDIATC proposed preliminary audit methodology for airconditioning facilities

You are invited to check these two guidlelines and provide feedback: Are they useful for you? Do you need these guidelines? What kind of information is missing? Do you agree or disagree? Feedback is very welcome and we want to say already THANKS to your answer.

GreenBuilding: A European Program to promote energy efficiency in non residential builings

Georg Benke, Austrian Energy Agency, National Contact point Austria

In 2004, the **European** Commission initiated the GreenBuilding Program (GBP). This program aims at improving the energy efficiency of non-residential buildings in Europe on a voluntary basis. The program addresses owners of non-residential buildings to realize cost-effective measures which enhance the energy efficiency of their buildings in one or more technical disciplines.

In a pilot phase ("The GreenBuilding project") in the years 2005-2006, the GreenBuilding infrastructure should be set up in ten European countries. In each participating country, a so called National Contact Point is being established for aiding organizations, who consider participation in GreenBuilding. The GreenBuilding pilot phase is a project supported by the European Commission's Intelligent Energy Europe Programme.

On the central project website, information are updated and amended continuously. Furthermore, there are links to the websites of the ten National Contact Points and the European Commission's Joint Research Centre (JRC).

http://www.eu-greenbuilding.org/

Participation in the GBP starts with the submittal of an action plan defining the scope and nature of the company's commitment. Based on an initial energy audit, the action plan must define the buildings in which energy efficiency actions will be undertaken as well as the energy services (heating, lighting, water heating, ventilation, air-conditioning, office equipment, etc.) and the specific measures, to which the commitment applies. If the action plan is accepted by GreenBuilding, the company is granted Partner status.

To support the measurements, technical guidelines are offered on the GB web side. This "Modules" defining the technical nature of an appropriate commitment for each energy service covered in the program. The modules are complemented by guidelines on horizontal issues, such as "Financing", "Energy Audit" and "Energy Management".

Until now 5 partners have signed the contract and 10 buildings with the efficiency report are listed in the web side. Behind this partners, there is a very interesting stories and reports, what kind of measurements have been done to become GreenBuilding Partner. This platform of reports should demonstrate, how much can be saved in the sector of non residential buildings. In the case of a public swimming hall in Vienna it is more than 60 % - in a case of a small church even more.

Maybe you know a building, which is worth to listed as an EU GreenBuilding Partner. It would help to raise the awareness for energy efficiency and the the building owner would profit from the higher image to be a GreenBuilding Partner.

www.energyagency.at/projekte/auditac.htm

Supported by Intelligent Energy Europe