



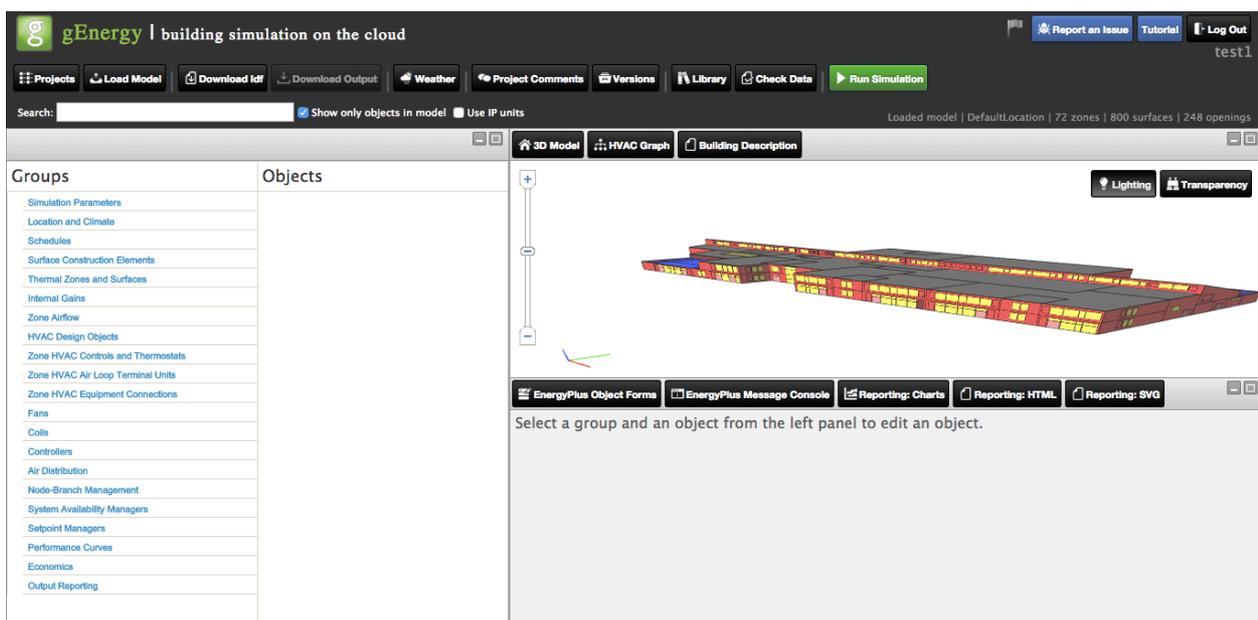
Nearly Zero-Energy Buildings: Best Practices from Intelligent Energy Europe

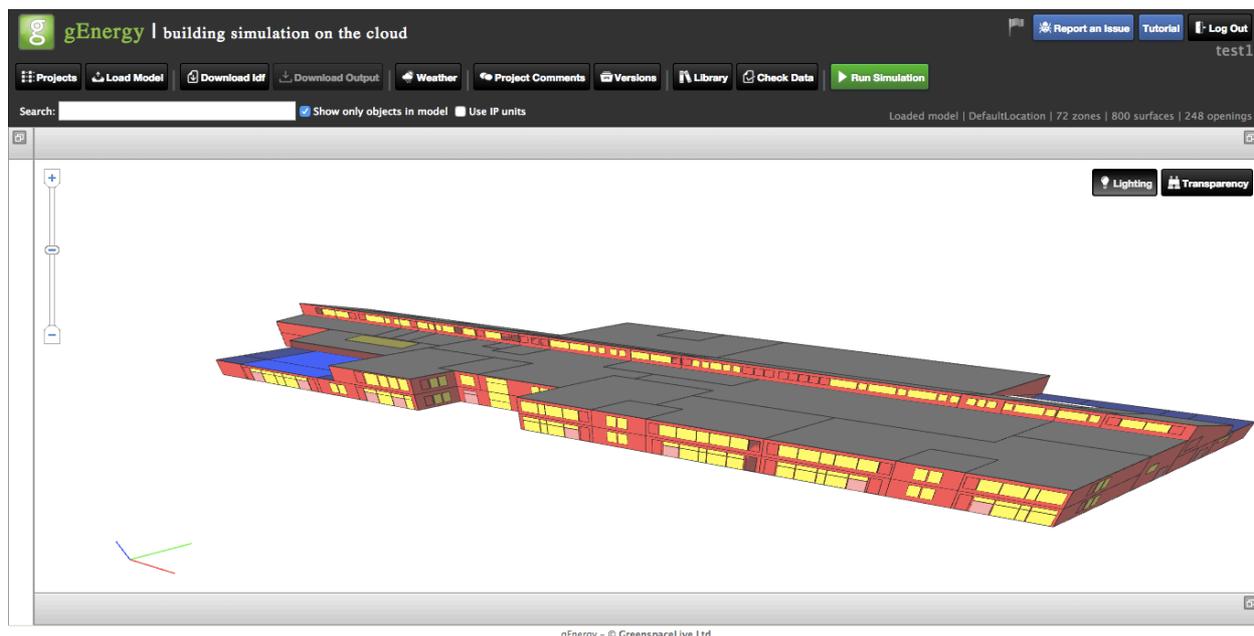
Web based dynamic simulation solutions towards nZEB

[GreenspaceLive Ltd.](#) is an e-startup based in the Isle of Lewis and it has developed some of the most innovative online BIM technology available today with [gEnergy](#), a powerful new building simulation engine for the cloud, and gModeller, a rich BIM enabler plugin for SketchUp. The company was a partner in the AIDA project and made significant contributions particularly with the design process of working towards nearly-zero-energy-buildings (nZEB). From spring 2012 to March 2015, AIDA aimed to increase the number of nZEB, the number of building professionals trained on integrated energy design and the number of municipalities starting to build/refurbish buildings to nZEB levels. More than 1600 project participants utilised the AIDA version of the simulation tools to ensure that the right design decisions were taken with iterative solutions resulting in optimised designs.

gEnergy

gEnergy is an Internet software platform for creating Energy Plus models or for importing Trimble, Sketchup, Autodesk Revit gbXML and existing Energy Plus IDF models. Over 600 building objects, constructions and HVAC systems are supported in gEnergy's easy to use Web interface that allows architects, engineers and consultants to accurately predict and apply best practice design into new building developments, with a view to reducing energy consumption and running costs over the life of the building. gEnergy allows those involved in specifying, designing and constructing buildings to develop richly detailed building information models that can be used to provide projected power usage data.





[gModeller](#) is a plugin for Trimble SketchUp which enables architects, designers and energy modellers to use SketchUp to create gbXML and EnergyPlus files which include the necessary information for further energy modelling. gModeller is easy to use, compatible with most energy and modelling systems, and simplifies the modelling process for doing accurate energy analysis and early stage "what-if" scenarios. As a result of using gModeller, Trimble SketchUp becomes an intelligent solution for low carbon building design and nZEB.

Native 3D graphics

gEnergy features a fast Web graphics library (WebGL) based 3D visualisation of building geometry, which is available in browsers like Google Chrome and Mozilla Firefox. For browsers, that do not support WebGL, gEnergy automatically downscales to a canvas

based 3D visualisation, still making a 3D model of the building's geometry available. The model is bi-directionally linked to the overall user interface, so that selecting a space in the object menu, highlights it in the 3D model, and vice versa, making it easier to edit complex models.

Extensive object libraries

The 3D models are populated from an extensive and extensible library of building objects, either standards based or from component manufacturers. These library items can also be used as templates and modified according to company or project requirements, allowing local extended libraries to be built up. In a complex model specific objects can be located using Object Search, which uses sophisticated tools, like gEnergy's search box, to automatically suggest search terms in the model. This can be useful when looking for an



object where the name or value is only partially known, saving significant time and effort. gEnergy also provides functionality for filtering out unnecessary or unused objects in order to simplify the process of navigating complex models.

Groups	Objects
Simulation Parameters	Building [New]
Location and Climate	ConvergenceLimits [New]
Schedules	HeatBalanceAlgorithm [New]
Surface Construction Elements	ShadowCalculation [New]
Thermal Zones and Surfaces	SimulationControl [New]
Internal Gains	SurfaceConvectionAlgorithm:Inside [New]
Zone Airflow	SurfaceConvectionAlgorithm:Outside [New]
HVAC Design Objects	Timestep [New]
Zone HVAC Controls and Thermostats	Version [New]
Zone HVAC Air Loop Terminal Units	ZoneAirHeatBalanceAlgorithm [New]
Zone HVAC Equipment Connections	
Fans	
Coils	
Controllers	
Air Distribution	
Node-Branch Management	
System Availability Managers	
Setpoint Managers	
Performance Curves	
Economics	
Output Reporting	

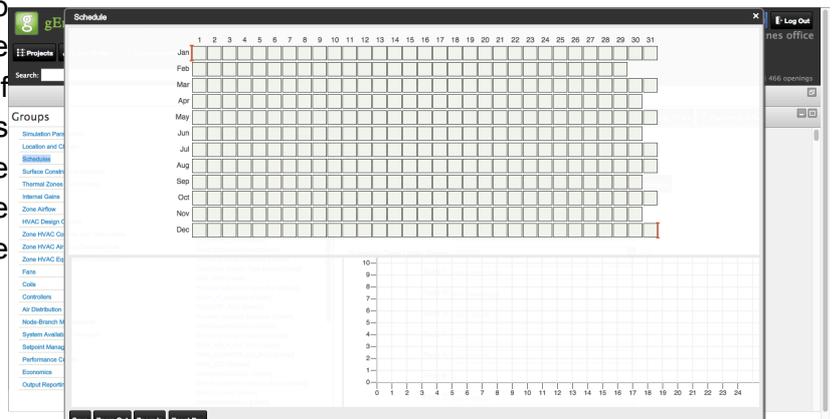
EnergyPlus models can be large and complex, composed of many different objects. Often however, many objects share common attributes, e.g., surfaces sharing the same constructions. gEnergy allows users to select and edit multiple objects at the same time, so that setting the properties of groups of objects becomes as simple as pressing the ctrl or shift key, selecting the objects in question and changing the appropriate parameters. A massive productivity boost!

Graphical schedule editing and HVAC

gEnergy comes with a graphical schedule editor for defining and editing schedule information, to be used when objects function at a defined level over a period of time. The graphical schedule editor allows users to easily create usage profiles and schedules using a draggable charting editor, drag and drop days, and selectable periods.

gEnergy supports powerful heating, ventilation and air-conditioning (HVAC) system design and modelling using an interactive graph based editor, showing all components and connections in an HVAC systems, e.g., air loops, water loops, control systems etc.

gEnergy's interactive HVAC graph view can also be used to highlight areas in a system, identify and analyse connections, and increase understanding of otherwise complex systems. The graph is also linked with the gEnergy form editor, so that selected components and their properties can be edited directly.

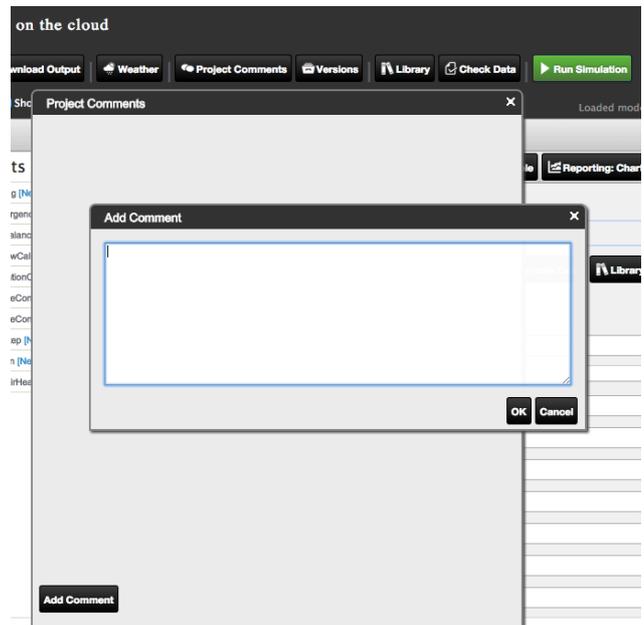


EnergyPlus console

With objects and schedules specified, a simulation can be run in EnergyPlus which has a console that users can monitor, to view EnergyPlus output messages, identify any modelling errors, and be informed of any issues that take place during model simulation. gEnergy allows the user to produce large amounts of simulation data, which can be charted and viewed according to your own specific requirements, using gEnergy's customisable dashboard based charting - adding and removing custom charts, editing existing charts, and selecting hourly, monthly and annual result parameters. Reports can be 'mixed and matched' to suit anyone's needs. All simulation results can be exported and downloaded from gEnergy for further analysis in applications like MS Excel.

Collaborate at project and object level

gEnergy supports collaboration by allowing users to share projects with others, and offers Google Docs-like comment threads at project and building object level. For example, if there is a question within the design team regarding an HVAC component, users can discuss the properties and behaviour of that specific object without cluttering overall project discussions. These comments are hyperlinked directly to the object in question and can be shared across the cloud. The result is a rapid, highly productive team-based approach to developing high-quality EnergyPlus models



which become powerful information assets for predicting building and systems performance.

This is supported in gEnergy with model versioning, where every change made is backed up as a version, meaning data is never lost, even after changing a model. Versioning also allows model alternatives to be simulated and compared - multiple constructions or systems can be used in two different versions of the same model to see how they compare.

gWorkspace

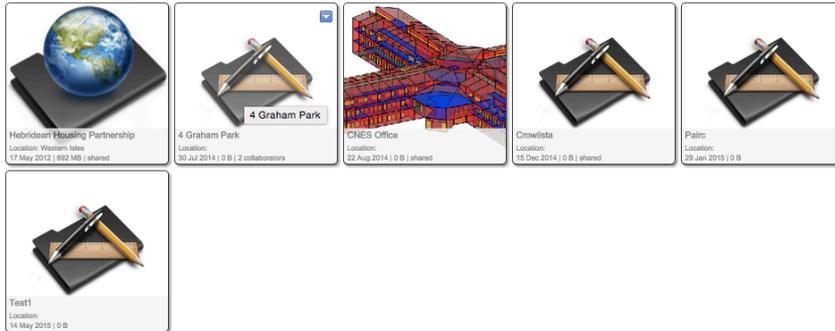
As a web based application, gEnergy can be used on any device that supports a web browser. This includes Microsoft Windows, Mac OS X, Linux, iOS, Android, and other operating systems - everything from large workstations, laptops, and tablets right down to smartphones. This makes gEnergy very portable. Start modelling on a desktop, edit and run while on the move on a laptop and tablet, check results on a smartphone, and





Projects
Donald Alexander

PEOPLE MESSAGES



present results on a client's computer. This is facilitated by another gWorkspace, GreenspaceLive's proprietary cloud-based building information management system.

[gWorkspace](#) provides a central location for data gathering and coordination with team members in the cloud acting as a secure virtual filing cabinet to store all information pertaining to each project. The benefit, though, is that projects can also be shared with multiple users, working together on building projects using stored information including photographs, floor plans, survey reports, repeat analysis runs to achieve a common goal or to show results to clients. gWorkspace features are available from within all greenspaceLive gTools.

GreenspaceLive

Whilst developing the gTools series of applications, GreenspaceLive has created 450

richly-detailed online foundation projects that can provide a base for developing schools, hospitals, housing and all other types of new and retrofit builds.

Donald Macritchie, Managing Director of GreenspaceLive states, *"Architects and design engineers are always looking to create aesthetically pleasing as well as functional buildings. With gEnergy they now have the ability to run their designs against real life energy and construction scenarios and gain accurate feedback on building performance. This will ensure the buildings of the future are sustainable, functional and beautiful."*

GreenspaceLive is also developing an integrated cost, energy, carbon and embodied carbon solution, Rapiere, due to be delivered later this year. GreenspaceLive is the software developer partner in the Rapiere consortium with construction industry partners Architype, Sweett Group plc and Chapman-BDSP.

You can register for a trial of GreenspaceLive at the website below.

www.greenspacelive.com

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