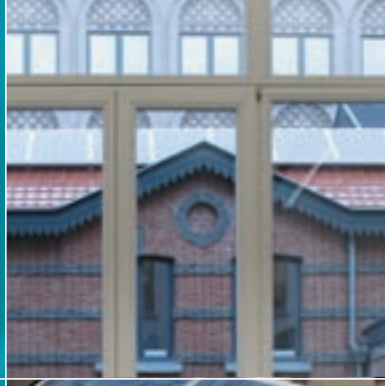
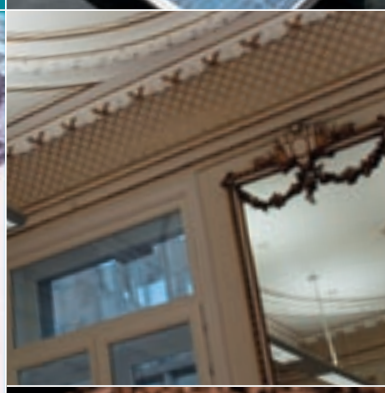
The Renewable Energy House

EREC

Europe's headquarters for renewable energy





100 % renewable energy supply for heating, cooling & electricity in a monument-protected building in the heart of Brussels

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A bit of history

In 2000, several European renewable energy associations decided to share a common office building in order to make use of synergies – the Renewable Energy House concept was born. This concept proved to be successful and the number of staff in the house grew rapidly so that the original premises soon became too small.

When looking for new premises, EREC teamed up with HRH Prince Laurent of Belgium. The Prince proposed to EREC and its members the creation of a living renewable energy and energy efficiency showcase in the heart of Brussels, accessible to the people of Europe and beyond. The challenge that lay ahead was how to preserve the 120-year-old building structure whilst integrating a series of renewable energy and energy efficiency measures. Furthermore, time available for this project was very short as EREC and its members faced a serious lack of space in their previous location, which made a quick move indispensable.

The excellent collaboration between all parties involved made the impossible come true – in less than a year a concept was developed and implemented, realising a truly spectacular sustainable energy showcase in the heart of Europe's capital, demonstrating both a significant reduction of energy consumption for heating, lighting, cooling and ventilation through the application of energy efficiency measures, as well as providing as much renewable energy as possible for the remaining energy demand.

In January 2006, 11 renewable energy associations moved to the new Renewable Energy House, located in Rue d'Arlon 63-65. The Renewable Energy House is much more than an office for the leading renewable energy industry, trade and research associations: it is a model showcase on how to integrate renewable energy and energy efficiency technologies in a monument-protected building in an urban environment.

The concept

The Renewable Energy House, an office building with modern meeting facilities of approx. 2000 m², is the central point for renewable energy issues in Europe's capital Brussels close to the European institutions such as the European Commission, the European Parliament and the Council, which allows it to benefit tremendously from synergies and also allows easy access to information on renewable energy for stakeholders and the interested public. At the beginning of 2006, the European associations located in the Renewable Energy House employ more than 45 staff.

The Renewable Energy House for the first time groups together all major actors in the field of renewable energy in Europe, thereby representing one of the fastest growing economic sectors with an annual turnover of more than 15 billion € employing more than 300.000 people and supplying 8 % of Europe's current energy demand.

The following associations are located under one roof in the Renewable Energy House:

EREC: European Renewable Energy Council
AEBIOM: European Biomass Association
EGEC: European Geothermal Energy Council
EPIA: European Photovoltaic Industry Association
ESHA: European Small Hydropower Association
ESTIF: European Solar Thermal Industry Federation
EUBIA: European Biomass Industry Association
EUFORES: European Forum for Renewable Energy Sources
EUREC Agency: European Renewable Energy Centres Agency
EWEA: European Wind Energy Association
GWEC: Global Wind Energy Council

The new Renewable Energy House is the perfect showcase for integration of innovative renewable energy technologies in an old building, which was refurbished by taking into account renewable energy and energy efficiency considerations.

For the first time in Brussels, a 120-year-old building was refurbished so as to minimise the energy consumption and to explore different methods for integrating renewable energy technologies, making it a 100 % renewable energy building.

The Energy concept

An encompassing energy concept was developed in close collaboration with EREC and its member associations, the architect (Atelier d'Art Urbain), an energy consultant (3E) and the Technical Advisory Board to ensure maximum use of renewable energy applications as well as energy efficiency measures.

The energy concept aims at:

- Maximising the use of renewable energy technologies in the building in order to offer a show-case for the integration of renewable energy technologies in a monument-protected building
- Ensuring the implementation of a full range of energy saving measures

All measures implemented contribute to reducing energy consumption of the building with the benefit of increasing the comforts to its tenants, and to supplying renewable energy.

The following measures were implemented:

Energy efficiency measures

- Insulation of façade and roof
- Low emission, sunprotecting glazing
- Highly-efficient lighting systems
- Ventilation system with heat recovery

Renewable energy measures

- Pellet heating system
- Solar thermal heating and absorption cooling system
- Geothermal heating and cooling system
- Electricity production with PV

It is estimated that the implemented energy efficiency measures will reduce the annual energy consumption for heating, ventilation and air-conditioning by 50 % compared to a reference building. 100 % of the building's heating and cooling demands are provided by renewable energy sources (biomass, wood pellet, geothermal heating and cooling, solar thermal heating and absorption cooling). The building features the latest PV technologies (modules, thin-film, semi-transparent) for the production of electricity and was equipped with a series of energy efficiency technologies (ventilation with heat recovery, insulation of façade and roof, highly-efficient double glazing, high-efficiency lamps). In addition to this, the remaining electricity required will be bought from renewable energy installations so that 100 % of the electricity consumption will be provided by renewable energy making the Renewable Energy House 100 % renewable energy based.

The different implemented energy efficiency and renewable energy measures are detailed on the following pages.

The project initiator

HRH Prince Laurent of Belgium has been active in the environmental field for the last 15 years. He defines the environment as the meeting point between balanced management of the economy, ecology and social equity, and summarises his vision in the concept of the three 'Es', thereby meaning the following: Economic activity implies managing an ecosystem; ecology involves observance of this ecosystem; social equity represents the harmony of well-being within this ecosystem.

HRH Prince Laurent notes that all too often, the balance between the three 'Es' is affected by an over-emphasis on the economy. Respecting the environment involves ensuring balanced management of the three aspects. If a balance can be achieved between the three 'Es', this is a step towards a more sustainable society.

The Prince proposed to EREC and its members a turnkey project with a view to creating a living showcase, accessible to the people of Europe and beyond, in line with the concept of the three 'Es' . His aim was to protect architectural heritage on the one hand and to introduce clean technologies into this heritage on the other.

The buildings accommodating the Renewable Energy House are classified buildings and - as if to emphasise the contrast - are located immediately opposite a modern building.

The plan was simple but ambitious: to renovate an old building, while preserving it, using renewable energy and energy efficiency technologies. With the assistance of EREC, qualified European companies were selected to install and manage the specific energy equipment required. The entire project was implemented in seven months. Not only do the tenants benefit directly from the reduction in the energy bill, but above all, they have access to a modern and at the same time prestigious office building.

With this new "Renewable Energy House", the vision of HRH Prince Laurent outlined above and symbolised by his concept of the three 'Es' takes practical shape in a spectacular way.

The Renewable Energy House renovation team

The realisation of this ambitious project would not have been possible without the close collaboration of various stakeholders all of whom shared a common vision. The coordinated interaction made it possible to implement the Renewable Energy House project in the short time available – seven months for carrying out renovation works including modern renewable energy and energy efficiency technologies. The Renewable Energy House renovation brought together partners from different disciplines (European renewable energy association representatives, architects, energy specialists, renewable energy equipment manufacturers, construction companies, financing institutions, real estate agents, etc.) from different country and language backgrounds. It was at the same time challenging, enriching and educative for everyone involved. The commitment of all parties involved and particularly the vision of HRH Prince Laurent of Belgium to align the "3Es" - economy, ecology and social equity - finds its direct expression in the Renewable Energy House, which is open to all citizens who are interested in learning more about sustainable energy.

The following actors have actively contributed to making this project a success:

Atelier d'Art Urbain: Architect - www.atelier-art-urbain.com

ATELIER D'ART URBAIN
ARCHITECTES

SODEPI: Project Manager - www.sodepi.be

SODEPI
DEVELOPMENT

3E: Developer of energy concept - www.3e.be

AMART: Construction Company - www.amart.be

AMART

Furthermore, EREC and its members would like to thank the Technical Advisory Board, who carefully studied the energy concept and provided important advice on how to optimise the energy performance of the building:

Harald Drück, Institut für Thermodynamik und Wärmetechnik (ITW), University of Stuttgart

itw

Hans-Martin Henning, Fraunhofer-Institut für Solare Energiesysteme ISE

Fraunhofer Institut Solare Energiesysteme

Werner Weiss, Arge Erneuerbare Energie AEE INTEC

AEE INTEC

EREC and its members would like to express their particular thanks to the various equipment sponsors, who have substantially contributed to the realisation of this project by providing the latest technologies in their different fields of expertise:

Solar thermal heating & cooling system (p. 10)

- **MAYA:** YAZAKI absorption cooling machine
- **SOLID:** solar thermal collectors, absorption cooling system
- **Sunstrip:** solar thermal absorbers
- **Thermomax:** evacuated solar thermal collectors
- **WILO:** pumps

Biomass heating system (p. 11)

- **KWB:** pellet boiler and pellet transportation system

Geothermal heating & cooling system (p. 12)

- **EWS Erdwärme-Systemtechnik GmbH & Co. KG:** design and support in pipe connections, pumps
- **GEFGA:** antifreeze (glycole)
- **HAKA.GERODUR AG:** borehole heat exchangers, manifold
- **Maroton GmbH:** borehole grouting material
- **OCHSNER Wärmepumpen GmbH:** heat pump
- **STÜWA Konrad Stükerjürgen GmbH:** borehole heat exchangers, borehole grouting material
- **UBeG Dr. E. Mands & Dipl.-Geol. M. Sauer GbR:** system design calculations, borehole design, system supervision
- **verheyden bvba:** drilling and installation of borehole heat exchangers and pipe connections

Solar electricity (p. 13)

- **Conergy AG:** multi-crystalline modules
- **First Solar GmbH:** thin-film modules
- **Fronius International GmbH:** inverters
- **IBC Solar AG:** multi-crystalline modules
- **Isofoton:** mono-crystalline modules
- **Multi-contact AG:** complete cabling system
- **NAPS Systems OY:** multi-crystalline modules
- **Phönix SonnenStrom AG :** roof mounting system
- **Photowatt International S.A.S:** multi-crystalline modules
- **Scheuten Solar Technology GmbH:** semi-transparent multi-crystalline modules, installation of the systems
- **SCHOTT Solar GmbH:** thin-film solar modules semi-transparent
- **Sharp Electronics Ltd.:** mono-crystalline modules
- **Shell Solar B.V.:** thin-film modules
- **SMA Technologie AG:** inverters
- **SolarWorld AG:** mono-crystalline modules
- **STECA:** inverters

HEATING AND COOLING SYSTEM

AN IDEAL WORKING ENVIRONMENT FROM 100% RENEWABLE HEATING AND COOLING

The Renewable Energy House obtains its complete heating and cooling requirements entirely from renewable energy sources. Using a combination of biomass (wood pellets), solar thermal and geothermal energy, the heating, cooling and ventilation system generates high standards of comfort in the whole building throughout the year. The Renewable Energy House thereby demonstrates that 100% renewable heating and cooling is feasible in a large proportion of Europe's buildings.

The Renewable Energy House is a 120-year old building, located close to several tall buildings. Therefore, it is a less-than-ideal starting point for the integration of renewable energy and solar technology in particular. If 100% renewable heating and cooling can be comfortably achieved in these conditions, state-of-the-art technologies, when applied to new buildings, can achieve "energy positive houses" that produce more energy than they consume.

Key elements of the renewable heating and cooling system in the Renewable Energy House:

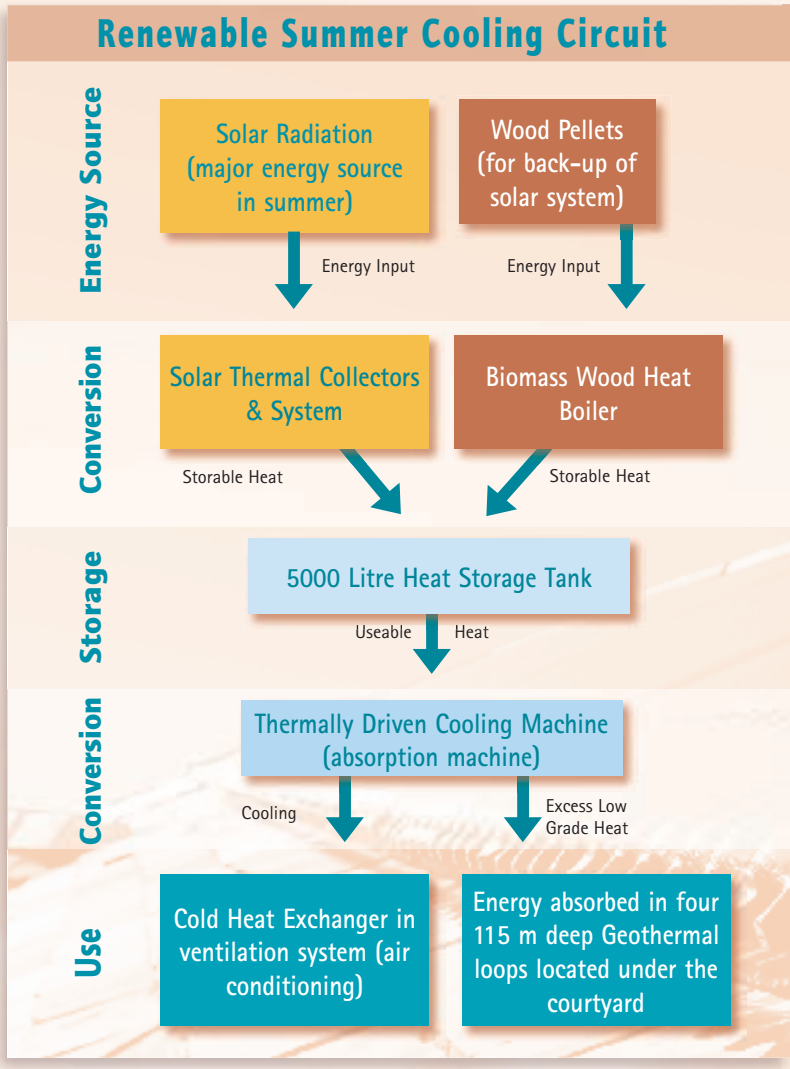
- 80 kW biomass wood pellet boiler
- 42 kW (60 m²) solar thermal collectors
- Four geothermal energy loops (115 m deep) exploited by a 25 kW ground source heat pump in winter and in summer, used as a "cooling tower" by the Thermally Driven Cooling Machine
- A 37.5 kW Thermally Driven Cooling Machine (TDCM)

As described below, these four elements integrate very effectively.

Heating – winter operation

In winter, the heating system mainly relies on the biomass (wood pellet) boiler and the geothermal system. The biomass boiler heats the radiators of the main building. The radiators in the back building are heated with energy extracted by the heat pump from the four geothermal energy loops located under the main courtyard.

The solar thermal system and biomass boiler heat the same storage tank. Due to shading from neighbouring buildings, the "sunlight" solar thermal contribution is low in winter. However, all the "daylight" solar gains in winter will minimise the consumption of wood pellets. During this season, the geothermal system operates on a separate circuit from the biomass and solar circuits.

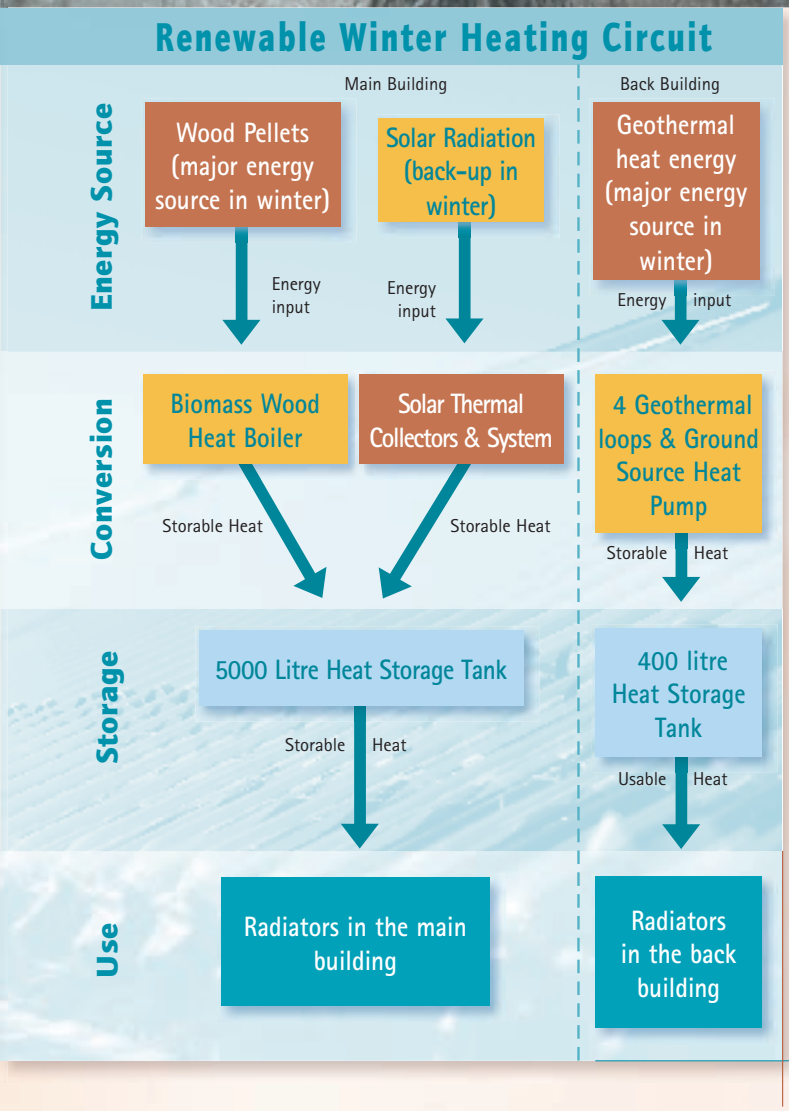


Cooling – summer operation

The core of the cooling system is the Thermally Driven Cooling Machine. While conventional cooling machines consume high amounts of electricity at peak demand times, this thermally driven cooling machine is powered from relatively low temperature heat (80 °C) and a small amount of electrical power for the control and pumping circuits. The thermally driven cooling machine used in the Renewable Energy House obtains its heat energy from the solar system which is backed up on cloudy days by the biomass boiler.

Since solar radiation levels and cooling demands coincide, the solar thermal system is able to provide much of the heat required by the cooling machine. Solar cooling is an ideal application for a solar thermal system.

The solar heat coming from the collectors is released by the thermally driven cooling machine as low-grade excess heat. In most conventional cooling systems of this type, the excess heat is dispersed into the environment through



a cooling tower. Such cooling towers have a visual impact and can also add to the ambient temperature in densely populated urban environments.

In the Renewable Energy House, the geothermal borehole loops function as a seasonal energy source, absorbing the excess low-grade heat during the summer months so that there is no need for a cooling tower. Through the winter operation of the geothermal system, year-on-year overheating of the boreholes is avoided.

System regulation

The Renewable Energy House features an advanced control system that senses the occupation levels and the ambient environment in individual rooms and adjusts the settings of the heating and ventilation system accordingly.

An automatic monitoring system installed and managed by the Austrian solar thermal company SOLID ensures the coordination of the different energy sources. The control system enables most of the necessary adjustments to be controlled and performed at a distance by this specialised company. Because of this remote monitoring facility, the regular in house system maintenance procedures are minimised.

The Renewable Energy House demonstrates one of the many ways in which different renewable energy technologies can be integrated. It is an excellent array of technology solutions for the demands of this site. Renewable energy is site specific, therefore any review needs to consider the site specific conditions when planning a renewable heating and cooling application.

www.maya-airconditioning.com

MAYA is the European distributor for YAZAKI absorption machines used for air-conditioning. MAYA sponsored in part the Thermally Driven Cooling Machine (TDCM) used in the Renewable Energy House. YAZAKI machines are available in 35 to 105 kW cooling capacity and multiple machines can realise a maximum 420 kW capacity.

Water in the range of 70-95°C can be used in the absorption cycle to produce 7°C chilled water for cooling. The working fluid comprises a solution of lithium bromide and water. It is chemically stable, non-flammable, non-toxic, ecologically benign and ozone friendly. All the following low cost heat sources can be used to run these TDCM: solar thermal, biomass, geothermal springs, cogeneration, district heating and industrial waste heat.

www.wilo.com

WILO AG with its headquarters in Dortmund is one of the world's leading manufacturers of pumps and pumping systems for solar, heating, ventilation and air-conditioning technology, water supply, sewage disposal and wastewater treatment.

WILO is a leading supplier of pumps for solar thermal systems in Europe and is growing at a significant rate. WILO sponsored part of the pumps necessary to run the heating and cooling system of the Renewable Energy House.

SOLAR THERMAL

The solar thermal system with some back-up from the biomass boiler is designed to provide all of the energy required for cooling in the Renewable Energy House. Modern solar thermal systems work in both daylight & sunlight and solar thermal is now used in many applications such as heating, cooling, industrial process heating and desalination.

The Renewable Energy House provides less-than-ideal conditions for a solar thermal system. All roofs are at least partially shaded by the surrounding tall buildings, there is no directly south facing roof and the available surface area for solar thermal collectors is limited. However, the east-west solution on this building works very effectively in this designed-for-cooling application. For virtually the whole of the hottest section of the day during the summer months, the sun shines directly onto either the east or west-facing bank of collectors and so the cooling demand and supply curve directly correspond to each other. Solar cooling is a technology with a bright future because the times of high cooling demand coincide with the highest yields from solar collectors.

Typically solar thermal systems designed for domestic hot water and central heating work at temperatures up to 60 °C.

A solar cooling system requires higher input temperatures, in this case between 70 and 95 °C. For this reason, high performance collectors improve the overall efficiency of the system. The Renewable Energy House features 30m² of evacuated tube collectors on the east roof and 30m² of special high performance flat plate collectors on the west roof. For other medium-to-high temperature applications such as industrial process heat or solar thermal power generation, special collectors are available which produce temperatures up to 250°C.

www.solid.at

SOLID GmbH specialises in the production, design, installation & operation of large solar heating & cooling systems, with projects installed in North America, Europe and Asia. SOLID offers Guaranteed Solar Result and Energy Service Contracts, where the system user pays for the energy produced and SOLID is responsible for monitoring and maintenance.

For the Renewable Energy House, SOLID supplied 30m² of special high performance flat plate collectors and coordinated much of the cooling installation. SOLID controls the operation of the house through internet-based remote monitoring.

SOLID has developed special flat plate collectors, which are optimized for higher temperatures. Individual modules can be supplied up to 17 m², allowing for quick installation and efficient operation.

www.thermomax-group.com

Thermomax is a world leader in the manufacturing and development of hi-tech evacuated tube solar collectors, electronic dataloggers and ST controllers.

For the Renewable Energy House, Thermomax supplied 30 m² of evacuated tube collectors. These high performance tubes, which can be seen from the back building, are very effective in providing energy for the solar thermal cooling system.

www.sunstrip.se

Sunstrip develops, produces and supplies absorber strips for solar collector manufacturers from all over the world. Almost 30 years as a supplier to the solar collector industry have made Sunstrip's absorber the most common product on the market. It has been extensively tested and is completely trusted.

BIOMASS

Biomass results from the process of photosynthesis. The energy from the sun is stored in the plants in a variety of forms (solid biomass, oil crops, sugar and starch plants, and wet biomass). The material can follow several conversion routes and can generate different final energy products such as heat, electricity and liquid biofuels.

The main building of the Renewable Energy House is heated with wood pellets, one form of solid biomass. Wood pellets are a clean, CO_2-neutral and convenient fuel, mostly produced from sawdust and wood shavings, compressed under high pressure using no glue or other additives. They are cylindrical in shape and usually 6-10 mm in diameter, and 10-30 mm in length. Furthermore, due to their high-energy content, the convenient delivery and storage features, pellets are the ideal fuel for fully automatic heating systems.

With a rapidly growing share of the market, they are a key technology for increasing biomass utilisation in Europe and beyond. Pellets are also an excellent way of using local resources thus making a concrete contribution to environmental protection and climate change prevention.

Pellet heating systems have several particular advantages. As a condensed fuel, transportation is cheaper and less cumbersome than for other biomass fuels. The high degree of standardisation allows for extremely low-emission combustion, even in very small appliances. And wood pellets are a highly convenient fuel for end users: delivery by tank truck and automatic feeding systems make them as user-friendly and time-efficient as a gas or an oil heating system.

The Renewable Energy House is equipped with an 80 kW pellet heating system and has two interconnected storage rooms which can take approximately 15 tons of pellets. The pellets are delivered by a tank truck (2-3 deliveries per year) and blown into the two rectangular storage rooms. From there and with the help of an elbow worm conveyer, they are transported automatically into the combustion chamber.

The boiler heating system is implemented as an underfeed firing system with afterburn ring. Ignition is carried out fully automatically. In the primary combustion area (burner plate), the fuel is fed in from underneath in a controlled way and, together with the slow primary-air flow, provides a smooth fuel bed, low dust emissions and optimum gasification conditions.

The output of the boiler can be adjusted to the heating requirements, in a fully automatic way, from stand-by to full-load operation. The pellet boiler is connected to the 5000 litre hot water storage tank (see heating and cooling section on pages 8-9) and the boiler heats the main building of the Renewable Energy House.

The pellet boiler is equipped with a fully automatic ash compaction unit. The ash is fully compressed so that it is only necessary to empty the ash box, depending on the boiler output, every 2 to 3 months. Ash contains pure minerals and is the perfect fertilizer for garden, lawn and forest.

www.kwb.at

The Austrian company KWB is a leading manufacturer of heating systems for biomass fuels with its own research, development and manufacturing departments. But KWB is more than this: staff and customers alike demonstrate together what the utilization of renewable energy is all about – providing energy for life! KWB offers a range of pellet boilers from 10 to 100 kW, designed to heat low-energy houses, large buildings (renovated buildings and new construction), commercial premises, offices, schools and public buildings.

GEOTHERMAL ENERGY

According to the definition, geothermal energy is the energy stored in form of heat beneath the surface of the solid earth. Applications comprise electric power production, district heating and small, decentralised heat pump systems for heating and cooling. Due to its independence from climatic variations, geothermal energy plays a strong complimentary role within the renewable energy mix.

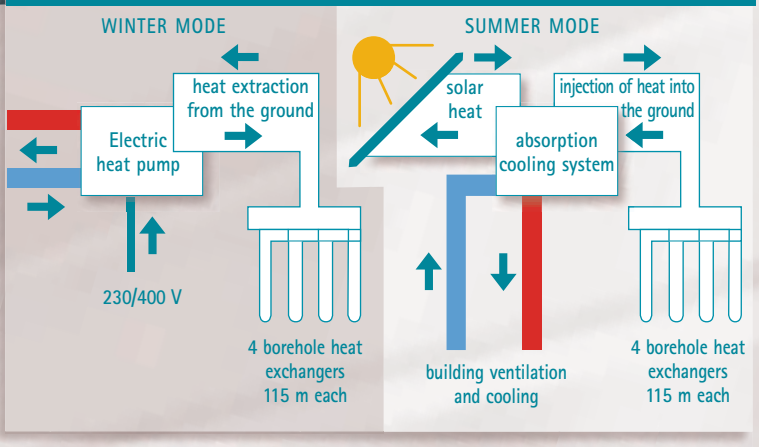
In the Renewable Energy House, geothermal energy is used in the form of a geothermal heat pump with 4 vertical borehole heat exchangers ("vertical loops") each 115 m deep. During winter the heat pump is used to heat the back building offices and conference rooms. The design of the radiators in the back building secure a typical maximum supply temperature in the order of 35-40 °C and in any case below 55 °C. The maximum heat load for the back building is 25 kW. The heat pump transforms energy from a low temperature level into heat at a high temperature level where it can be used for heating purposes. The heat pump used in the Renewable Energy House has a maximum heating output of 28.3 kW.

The geothermal system is not only used for heating but acts also as a heat sink for the excess condensor heat of the solar absorption cooling system in summertime.

Not only does the design of the borehole heat exchangers have to account for the heat load but also for the excess heat injection from solar cooling in summer.

The 4 borehole heat exchangers have been installed by drilling inside the interior courtyard, with the drilling rig passing the narrow doorway with only a few centimetres of clearance.

SCHEMATIC OF THE GEOTHERMAL HEAT PUMP SYSTEM FOR THE RENEWABLE ENERGY HOUSE, TO THE LEFT IN WINTER OPERATION (HEATING) AND TO THE RIGHT IN SUMMER MODE (COOLING)



EWS Erdwärme-Systemtechnik GmbH & Co. KG, Lichtenau, Germany

www.ews-erdwaerme.de

GEFGA mbH, Limburg, Germany

www.gefga.de

HAKA.GERODUR AG, Benken, Switzerland

www.hakagerodur.ch

Maroton GmbH, Reiskirchen, Germany

www.maroton.de

OCHSNER Wärmepumpen GmbH, Linz, Austria

www.ochsner.at

STÜWA Konrad Stükerjürgen GmbH, Rietberg, Germany

www.stuewa.de

UBeG Dr. E. Mands & Dipl.-Geol. M. Sauer GbR, Wetzlar, Germany

www.ubeg.de

verheyden bvba, Mechelen, Belgium

www.pbv.be

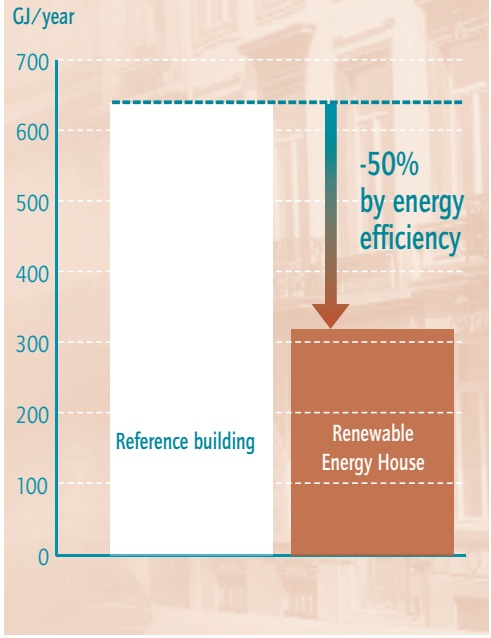
Energy efficiency measures

Any sustainable energy solution has to contain measures on both the demand and supply side, thereby taking into account energy efficiency and renewable energy technologies. With the Renewable Energy House, this principle was carefully applied, although because the building is monument-protected some energy efficiency measures are excluded. In existing buildings there is much less flexibility in the design and layout of energy efficiency measures. Nevertheless, a good number of energy efficiency technologies have been implemented such as:

- Insulation of the exterior wall on the back façade with 7 cm EPS (expanded polystyrene)
- Replacement of windows in the back façade with new windows with a total k-value of 1.5 W/m²K
- Addition of highly-efficient windows in front of (inside) the existing single glazed windows resulting in a triple-glazing of the front-façade (total k=1.3 W/m²K)
- Insulation of the roof with 15 cm of mineral wool
- Installation of a ventilation group with a high efficiency heat recovery wheel (heat recovery efficiency of 85 %)
- Sun protective Velux roof glazing with a solar factor of g=0,35
- High-efficiency DL5 fluorescent lamps with electronic ballasts and highly-efficient reflectors

The application of these measures enables energy savings of almost 50% as compared to a reference renovation, as is shown in the graph to the left.

ANNUAL ENERGY CONSUMPTION FOR HEATING, VENTILATION AND AIR-CONDITIONING FOR A REFERENCE RENOVATION AND THE EREC RENOVATION



PV TECHNOLOGIES

What is Photovoltaic Energy ?

The word "photovoltaic" is a marriage of two words: "photo" meaning light, and "voltaic" meaning electricity. So photovoltaic technology, the scientific term used to describe solar energy, involves the generation of electricity from light.

The secret to this process is the use of a semi-conductor material, which can be adapted to release electrons, the negatively charged particles that form the basis of electricity. The most common semi-conductor material used in photovoltaic (PV) cells is silicon.

PV Technology

The most important parts of a PV system are the cells which form the basic building blocks, the modules which bring together large numbers of cells into a unit, and, in some situations, the inverters used to convert the electricity generated into a form suitable for everyday use.

PV cells are generally made either from crystalline silicon, sliced from ingots or castings or from grown ribbons, or thin film, deposited in thin layers on a low cost backing. Thin film technology based on silicon and other materials is expected to gain a far larger share of the PV market in the future.

Other examples of cell types are concentrator cells which focus light from a large area onto a small one, or spheral solar technology which uses minute silicon beads bonded to an aluminium foil matrix.

Modules are clusters of PV cells incorporated into a unit, usually by soldering them together under a sheet of glass. Module producers usually guarantee their performance for 20-25 years.

Inverters are used to convert the direct current (DC) power generated by a PV generator into alternating current (AC), which is compatible with the local electricity distribution network. This is essential for grid-connected PV systems.

Conergy AG
www.conergy.com

First Solar GmbH
www.firstsolar.com

Fronius: International GmbH
www.fronius.com

Integration of photovoltaic systems in the new Renewable Energy House

The Renewable Energy House provides the opportunity to integrate various PV technologies in a monument-protected building.

The objective was to display as many different PV technologies as possible, thereby familiarising visitors with this innovative way of generating electricity. The following PV technologies have been integrated:

- On the roof of the back building, 7 mono-crystalline modules can be found.
- The windows in the corridor leading to the back building contain 6 thin-film modules, which are integrated into the windows.
- Furthermore, the roof of the corridor contains three multi-crystalline, four thin-film and three mono-crystalline modules including an innovative roof-mounting system.
- Just at the entrance of the large meeting room in the back building, several inverters are installed which convert the direct current power generated by the different modules into the alternating current power that is used in the building.
- In the back façade of the main building, another form of window-integrated PV modules can be seen, these being integrated in the windows of the kitchenette & toilets.
- The integration of further PV technology is planned for the future.

The power of the complete PV system is about 3 kW. At average a PV system representing this power will generate an energy production of about 2.550 kWh yearly.

EREC and its members would like to thank the companies who provided their products free of charge, and without whom the project of integration of the PV system in the new Renewable Energy House could not have been developed.

IBC Solar AG
www.ibc-solar.de

Isofoton
www.isofoton.es

Multi-contact AG
www.multi-contact.de

NAPS Systems OY
www.napssystems.com

Phönix SonnenStrom AG
www.sonnenstromag.de

Photowatt International S.A.S
www.photowatt.fr

Scheuten Solar Technology GmbH
www.scheutensolar.nl

SCHOTT Solar GmbH
www.schott.com

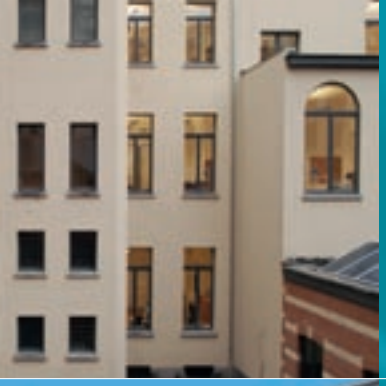
Sharp Electronics Ltd.
www.sharp.co.uk

Shell Solar B.V.
www.shell.com

SMA Technologie AG
www.sma.de

SolarWorld AG
www.solarworld.de

STECA
www.steca.de



The Renewable Energy House: a best-practise example of a sustainable energy building

The Renewable Energy House – Main Facts

EREC

- Headquarters for the European renewable energy sector
- Renewable energy and energy efficiency showcase in a monument-protected building
- 100 % renewable energy supply for heating, cooling and electricity
- Central meeting point for renewable energy issues in Europe's capital Brussels close to the European institutions (European Commission, European Parliament, Council)
- Meeting facilities for sustainable energy actors
- Information displays of all renewable energy technologies
- Encompassing information and communication activities around the building to promote renewable energy technologies

The Renewable Energy House - Europe's Headquarters for renewable energy

EREC – European Renewable Energy Council
AEBIOM – European Biomass Association
EGEC – European Geothermal Energy Council
EPIA – European Photovoltaic Industry Association
ESHA – European Small Hydropower Association
ESTIF – European Solar Thermal Industry Federation
EUBIA – European Biomass Industry Association
EUFORES – European Forum for Renewable Energy Sources
EUREC Agency – European Renewable Energy Centres Agency
EWEA – European Wind Energy Association
GWEC – Global Wind Energy Council

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EUROPEAN RENEWABLE ENERGY COUNCIL

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