

A photograph of several bright yellow sunflowers in a field, set against a clear blue sky with scattered white clouds. The sunflowers are in the foreground, with their heads facing towards the right. The background shows a vast field of similar sunflowers stretching towards the horizon.

Uponor

SYSTEMS FOR
RENEWABLE ENERGIES

Biogas, geothermal energy, wood pellet:
best utilization of renewable energies
with Uponor system solutions

Biogas plants

Electricity and heat from you own generator

A purely natural product: energy from biomass

What could be more natural than biogas? Biomass is produced through the action of sunlight and carbon dioxide on vegetable material; biogas generators reconvert the biomass back into carbon dioxide and energy. Especially on farms - what could be more obvious than to put liquid and solid manures, often in combination with silage or organic wastes, to good use in order to produce energy? Biogas generators may also be operated using energy crops such as maize, beets or grains which are allowed to be grown on set-asides. When biogas is used as fuel in a co-generation plant, both electricity and heat are produced. The balance is ecologically as well as economically a positive one: biogas pays off, reduces environmental pollution through greenhouse gas methane and is CO2 neutral.

Biogas generates more energy than can be used on the farm

The bacterial decomposition of organic substances results in biogas, a mixture of gases containing up to 75% methane and is comparable with natural gas. A biogas generating plant which uses this process in agricultural environments to produce energy normally consists of a fermentation unit in which the biomass is fermented in airtight conditions and a co-generation plant in which the generated biogas produces electricity and heat using a combustion engine. The plant is supplemented by a series of storage tanks for feedstock such as liquid manure, silage or organic waste and for the gas produced. In most cases, more energy is generated from the biogas than can be used on site so it can be fed into a public network for a legally determined price. The waste heat from the co-generation plant is used to heat the fermentation plant and beyond that supplies free energy for heating the farmhouse and outbuildings. Even the residues from the fermentation plant are not

Uponor pipe systems make sure that my biogas system is even more efficient

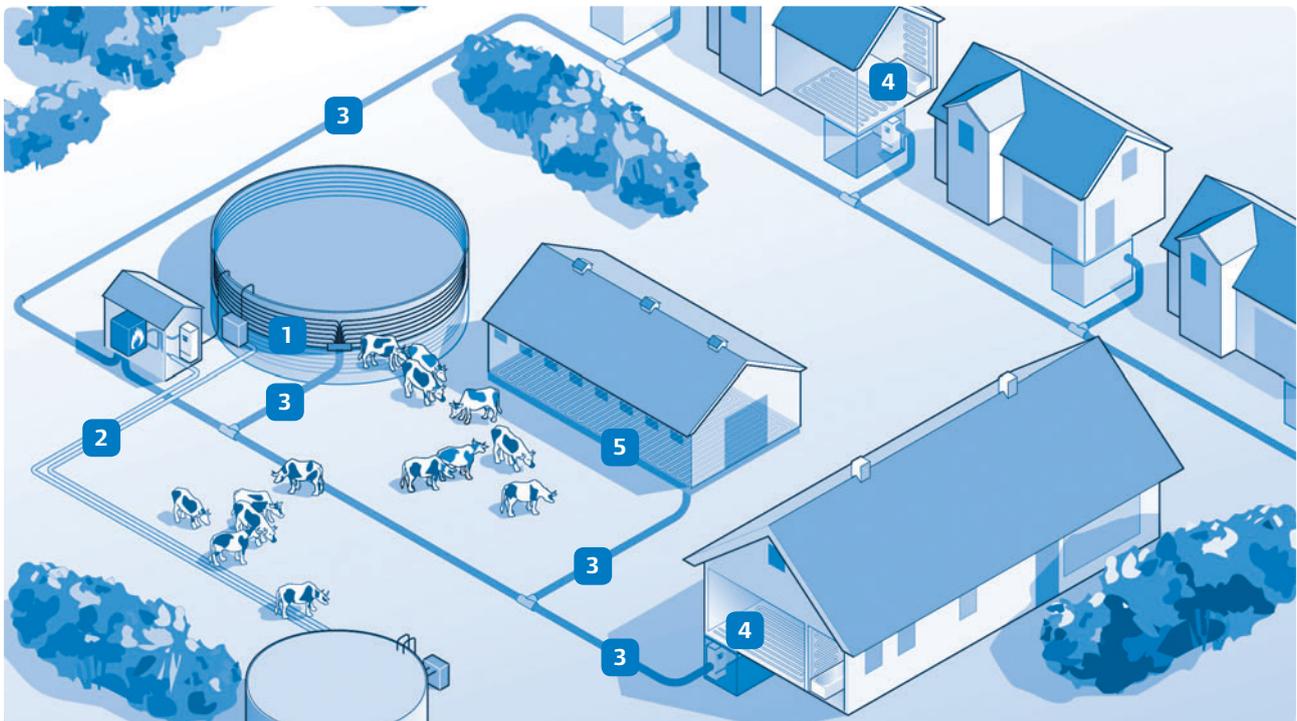


wasted but can be used as valuable fertilizer on the areas under cultivation.

One-stop pipe connections to handle any task

A biogas system requires a number of pipe connections. One-stop system solutions made by Uponor will deal with any task that comes along. For example, reliable and extremely durable Uponor heating pipes are ideal as supply lines to the fermentation plant. Heavy-duty Uponor Wirsbo PE-Xa gas pipes provide permanent

safety when transporting biogas. Pre-insulated pipe systems made by Uponor are an ideal and cost-efficient solution for supplying the fermentation plant heating and residual hygienization unit with process heat and for distributing local heat to the farmhouse and out-buildings throughout the whole of the farmyard with Uponor area heating providing a comfortable living environment and low heating costs.



1 Heating of fermentation plant

- Uponor heating pipes
- Uponor PE-Xa heating pipe
- Uponor PE-Xc heating pipe
- Uponor multi-layer composite pipe



2 Gas pipes

- Uponor Wirsbo PE-XA



3 Local heat supply

- Uponor Ecoflex Thermo



4 Area heating

- Floor and wall heating
- Uponor Tecto
- Uponor Minitec
- Uponor Siccus



5 Heating of industrial and business areas

- Uponor Classic
- Uponor pipe for industrial area heating



Geothermal energy / Heat pumps

Energy on the doorstep

Cost-efficient and unlimited availability: heat from the ground

Anyone looking for an inexhaustible source of energy independent of fossil sources need not look very far – the solution is right on the doorstep. No matter whether summer or winter, the temperature of the ground just below the surface is a constant 10 degrees. In the warmer summer months, the rays of the sun increase temperatures slightly but the main source of energy is the high temperature at the earth's core making itself noticeable right up to the uppermost levels. At first sight, 10 °C does not sound like much but this temperature is totally adequate for cost-efficient generation of energy. The key to success is the heat pump which extracts energy from the ground to release it in buildings at a higher

temperature level. Although the heat pump itself requires energy (usually electricity) it provides many times over the amount of energy for heating.

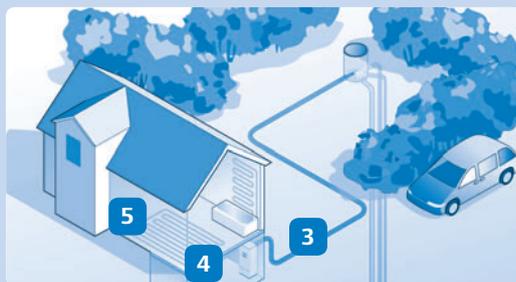
Geothermal energy transported by collectors or probes into the home

There are two different processes for obtaining the geothermal energy from the surface of the ground. If collectors in the form of a large horizontal system of plastic pipes are used, these are installed at a depth of 100 to 150 cm in the ground to collect the geothermal energy. Depending on the ground's consistency and degree of water saturation, between 10 W/m² and 40 W/m² are withdrawn from the ground. Geothermal energy collec-

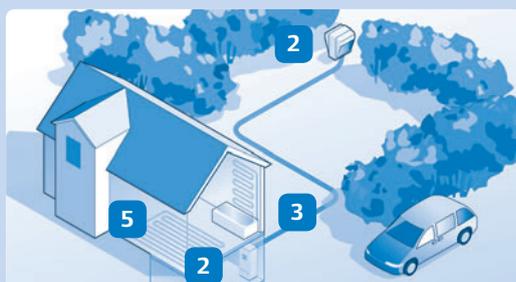
Brine heat pump with ground collector



Brine heat pump with ground probe



Air-water heat pump



1 Geothermal energy collector

- Uponor PE-Xa heating pipe
- Uponor PE-Xc heating pipe
- Uponor multi-layer composite pipe



2 Air-water heat pump

- Uponor heat pump LWP



3 House lead-in

- Uponor Ecoflex Thermo



4 Heat pump

- Uponor heat pump SWP



5 Floor and wall heating

- Uponor Tecto
- Uponor Minitec
- Uponor Siccus



tors are particularly suitable for use in new building projects where there are sufficient open areas. In contrast, geothermal energy pumps use vertical drillings down to 30 to 100 m depth and can generate 50W to 100W per meter probe length. They are particularly suitable for use in old buildings and in densely-populated areas as they require comparatively little space. Both systems are filled with a mix of water and anti-freeze which transport the earth's heat in a closed circuit to the heat pump. The heat pumps which are usually electrically powered work on the same principle as a refrigerator. On the vaporizer side, the refrigerating agent relaxes and draws the energy geothermal heat from the circuit. On the condenser side, the refrigeration agent is compressed and gives off the produced energy at a higher temperature to the circuit of the heating plant.

Area heating systems and heat pumps – an ideal partnership

Heat pumps function particularly effectively when combined with floor or wall heating systems as a lower flow temperature is required and the heat pump needs only to handle a correspondingly lower temperature difference. An Uponor area heating system uses cost-efficient geothermal energy as the perfect source of energy to provide cosy and comfortably warm rooms. Air temperature in the rooms and areas adjacent to the rooms are practically the same so that this form of heating feels specially cosy and pleasant. At the same time, high-speed air movement is avoided – so there are neither draughts nor is dust blowing around.



**Comfortable heat,
low energy costs and an
ecologically sound heating
concept: geothermal energy
and area heating in perfect
partnership.**

Wood pellets: renewable energy

Modern heating using traditional fuel

There cannot be a more traditional way of obtaining energy than by burning wood. Fossil fuels such as coal, natural oil and natural gas led to wood being temporarily neglected as a source of energy but in view of limited resources, increased prices and the ecological negative image of fossil fuels, wood is once again becoming more interesting. Especially when looking at the more contemporary forms of energy generation where not logs but pellets of wood are burned. Wood pellets can be burned in semi-automatic or in fully-automatic stoves and combine the ecological benefits of sustainable, carbon dioxide neutral fuel with favourable prices and the comfort provided by a gas-fuelled or oil-fueled stove.

A comfortable and ecologically sensible heating material

Wood pellets are standardized, highly-compressed pressed pieces of wood, 20-50 mm long, and between 4 and 10 mm in diameter. They are made of untreated residual wood such as sawdust, chippings or residual timber from the forests. They are particularly cost-favourable and their small standardized dimensions make them ideal to feed mechanically into heating systems. The energy content of wood pellets at 5kWh/kg lies above that of conventional uncompressed wood fuel. One kilogramme of pellets has approximately the same energy content as half a litre of fuel oil, but regarding price, is distinctly more attractive. An efficiency rate of up to 95% can be achieved in computer-control-

With Uponor pipe systems and local heat distribution outbuildings are heated trouble-free with our wood pellet heating unit.



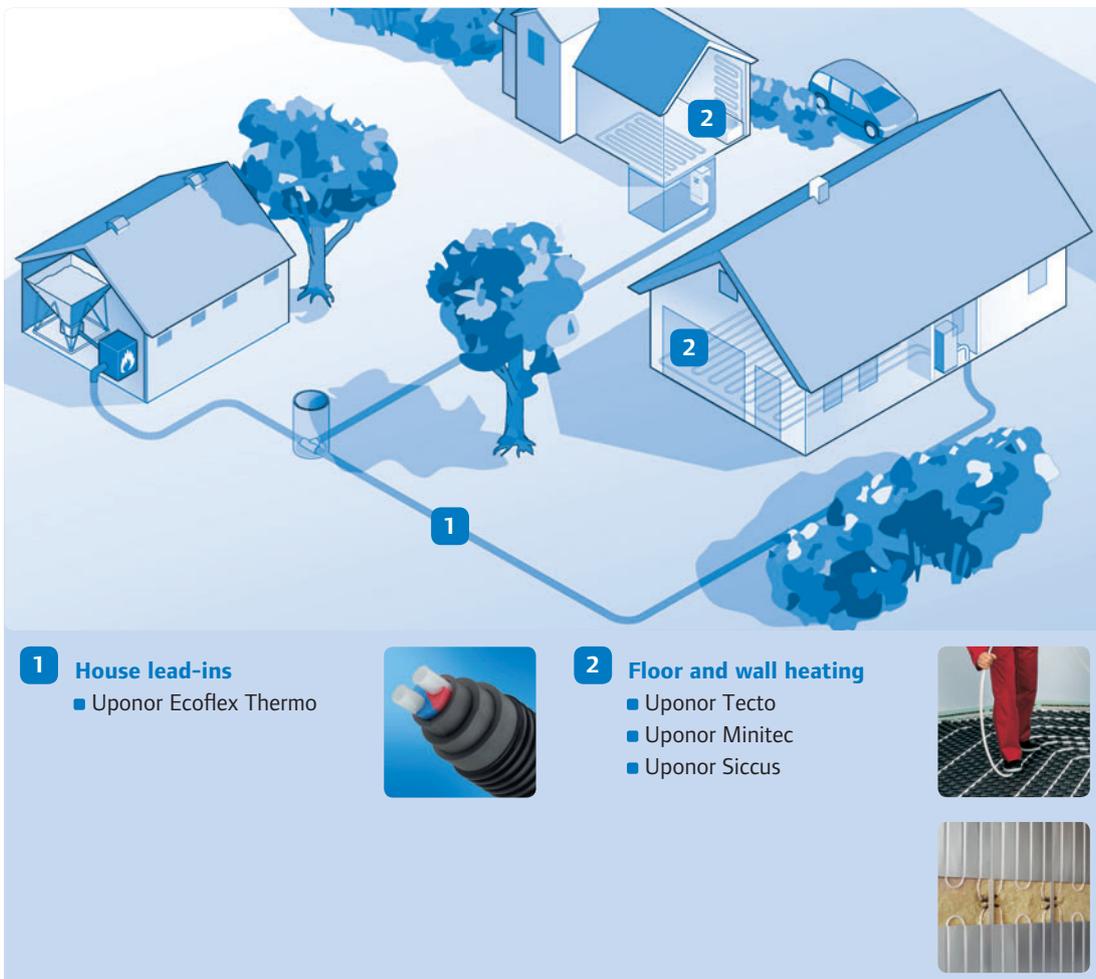
led combustion in a closed combustion chamber. Wood pellets can be burned in single stoves where the storage space must be regularly filled by hand; easier to handle are fully-automatic central heating units where the pellets are automatically transported by means of suction or a screw conveyor from a storage area to the burner.

A heating system of this nature provides the same level of comfort as a gas or oil-fuelled heating and can be additionally used to prepare hot water.

Additional living space through installation of heating system into outbuilding



Heating systems using wood pellets need space where the voluminous heating material can be stored in dry conditions. This could be, for example, a room in the cellar where previously an oil tank had stood or a room in the attic. Local heat distribution to other outbuildings such as garden house can be easily implemented at no great cost by using Uponor pre-insulated pipes which incorporate flow and return in just one single flexible pipe system.



Uponor – partner, pioneer and major market player

The range of Uponor activities covers a multitude of applications; from area heating and area cooling to potable water installations, radiator connections through to designs for civil engineering and environmental and municipal engineering.

Since its foundation in Finland in 1965, Uponor has been setting and further developing standards for the market.

In the future, you can safely place your confidence in our performance and efficiency in our three reorganized business sectors : heating/cooling, installation systems and infrastructure providing a unique added value – for the benefit of our customers.

Uponor. Simply more.

Pipeline systems

- flexible, pre-insulated pipe systems
- House connections PE-Xa

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