



Regional Bioenergy Initiatives  
Increasing the Market for Biomass Heating in Europe

# Successful financing schemes of biomass project development





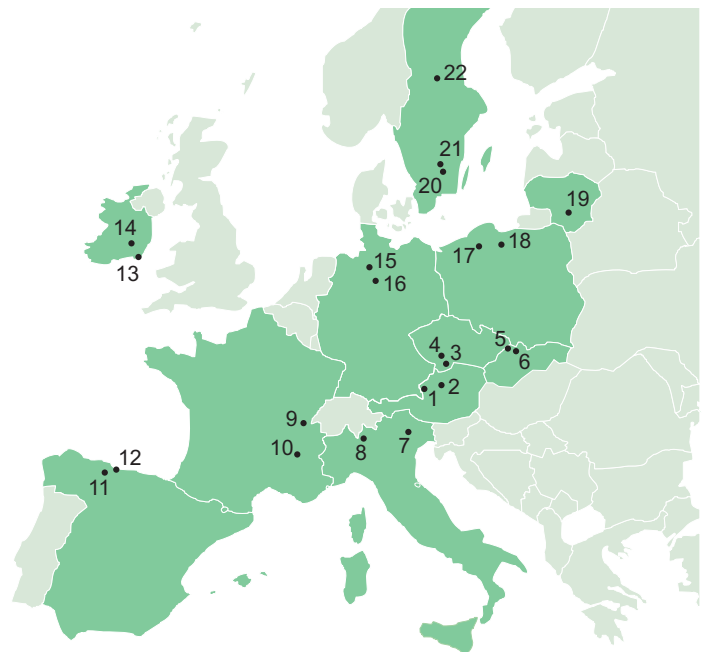
## Introduction

---

The booklet offers a compilation of case studies of innovative financing schemes and solutions for biomass heating plants. It aims to inspire regional and local decision makers to make use of these experiences.

It summarises successful financing methods for

- 22 biomass heating plants in 12 European regions
- heating solutions for churches, apartment and service buildings, city halls, hospitals, schools, etc.
- capacities from 60 kW to 5.5 MW,
- investment costs between 35,000 and 4,000,000 Euro
- a variety of different biomass fuels such as wood chips, pellets, willow, wood residues, olive stones, etc.



## The financing methods

---

A special focus put on contracting (third party financing – TPF) and the development of energy service companies (ESCOs). Contracting is a very efficient instrument for funding projects in the field of energy efficiency and renewable energy sources. Energy efficiency measures and renewable energy investments are pre-financed and implemented by an ESCO. Several biomass heating projects presented in the guide were implemented by contracting: Stegbuchner, Fronius and Ecodolomiti/Luxottica, the plants in Kirchlinteln and Lahe as well as the plant in the Hotel Dalecarlia. Further projects were realised using long-term heat delivery contracts (Klokocov, Lubochna, Erba).

In addition to contracting, other interesting financing methods are shown in this booklet. For example, the EcoFund in Poland supported the biomass heating plant in Rzeczenica. The biomass plant in Kacergine, Lithuania, was financed with allocations from the Baltic Billion Fund. Emission sales were one source of finance in Dříteň, South Bohemia. Other funding instruments including national co-financing, soft loans, preferential or interest-free loans are also presented.



No.	Title	Type institution/company	Financing mechanism	Region and Partner
1	Pellet heating for an apartment building	Real estate company	Contracting	<b>Upper Austria</b> ESV
2	Biomass for solar inverters	Manufacturing company	Contracting	
3	The first Czech biomass ORC installation	Town	Grants, bank loans	<b>South Bohemia</b> ECCB
4	Renewable heat under the cooling towers of a nuclear power plant	Village	Grants, compensation, emission sales	
5	Pellet district heating in Klokocov	Municipality	Grants, own funding (municipality, owners of flats)	<b>Zilina</b> BIOMASA
6	Wood pellets for NEDI	Health sanatorium, municipality	Grants, own funding (municipality, NEDI)	
7	A win-win situation in Belluno	Farming company	Contracting	<b>South Tyrol</b> ÖKI
8	Local resources for Erba	Municipality	Public funding, heat delivery contract	
9	Wood heating for Poizat	Municipality	Subsidies, own funding (municipality)	<b>Jura</b> ITEBE
10	Chestnut forests as energy resource	Communauté de communes	Subsidies, own funding (municipalities)	
11	Biomass for social services	Educational foundation	Subsidy, own funding (foundation)	<b>Asturias</b> FAEN
12	Olive stones for a hospital	Hospital	Subsidy, soft loan	
13	Wood chips for Kelly's Hotel	Kelly's Resort Hotel	Grants, own funding	<b>South East Ireland</b> SERA
14	Mini-district heating system at Camphill Jerpoint	Mutual help community	Grants, own funding	
15	Energy services for a housing development	Municipality	Contracting	<b>Hanover Region</b> target
16	Wood heating plant in a residential area	Housing society	Contracting	
17	Three coal fired boilers switched to biomass	Municipality	Subsidy, preferential loan, own funding (municipality)	<b>Pomerania</b> BAPE
18	Willow heat an educational centre	Special educational centre	Subsidy, preferential loan, own funding (municipality)	
19	A biomass boiler for a rehabilitation hospital	Rehabilitation hospital	Baltic Billion Fund	<b>Kaunas</b> LEI
20	Pellet heating for churches and parish hall	Church community	National co-financing, own funding (church administration)	<b>South-East Sweden</b> ESS
21	Pellet heating plant for apartment buildings	Local housing company	National co-financing, own funding (housing company)	
22	Pellet heating in the Dalecarlia hotel	Hotel	Contracting	<b>Gävleborg</b> GDE

## 1 | Pellet heating for an apartment building

### Background

---

In 2005, Stegbuchner-Kist Bau, a construction and real estate company, constructed a building with 12 apartments and 5 offices in the municipality of St. Pantaleon. First an oil heating system was planned, however, with increasing oil prices the company decided in favour of a pellet heating system.



### Biomass technology

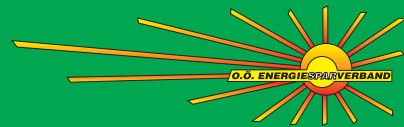
---

Enserv Energieservice implemented a pellet heating system with a capacity of 150 kW. The pellet heating is situated in the basement of the building and supplies a total surface area of 1,279 m<sup>2</sup> with heat and domestic hot water. The buffer storage has a volume of 4,000 litres and 55 tons of wood pellets are used per year.

### Financing

---

Enserv had been a business partner of Stegbuchner before and also had some experience with heat supply contracts. The project in St. Pantaleon was financed by contracting and Enserv acts as the ESCO. Stegbuchner and Enserv entered a 15-year-contract. During this period, Enserv is responsible for the operation and the maintenance of the heating facility. Stegbuchner pays 49.88 Euro per MWh for the delivery of heat for space heat and domestic hot water which is defined in a so-called "heat contract". In case that the contract is not extended after the end of duration, Stegbuchner becomes the owner of the heating facility.



## Lessons learnt

---

The installation of a pellet heating instead of an oil boiler leads to savings of 22 tons of heating oil per year. According to the management of Stegbuchner, the implementation of the whole contracting project was rather uncomplicated and the cooperation with the ESCO was very good. The new municipality building as well as the nearby fire station will also be connected to the pellet heating system which will make the project even more successful.

### Technical data:

Technology	biomass heating plant
Capacity	150 kW
Fuel	pellets
CO <sub>2</sub> emission reduction	64 tons/year
Year of installation	2005

### Financing:

Type of financing	contracting
Investment costs	35,000 Euro
Contract duration	15 years

## Contact for further details:

---

O.Ö. Energiesparverband  
Landstrasse 45, A-4020 Linz, Austria  
Tel. +43 732 7720 14380  
[office@esv.or.at](mailto:office@esv.or.at), [www.esv.or.at](http://www.esv.or.at), [www.oec.at](http://www.oec.at)

Stegbuchner-Kist Bau  
A-5120 St. Pantaleon 11, Austria  
[office@kinostadl.at](mailto:office@kinostadl.at), [www.kinostadl.at](http://www.kinostadl.at)

## 2 | Biomass for solar inverters

### Background

---

Fronius is a globally operating producer of welding technologies and battery systems with more than 1,500 employees. Fronius is also a leading producer of solar inverters. Due to increasing business activities, new facilities were needed and Fronius decided to build a new production and logistics centre for more than 600 employees. The heat supply for space and process heat in this new plant is supplied by a biomass heating plant.



### Biomass technology

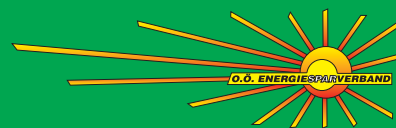
---

The biomass heating plant has 2 boilers, a 1,200 kW boiler for winter and a 300 kW boiler for summer operation. In addition, a 1,300 kW gas boiler covers peak load demand. This way, the biomass boilers can be operated very efficiently throughout the year by avoiding inefficient part load operation. The annual heating demand of about 5,000 MWh is covered by wood chips which are stored underground - together with the boilers. 95 % of the total heat demand is covered by biomass.

### Financing

---

The financing of the biomass plant was done by contracting, implemented by the ESCO Aigner. The ESCO is/was responsible for the planning, financing, construction, operation and maintenance of the plant. It also takes the full technical risk and ensures the daily operation of the plant. Additionally, the ESCO is responsible for the fuel supply. The wood chips are bought from neighbouring farmers. Fronius and the ESCO entered a 15-year-contract which ensures the delivery of space and process heat. In return, Fronius pays a certain amount per MWh heat delivered.



## Lessons learnt

---

The most important argument in favour of a contracting scheme was that Fronius prefers to focus on its core business of developing and marketing innovative products and solutions. This means that instead of becoming a specialist in the construction and operation of biomass heating plants themselves, Fronius looked for a specialist – an ESCO. Although, initially there had been plans to supply the new facility with natural gas, due to its involvement in solar technologies, it was a matter of corporate identity to decide in favour of biomass.

### Technical data:

Technology	biomass heating plant
Capacity	1,200 kW + 300 kW
Fuel	wood chips
CO <sub>2</sub> emission reduction	1,000 tons/year (compared to natural gas)

### Financing:

Type of financing	contracting
Investment costs	556,088 Euro
Contract duration	15 years (2006 - 2021)

## Contact for further details:

---

O.Ö. Energiesparverband  
Landstrasse 45, A-4020 Linz, Austria  
Tel. +43 732 7720 14380  
[office@esv.or.at](mailto:office@esv.or.at), [www.energiesparverband.at](http://www.energiesparverband.at)

Fronius International GmbH  
Fronius Strasse 5  
A-4642 Sattledt, Austria  
Tel.: +43 7242 241  
Fax.: +43 7242 241 8799  
[corp.communication@fronius.com](mailto:corp.communication@fronius.com)



## 3 | The first Czech biomass ORC installation

### Background

---

Trhové Sviny is a small Czech town in South Bohemia with about 4,700 inhabitants. Heat supply was provided by a coal fired district heating plant in very bad and inefficient condition. In 1997, Trhové Sviny established its own energy strategy and the heating management company of Trhové Sviny was founded, owned by the municipality (100%) with 10 employees.



### Biomass technology

---

Between 1994-1997, the four coal boilers were substituted by three gas boilers before the installation of one biomass boiler (2.5 MW) in 1999. The reason for this decision was to be independent of the gas supply and to keep the heat price at an acceptable level. Since its installation, this boiler is the main source of heat supply for the town, the remaining three gas boilers are used during winter for peak load. In 2003, another biomass boiler (3 MW) was installed, together with a CHP unit (ORC system, 600 kW). The installation now supplies all municipality buildings (five schools, three clinics, town offices, sport hall, etc.) and 400 apartments with heat. The total capacity of the plant is 15 MW, the total heat output is 12,500 MWh per year, the length of the heat grid is 8.5 km.

### Financing

---

The installation of the first biomass boiler was financed by a bank loan (89%) and a grant from the Czech Energy Agency (11% of the total costs of the project). As Austrian technology was used, the company received a grant from KommunalKredit Austria of 12% of the total project costs. The remaining costs of the CHP unit (ORC system) installation, the second boiler and the extension of the distribution network (1.5 km more, 55 family homes) were financed by the State Environmental Fund of the Czech Republic (50% grant, 30% interest free loan) and a loan from the bank (20%).



## Lessons learnt

---

The ash from combustion can be used as a fertilizer by local farmers and the project established a good cooperation with local wood working companies as the plant uses wood residues. There were many contacts from the Czech Republic and abroad of persons interested in the project. The main benefit for the municipality is the improvement of the social, economical and environmental situation of the town.

### Technical data:

Technology	biomass CHP plant, district heating
Capacity	15 MW (total), 5.5 MW (biomass heat), 600 kW (electricity)
Fuel	mixture of wood residues
CO <sub>2</sub> emission reduction	4,504 tons/year
Year of installation	1999, 2004-05

### Financing:

Type of financing	grants, bank loans
Investment costs	1 <sup>st</sup> part – 715,000 Euro , 2 <sup>nd</sup> part – 3,447,000 Euro
Share of grants in total costs	1 <sup>st</sup> part – 23%, 2 <sup>nd</sup> part – 50%

### Contact for further details:

---

Energy Centre České Budějovice  
Nám. Př. Otakara 87/25  
37001 České Budějovice  
Czech Republic  
Tel. +420 387 312 580  
[eccb@eccb.cz](mailto:eccb@eccb.cz), [www.eccb.cz](http://www.eccb.cz)



## 4 | Renewable heat under the cooling towers of a nuclear power plant

### Background

---

The village of Dříteň has about 700 inhabitants and is located in the centre of South Bohemia, close to the nuclear power plant Temelin. A district heating system fired with coal remained as a heritage from communist times. In 1996, the representatives of the village started to consider new heating technologies. As there was no possibility to connect to the gas grid, they first installed a smaller biomass boiler (350 kW) and combined it with the existing coal boilers. In



2000, a decision was taken to heat exclusively with biomass and two wood chip boilers with a power of 1 MW each were installed. Finally, the village founded its own heating company with four employees.

### Biomass technology

---

A storage building for the wood chips was constructed and the distribution network was renewed and extended. The village of Dříteň has its own fuel resources from the local woods and also of a planting of fast growing species (3 hectares). The heating plant covers more than 90% of the village's heat consumption – all municipal buildings, 100 apartments, 108 family homes etc. and it produces 2,800 MWh of heat annually. Presently, there are plans to connect 60 more homes to the district heating.

### Financing

---

The project was supported by a grant of the State Environmental Fund of the Czech Republic. The contribution was 80% of the total costs, of which 50% were a grant and 30% were an interest free loan. Another 2.8 % were donated by the Czech Power Company (ČEZ) as an annual compensation for the proximity to the nuclear power plant. Another 2.9% were covered by emission sales to the Dutch company PTG. The remaining costs of about 14% were covered by the municipality, also coming from the sales of the old boilers.

## Lessons learnt

The organisational part of the project was very demanding. Negotiations with the inhabitants were long and difficult because at the beginning they did not believe in biomass as a fuel. It took a lot of time and energy to convince them. The mayor, Mr. Lukas, stressed the necessity of a public campaign before implementing biomass heating.

### Technical data:

Technology	biomass district heating plant
Capacity	2 x 1 MW
Fuel	wood chips
CO <sub>2</sub> emission reduction	1001 tons/year
Year of installation	2000-01

### Financing:

Type of financing	grant, compensation, emission sales, own funding
Investment costs	1,232,000 Euro
Share in total costs	<ul style="list-style-type: none"> <li>• SEF grant: 80% (50% grant + 30% interest free loan)</li> <li>• compensation from ČEZ: 2.8%</li> <li>• emission trading: 2.9%</li> <li>• own funds: 14%</li> </ul>

### Contact for further details:

Energy Centre České Budějovice  
 Nám. Př. Otakara 87/25  
 37001 České Budějovice  
 Czech Republic  
 Tel. +420 387 312 580  
[eccb@eccb.cz](mailto:eccb@eccb.cz), [www.eccb.cz](http://www.eccb.cz)



## 5 | Pellet district heating in Klokocov

### Background

---

The school building in Klokocov, a small village in the Northwest of Slovakia, was a pilot project realised in 2000-2001 by BIOMASA, a non-profit organisation whose members are mainly municipalities. BIOMASA works on an integrated approach to create a pellet market in Slovakia which includes the installation and operation of biomass boilers, the production of pellets and the promotion of biomass. So far, 44 fossil-fuelled boilers with a capacity between 15 and 2,500 kW were exchanged to biomass boilers, mainly in public buildings. The school in Klokocov is an example of a small biomass district heating as it supplies the school, the school gym, the canteen, two residential buildings, the municipal office building and the village service building with heat.



### Biomass technology

---

The biomass heating plant, equipped with a 725 kW boiler, is located in the main school building. It substituted two old, inefficient coal and coke boilers which had a capacity of 910 kW. The annual heating demand of all connected buildings amounts to about 765 MWh and is covered by wood pellets which are stored in the storage room with a walking floor next to the boiler room.

### Financing

---

The financing of the project came from several sources: The boiler was financed by a grant of DEPA (Danish Environmental Protection Agency), the grid and the control unit by the owners of the connected buildings (the occupants of the two residential buildings, the municipality and the regional office). The boiler room is owned by BIOMASA which is responsible for the operation and the maintenance of the plant and the fuel supply, using pellets from its own plant. BIOMASA established heat contracts with all consumers for 12 years, who pay monthly for the heat – based on a fixed price and per MWh of delivered heat.



## Lessons learnt

---

The project required good coordination, cooperation and management and therefore, one of the most important points was that the management as well as the acquirement of grants were carried out by BIOMASA. Another important aspect was that the main investment – the boiler room technology – was covered by a grant. The heating costs decreased by half, to which the new biomass heating system and the retrofitting of the building contribute about 50% each. Finally, the heat consumers do not need to look after heating, fuel supply or maintenance anymore.

### Technical data:

Technology	biomass district heating plant
Capacity	725 kW
Fuel	wood pellets, at the beginning of operation wood chips
CO <sub>2</sub> emission reduction	560 tons/year (compared to brown coal)

### Financing:

Type of financing	combined financing: grants, owner of flats and own resources of the municipality
Investment costs	425,000 Euro (boiler room, distribution system, building reconstruction)
Contract duration	12 years (2000-2012)

## Contact for further details:

---

BIOMASA, Association of legal entities  
023 34 Kysucky Lieskovec, No. 743, Slovakia  
Tel. +421 41 423 15 00  
[biomasa@biomasa.sk](mailto:biomasa@biomasa.sk), [www.biomasa.sk](http://www.biomasa.sk)



## 6 | Wood pellets for NEDI

### Background

---

The health sanatorium (National Endocrinology and Diabetology Institute – NEDI) and the municipality of Lubochna, a small spa village in central Slovakia, had to exchange the old and inefficient oil heating systems. As the price perspectives of heating oil are uncertain and the village is not connected to the gas grid, the use of biomass was the solution. Biomass boilers were provided by BIOMASA, the municipality and the health sanatorium (both foundation members of BIOMASA) had to implement the grids, the control unit of the distribution system and premises for technology installation. The installation of the boiler room took place in 2003. In total, 14 buildings are now heated by this biomass boiler, among them 3 school pavilions, a kindergarten, the municipal office and several buildings of NEDI.



### Biomass technology

---

The biomass heating plant consists of 2 boilers, a 1,800 kW boiler for the winter period and a 700 kW boiler for summer as well as for peak load demand. This ensures that the biomass plant can be operated very efficiently throughout the year. The annual heating demand of all connected buildings is about 4,200 MWh. The pellets storage has a capacity of about 80 tons of pellets, the annual pellets consumption is about 1,000 tons. In winter, the restricted storage capacity makes a pellets delivery necessary three times per week.

### Financing

---

The project was financed from several sources: the boiler room technology (boiler, fuel feeder, control unit) was installed, financed and is owned by BIOMASA (with grants of the Ministry of Environment of SR, UNDP-GEF and the Austrian Environmental Fund). Grids, control unit and the reconstruction of the building for the boiler room were financed by NEDI and the municipality (as owners of the buildings). BIOMASA is responsible for the operation and the heat delivery.



## Lessons learnt

---

The costs for heat from biomass are about 30% less than from heating with oil. Another 30% cost reduction is a consequence of the better control of the heating system and of other energy measures. BIOMASA, as heat supplier, is responsible for the operation, maintenance and fuel supply, the heat consumers do not have to concern themselves with the fuel supply or maintenance. Because of the good experiences with biomass heating from this project, NEDI decided to exchange other oil boilers to pellet boilers as well.

### Technical data:

Technology	biomass district heating plant
Capacity	1,800 kW + 700 kW
Fuel	wood pellets
CO <sub>2</sub> emission reduction	2,000 tons/year (compared to heating oil)

### Financing:

Type of financing	grants, own funding
Investment costs	340,000 Euro – boiler room, 280,000 Euro – distribution system and main control units
Contract duration	12 years (2003-2015)

## Contact for further details:

---

BIOMASA, Association of legal entities  
023 34 Kysucky Lieskovec, No. 743, Slovakia  
Tel. +421 41 423 15 00  
[biomasa@biomasa.sk](mailto:biomasa@biomasa.sk), [www.biomasa.sk](http://www.biomasa.sk)



## 7 | A win-win situation in Belluno

### Background

---

Ecodolomiti, a farming company, bought a wood chipper to make use of their own wood residues. A separate company was established for the sales activities. Ecodolomiti started to search for companies interested in establishing a contracting project and found it in Luxottica. Luxottica produces glasses and sunglasses in several factories located in the Northern Italian province of Belluno. One factory in the town Agordo has a warehouse for goods' storage. At this location, the biomass heating plant was installed.



### Biomass technology

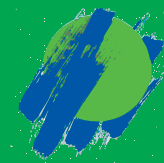
---

The biomass heating plant has a 114 kW wood chip boiler and is used for heat generation. The boiler is housed in a container with a 15 m<sup>3</sup> external storage tank. The annual energy production is 200-250 MWh. The plant was put in operation in November 2003. The annual heat demand is completely covered by wood chips produced by Ecodolomiti.

### Financing

---

Ecodolomiti purchased the boiler using a leasing contract. They are responsible for the management of the plant and the wood chip supply. Luxottica is only paying for the heat delivered. Over the last four years, the prices remained relatively stable at 70 Euro per MWh. The contract between Ecodolomiti and Luxottica is renewed on a yearly basis by tacit prolongation.



Ökoinstitut  
Südtirol /  
Alto Adige

## Lessons learnt

---

An important feature of the project is that it was a sort of an "experiment" for both partners that generated a win-win situation: Ecodolomiti wanted to investigate whether it was possible to provide a complete heating service (from wood chipping to installing and managing a heating plant), the intention of Luxottica was to reduce heating costs. This "experiment" had positive outcomes for both partners.

### Technical data:

Technology	biomass heating plant
Capacity	114 kW
Fuel	wood chips
CO <sub>2</sub> emission reduction	approx. 50 tons/year
Year of installation	2003

### Financing:

Type of financing	contracting
Investment costs	35,000 Euro
Contract duration	renewable every year

### Contact for further details:

---

Ökoinstitut Südtirol / Alto Adige  
Via Talvera 2, I – 39100 Bolzano, Italy  
Tel. +39 0471 9800 48  
[Info@oekoinstitut.it](mailto:Info@oekoinstitut.it), [www.oekoinstitut.it](http://www.oekoinstitut.it)



## 8 | Local resources for Erba

### Background

---

The municipality of Erba wanted to find a sustainable and innovative solution for heating the nursery school and decided to make use of a renewable energy technology.

The municipality chose biomass, based on a market survey which showed that wood chips of excellent quality were available in the surrounding area. With this option the municipality can also make use of wood from its own forests.



### Biomass technology

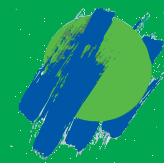
---

The new heating plant supplies heat and sanitary water to the nursery school which has a surface of 1,200 m<sup>2</sup>, including five classrooms and a kitchen equipped for the preparation of 200 meals a day. The nursery school's overall volume is 3,700 m<sup>3</sup>. The biomass heating plant has a 150 kW capacity. The annual heat demand of about 150 MWh is covered entirely by wood chips, which are stored in a separate storage room with a net volume of 60 m<sup>3</sup>.

### Financing

---

The municipality of Erba bore the expenses of purchase and installation of the boiler. The heat management service was assigned for 9 years to a local company. This company (CIPCALOR) is specialised in forestry operations in an area around the heating plant (5 – 20 km) and produces chips from wood residues. To ensure an optimal management of the installation, CIPCALOR has formed a partnership with CSI which is specialised in heating plant maintenance.



## Lessons learnt

---

The initial scepticism of the decision makers of a heating plant which relies exclusively on a renewable energy source (like wood chips) was overcome and the project is working with excellent results. To obtain such results, it is important to evaluate other projects. Moreover, it is essential to involve all the actors in the project: plant designers, wood chip producers and the maintenance services.

### Technical data:

Technology	biomass heating plant
Capacity	150 kW
Fuel	wood chips
CO <sub>2</sub> emission reduction	approx. 30 tons/year
Year of installation	2006

### Financing:

Type of financing	public funding (boiler); heat delivery contract
Investment costs for the boiler	87,000 Euro
Contract duration	9 years (2006 – 2015)

## Contact for further details:

---

Ökoinstitut Südtirol / Alto Adige  
Via Talvera 2, I – 39100 Bolzano, Italy  
Tel. +39 0471 9800 48  
[Info@oekoinstitut.it](mailto:Info@oekoinstitut.it), [www.oekoinstitut.it](http://www.oekoinstitut.it)



## 9 | Wood heating for Poizat

### Background

---

After the participation in a "wood energy open day" at a local energy agency in July 2001, the town council of Poizat/France launched a feasibility study for a biomass heating for the buildings of the town hall. The old heating boiler had to be replaced, at the same time also a new school building was constructed. Therefore, one central heating system to supply energy for all buildings was installed. Poizat is a municipality with 1,100 ha of forests and the installation of a wood chip boiler increased the valorisation of this local resource.



### Biomass technology

---

The 100 kW boiler operates fully automatically with an automatic control system which makes the maintenance of the heating system very convenient. The biomass heating supplies a total surface of 1,500 m<sup>2</sup> and the length of the grid is 300 metres. The management and the maintenance of the boiler are ensured by the municipality. They decided to use the wood of its own municipal forest. The wood fuel supply is ensured by the municipal employees, there are no subcontractors for this activity. 350 – 400 m<sup>3</sup> of wood chips with a moisture content of 25% are chipped and stored in a hangar annually. The capacity of the hangar is approximately 500 m<sup>3</sup> and the capacity of the silo in Poizat is 25 m<sup>3</sup>.

### Financing

---

The project received 70% of subsidies from the French Environment and Energy Management Agency (ADEME), from the European regional development fund (ERDF), from the region Rhône-Alpes and from the Department of Ain. The municipality financed the remaining 30% of the project and ensures planning, financing, construction and maintenance.

## Lessons learnt

Wood energy creates local added value and employment. In this case, the municipality makes use of its own forest, and the automatic wood heating system is fully within the responsibility of the city.

### Technical data:

Technology	biomass heating plant
Capacity	100 kW
Fuel	wood chips
Storage	500 m <sup>3</sup>
Annual consumption	350 m <sup>3</sup>
Surface heated	1,500 m <sup>2</sup>
Year of installation	2005

### Financing:

Type of financing	direct investment by the town council
Investment costs for the boiler	260,000 Euro
Rate of subsidy	<ul style="list-style-type: none"> <li>• 70 %</li> <li>• ADEME &amp; ERDF</li> <li>• Région Rhône-Alpes</li> <li>• Conseil Général de l'Ain</li> </ul>

## Contact for further details:

Mairie du Poizat  
 M. Raymond POUPON  
 Village  
 F-01130 Le Poizat, France  
 Tel. : +33 (0)4 74 75 30 14  
 Fax : +33 (0)4 74 75 31 86  
[mairiedupoizat@wanadoo.fr](mailto:mairiedupoizat@wanadoo.fr)



## 10 | Chestnut forests as energy resource

### Background

---

The "Communauté de Communes" de Vinay (a group of municipalities in Vinay), an area mainly covered by chestnut forests located east of Grenoble, set up the tourist building "Le Grand Séchoir" – séchoir is the name of the nut drying facility. This is a museum to show the value of the chestnut forests as a natural resource. In 2001, a study of automatic wood chip heating systems was carried out, taking into account the wood energy installations in the North-East of France. As the local



economy is mainly based on chestnut exploitation, all persons in charge of the project agreed to install an automatic biomass heating plant in the new museum.

### Biomass technology

---

The boiler with a power of 100 kW is operating fully automatically and has a high-performance automatic control system which allows the optimisation of the combustion. The removing of the ash works automatically – the ashes are extracted to the ashtray by a conveyor screw. The management and the maintenance of the boiler room are ensured by the electricity company of the "Communauté de Communes". Fuel supply is ensured by a local company. The wood with a moisture content of 20 – 30% is collected from the chestnut forests, chipped and transported to the heating plant in a 17m<sup>3</sup> agricultural container. The silo with a capacity of 40m<sup>3</sup> is placed underground and allows for a fuel storage for around three weeks during the heating period. The annual consumption of wood chips is approximately 250m<sup>3</sup>. The wood chips replace the equivalent of 18 tons of oil per year.

### Financing

---

The project received subsidies of 68% from the Fench Environment and Energy Management Agency (ADEME), the European regional development fund (ERDF), the region Rhône-Alpes and the department of Isère. 32% of the investment costs were covered by the "Communauté de Communes" who also managed the project realisation (planning, financing, construction).

## Lessons learnt

Wood energy is a local resource for local development, especially in rural areas. Therefore, the biomass heating in "Le grand Séchoir" sets an important example to start other initiatives. An important aspect which has to be taken into account when starting a biomass project is that the resource biomass is available in the area and that the main actors to provide the necessary services (supply chain, logistics, maintenance of the boiler...) exist locally. The implementation of the biomass heating worked well without any problems.

### Technical data:

Technology	biomass heating plant
Capacity	100 kW
Fuel	wood chips
Surface heated	1,500 m <sup>2</sup>
Year of installation	2004

### Financing:

Type of financing	direct investment by the "Communauté de communes"
Investment costs for the boiler	206,000 Euro
Rate of subsidy	68 % <ul style="list-style-type: none"> <li>• ADEME/ERDF: 57,000 Euro</li> <li>• Région Rhône-Alpes: 45,000 Euro</li> <li>• Conseil général de l'Isère: 37,500 Euro</li> </ul>

### Contact for further details:

LE GRAND SECHOIR – Maison du Pays de la Noix  
 705 Route de Grenoble  
 F-38470 VINAY, France  
 Tél. : +33 (0)4 76 36 36 10  
 Fax : +33 (0)4 76 36 86 47  
[info@legrandsechoir.fr](mailto:info@legrandsechoir.fr), [www.legrandsechoir.fr](http://www.legrandsechoir.fr)



## 11 | Biomass for social services

### Background

---

FUNDOMA is an educational foundation located in the city of Oviedo, originally dedicated to the coal mine workers' orphans from the region. At present, the foundation is mostly involved in educational and social services. Their facilities consist of 14 buildings, of which eight are residences (student's hall, old people's homes and handicapped persons residences), a sports centre, three service buildings (kitchen, canteen, offices, laundry etc.), a hostel and a school. The biomass district heating system supplies central heating and domestic hot water for eight of those buildings and replaced their old boilers fuelled by oil, coal and natural gas.



### Biomass technology

---

The biomass district heating system consists of three biomass boilers of 500 kW each. The boilers have a minimum performance rate of 90% and are fuelled with biomass delivered from a 99 m<sup>3</sup> silo by a conveyor screw. The pipeline has a length of 1,050 meters, divided in two closed loops that serve four buildings each.

### Financing

---

The biomass district heating system was financed by a non-refundable subsidy of the Regional Ministry for Industry and Employment (33%), the rest came from the foundation's own funds. The regional subsidy required an automated biomass plant with a minimum performance rate of 90%.



## Lessons learnt

---

The fact that the biomass market is in an early stage in this region presented some challenges for this project. For example, it was difficult to find a company with enough experience in this kind of installation. There were similar problems to solve for the fuel suppliers.

### Technical data:

Technology	biomass district heating plant
Capacity	3 x 500 kW
Fuel	solid biofuels
CO <sub>2</sub> emission reduction	650 tons/year
Year of installation	2007

### Financing:

Type of financing	subsidy (33%), own funds
Investment costs	896,000 Euro

## Contact for further details:

---

Fundación Asturiana de la Energía (FAEN)  
Fray Paulino s/n. 33600 Mieres (Asturias), Spain  
Tel. +34 985 46 71 80  
[www.faen.es](http://www.faen.es)

## 12 | Olive stones for a hospital

### Background

---

The Hospital del Oriente de Asturias is a 10,500 m<sup>2</sup> building located in Arriondas and supplies a population of around 52,000 inhabitants with medical care. During 2007, it was necessary to replace the old gas and oil boilers that provided the central heating to one of the three hospital buildings (with 3,000 m<sup>2</sup>). The management of the hospital decided to install a biomass heating plant.



### Biomass technology

---

The biomass heating plant consists of a 450 kW boiler that provides the central heating for a part of the hospital buildings and has a 23 m<sup>3</sup> silo for the fuel storage. The other hospital buildings are heated by an oil heating plant. The biomass boiler supplies heat during the winter period and works as a support for the other boiler for the rest of the year. It replaced an old oil boiler with an annual oil consumption of 33,000 litres, which lead to a reduction of CO<sub>2</sub> emissions of 91 tons per year. Additionally, the total annual gas and oil consumption of the building was reduced by half compared to the consumption the year before.

### Financing

---

The financing of the plant was done partly by a subsidy (non-refundable) of the Regional Ministry of Industry and Employment and partly by means of a soft loan granted from the IDAE. The subsidy from the Regional Ministry was granted as a part of the national renewable energy plan, meeting the requirements of being an automatic biomass plant with a minimum performance of 90%. Thus, 45% of the total investment costs were covered. The rest of the expenditure (55%) was covered by means of an 11 years soft loan granted by the IDAE at Euribor plus 0.30% with an opening fee of 0.30%.

## Lessons learnt

---

The fact that the biomass market is in an early stage presented some challenges for this project. For example, it was difficult to find an installer with enough experience. There were similar problems to solve for the fuel suppliers. At first, dried olive pomace was tested but the low granulometry was not satisfying and therefore, the fuel was changed to olive stones.

### Technical data:

Technology	biomass heating plant
Capacity	450 kW
Fuel	olive stones
CO <sub>2</sub> emission reduction	100 tons/year (compared to heating gas oil)
Year of installation	2007

### Financing:

Type of financing	subsidy (45%) + soft loan (55%)
Investment costs	161,000 Euro

## Contact for further details:

---

Fundación Asturiana de la Energía (FAEN)  
 Fray Paulino s/n. 33600 Mieres (Asturias), Spain  
 Tel. +34 985 46 71 80  
[www.faen.es](http://www.faen.es)



## 13 | Wood chips for Kelly's Hotel

### Background

---

Kelly's Resort Hotel and Spa is uniquely situated along 8 kilometres of sandy beach in Rosslare, Co. Wexford, also known as the "Sunny South-East" of Ireland. Founded in 1895, Kelly's is one of Ireland's top four-star resort hotels with 117 bedrooms, three restaurants, two bars, a fitness centre with two indoor swimming pools and "Sea Spa" complex containing various pools and treatment rooms.



Rising energy costs and a desire to reduce carbon emissions prompted the hotel management to change to renewable heat technology.

### Biomass technology

---

A 350 kW wood chip boiler was installed in February 2006 with two of the existing 150 kW oil boilers remaining in place to meet additional demand. The two remaining boilers only become operational if additional heat is required during peak loads in extremely cold weather. The site at the hotel is very tight on space. This challenge was overcome by locating the fuel store in a raised position. A 70m<sup>3</sup> prefabricated shed was constructed above a flat roof, as a fuel store for the wood chips. The main maintenance task is the cleaning of the wood chip burner, which is necessary every two weeks only. The ash that is generated, which is quite a small quantity, is mixed with compost and this mix can be used in the gardens around the hotel.

### Financing

---

The hotel invested 104,880 Euro in the project and it received a "Sustainable Energy Grant" of 26,220 Euro through the "Bioheat Boiler Deployment Programme" from Sustainable Energy Ireland which is funded by the National Development Plan 2007-2013 (partly funded by the European Union). In comparison with 2005 figures, the hotel saved almost 25,000 Euro on heating costs in 2006. This means that Kelly's Hotel expects a three-year payback period on its capital investment. The hotel has entered into a long-term agreement with its installer for both wood fuel supply and maintenance.



## Lessons learnt

---

The wood chip fuelled boiler generates a heat output of 226,800 kWh per month. The hotel has learnt that the installation of the wood chip boiler was a correct decision both financially, because the hotel no longer has to worry about fluctuating oil prices and environmentally, because the hotel now has a carbon neutral energy source. It is estimated that the water-heating bills for the hotel will be reduced by over 50% as a result of switching to a wood chip fuelled boiler.

### Technical data:

Technology	biomass boiler
Capacity	350 kW
Fuel	wood chips
CO <sub>2</sub> emission reduction	252 tons/year
Year of installation	2006

### Financing:

Type of financing	own funding, grants
Investment costs	104,880 Euro

## Contact for further details:

---

South-East Regional Authority  
1 Gladstone Street, Clonmel  
County Tipperary, Ireland  
Tel. +353 52 26 200  
[dir@sera.ie](mailto:dir@sera.ie), [www.sera.ie](http://www.sera.ie)

Kelly's Resort Hotel and Spa,  
Rosslare, Co. Wexford, Ireland  
[ppower@kellys.ie](mailto:ppower@kellys.ie), [www.kellys.ie](http://www.kellys.ie)

## 14 | Mini district heating system at Camphill Jerpoint

### Background

---

The Camphill Community in Jerpoint is a mutual help community for adults of all ages with varying degrees of disability. During the planning of a new community house, analysis showed that it made economic and environmental sense to design and install a modern wood fuelled heating network for the major buildings of the community. These buildings include a new 9-bedroom and an existing 12-bedroom community house, an office building and a separate building containing a community hall, apartment and food-processing workshop.



### Biomass technology

---

The wood chip heating system is located in a boiler-house (designed to complement the surrounding buildings), fed from a rotating auger in the attached wood chip store. Each of the buildings in the Community is connected to the boiler by a system of pipes installed beneath the ground. The fully automatic 150 kW boiler achieves an efficiency rate of 92%. An automatic grate ensures that the boiler operates optimally for all fuel types such as wood chips, sawdust or wood pellets. The performance and emissions data are monitored remotely and the data are sent by modem to the Fröling service department in Austria. Local technical support is available by telephone.

### Financing

---

The system is 100% owned by Camphill Jerpoint. The total capital and installation costs amounted to 85,500 Euro. The system was built in phases with grant funding made available from BNS Leader and Sustainable Energy Ireland (SEI). BNS Leader is a rural development company funded by grant-aid from the EU and the Department of Agriculture, Fisheries and Food. Sustainable Energy Ireland is funded by the National Development Plan. In addition, money was raised by Camphill parents, friends and groups who ran a number of fund raising projects. The transition year students of a local College also raised funds.



## Lessons learnt

---

While a wood fuelled heating system is more expensive to install than a conventional fossil fuelled system, fuel costs are lower and CO<sub>2</sub> savings are significant. An advantage of using a wood fuelled heating system is security of fuel supply, which is locally available and delivered directly to the fuel store. The boiler can burn wood fuel with up to 40% moisture content but works most efficiently with fuel under 20% moisture content. The operating convenience of this modern wood chip system is similar to that of an oil or gas boiler.

### Technical data:

Technology	small scale district heating system
Capacity	150 kW
Fuel	wood chips/sawdust/wood pellets
CO <sub>2</sub> emission reduction	100%
Year of installation	2005

### Financing:

Type of financing	own funding, grants
Investment costs	85,500 Euro

### Contact for further details:

---

South-East Regional Authority  
1 Gladstone Street, Clonmel  
County Tipperary, Ireland  
Tel. +353 52 26 200  
[dir@sera.ie](mailto:dir@sera.ie), [www.sera.ie](http://www.sera.ie)

Mr. John O'Connor,  
Camphill Jerpoint, Kilkenny, Ireland  
[jerpoint@camphill.ie](mailto:jerpoint@camphill.ie), [www.camphill.ie](http://www.camphill.ie)

## 15 | Energy services for a housing development

### Background

---

In 1998, the municipality of Kirchlinteln/Germany planned a development area for 60 one-family homes. Instead of an individual heating system for each building, the construction of a central wood heating plant was proposed to the owners of the nearby forest. The local council supported this idea from the beginning. After a site-visit to a comparable project, a feasibility study was commissioned. The study showed that the heating costs were comparable to heating oil or natural gas. An



operating company, an ESCO, was founded by an installer and two forest owners. The development area was owned by two private proprietors and the Protestant Church, who included the central heat supply in the property purchase contracts. The plant was put into operation in October 2000.

### Biomass technology

---

The biomass heating plant consists of 2 boilers, a 450 kW boiler for base load fired by wood chips and a 300 kW natural gas boiler for peak load. This ensures that the biomass plant can be operated very efficiently throughout the year by avoiding inefficient part load operation. The annual heating demand of about 870 MWh is covered to 90% by wood chips. The plant is installed in a building close to the homes.

### Financing

---

The financing of the plant was done by contracting, implemented by a new ESCO responsible for supplying the new buildings with heat. The ESCO is/was responsible for the planning, financing, construction, operation and maintenance of the plant. It also takes the full technical risk. Additionally, the ESCO is responsible for the fuel supply and the wood chips are bought from neighbouring farmers. The home owners and the ESCO entered a 20-year-contract.

## Lessons learnt

---

Contracting was the only way to establish a central heating system. The landholder of the forest and the installer ensure the long term supply by founding an operating company. Currently, the supply of wood of good quality at low prices represents a challenge. During the first years, the business situation was difficult because the capital costs were not covered sufficiently by heat sales due to a delay of the construction work. The better isolation of modern buildings with their reduced heat demand makes small district heating systems economically efficient only in highly populated areas with short distribution grids.

### Technical data:

Technology	biomass heating plant
Capacity	450 kW
Fuel	wood chips
CO <sub>2</sub> emission reduction	300 tons/year (compared to natural gas)

### Financing:

Type of financing	contracting
Investment costs for the boiler	400,000 Euro
Rate of subsidy	<ul style="list-style-type: none"> <li>• 35% contribution by clients</li> <li>• 20% public grant</li> <li>• 20% regular grant</li> <li>• 25% equity</li> </ul>
Contract duration	20 years (2000-2020)

## Contact for further details:

---

3N-Kompetenzzentrum Nachwachsende Rohstoffe  
Goettingen Office, Germany  
Tel.: +49- 551 307 38 17  
Fax: +49- 551 307 38 21  
[goettingen@3-n.info](mailto:goettingen@3-n.info), [www.3-n.info](http://www.3-n.info)

## 16 | Wood heating plant in a residential area

### Background

---

In spring 2005, the housing society GBH planned the installation of a wood heating plant to supply two residential areas with heat in Lahe, Hanover. A central boiler plant already existed, however, the supply of solid fuels delivered by truck in a very populated area presented a special challenge.



### Biomass technology

---

The biomass heating plant, which is located in a separate building, consists of 2 boilers, a 360 kW base load boiler fired with wood chips and a 900 kW natural gas boiler for peak load. This ensures that the biomass plant can be operated very efficiently throughout the year. An underground storage for the wood chips was built which is practically invisible for the occupants of the apartments. 70% of the annual heating demand of about 2,200 MWh is covered by wood chips. The 2,300 m<sup>3</sup> required per year come from forests and landscape conservation.

### Financing

---

The financing of the plant was realised by contracting. GBH founded a company, an ESCO, which is in charge of supplying all buildings of the housing society with heating and is owned to 100% by the housing society GBH. The ESCO is/was responsible for the planning, financing, construction, operation and maintenance of the plant. It also takes the full technical risk and ensures well functioning. The GBH and the ESCO entered a 20-year-contract.

## Lessons learnt

Contracting was the most efficient way to exchange the old heating plants of the housing company. Moreover, GBH did not have the financial resources to install new boilers and wanted to focus on their core business of building and operating apartment buildings. In the meantime, the ESCO installed another three biomass heating plants, two fired with wood chips and one with wood pellets.

### Technical data:

Technology	biomass heating plant
Capacity	360 kW
Fuel	wood chips
CO <sub>2</sub> emission reduction	380 tons/year (compared to natural gas)

### Financing:

Type of financing	contracting
Investment costs for the boiler	380,000 Euro
Rate of subsidy	<ul style="list-style-type: none"> <li>• 9% contribution of the client</li> <li>• 9% subsidy by state</li> <li>• 60% public grant</li> <li>• 22% equity</li> </ul>
Contract duration	20 years (2006 – 2026)

### Contact for further details:

3N-Kompetenzzentrum Nachwachsende Rohstoffe  
Goettingen Office, Germany  
Tel.: +49- 551 307 38 17  
Fax: +49- 551 307 38 21  
[goettingen@3-n.info](mailto:goettingen@3-n.info), [www.3-n.info](http://www.3-n.info)



## 17 | Three coal fired boilers switched to biomass

### Background

---

Rzeczzenica is a small, rural municipality in the Pomeranian region (Poland). Heating systems usually are small boilers fuelled by wood or coal, characterized by high CO<sub>2</sub> emissions and a low efficiency. The municipality aims at 90% of renewable energy by 2020. As the heating supply system for a complex of three public buildings had to be exchanged, the idea arose to substitute them by one central biomass heating plant. Each of the buildings, housing the primary and the secondary school, the kindergarten and a municipal office building, had a coal fired boiler before.



### Biomass technology

---

The new biomass heating plant has one 700 kW boiler, housed in a separate building close to the three buildings. The equipment was delivered and installed by a company from Gdynia. The plant is fuelled by wood chips and sawdust bought from a nearby sawmill. The boiler was equipped with a tilting grate. The maximum humidity of the fuel can be 50%. The fuel is supplied from a silo by means of a conveyor screw.

### Financing

---

The total cost of the modernisation were 260,000 Euro. The municipality was able to cover 23% of the costs, 59% were subsidized by the Regional Fund for Environmental Protection and Water Management together with EcoFund. The EcoFund's task is to provide financial support for environmental protection projects important to the region as well as helping to attain ecological goals recognized by the international community. The remaining 18% came from a preferential loan offered by the Regional Fund for Environmental Protection and Water Management.



## Lessons learnt

---

At the beginning, bad fuel quality caused problems with the boiler's performance. One of the biggest advantages of this investment is the fact that the money spent for fuel remains at the local market, and thus the municipality benefits from it: several job opportunities arose in the fields of fuel production and logistics. Furthermore, the substitution of fossil fuel by a renewable one contributes to a considerable reduction of emissions, including CO<sub>2</sub>. Finally, the reduction of operating costs from 44,000 to 20,500 Euro allows a quick pay back of the loan.

### Technical data:

Technology	biomass district heating plant
Capacity	700 kW
Fuel	wood chips and sawdust
CO <sub>2</sub> emission reduction	718 tons/year (compared to coal)
Year of installation	2001

### Financing:

Type of financing	<ul style="list-style-type: none"><li>• Own (municipality) funding: 23%</li><li>• Preferential Loan from Regional Fund for Environmental Protection and Water Management: 18%</li><li>• Subsidy: 59% (Regional Fund for Environmental Protection and Water Management: 21%; EcoFund: 38%)</li></ul>
Investment costs	260,000 Euro

### Contact for further details:

---

Baltic Energy Conservation Agency  
ul. Budowlanych 31  
PL 80-298 Gdansk, Poland  
Tel.: +48 58/347 55 35  
Fax: +48 58/347 55 37  
[bape@bape.com.p](mailto:bape@bape.com.p), [www.bape.top100.net.pl](http://www.bape.top100.net.pl)



## 18 | Willows heat an educational centre

### Background

---

Barcice is a small village in the municipality of Ryjewo in Kwidzynski Powiat with only 330 inhabitants. The special educational centre for children with slight mental disabilities was created in 1927. Today, the building with a surface area of 2,777m<sup>2</sup> is permanently occupied by 80 children. Before the modernisation, heating was provided by three coal boilers with a total capacity of 560 kW. The substitution of the old boilers was part of the district's development programme. Moreover, the district council wanted to create an additional market for the local willow producers.



### Biomass technology

---

A new 300 kW biomass boiler was installed. It was the first willow-fuelled installation in the region. Wood residues can be used as an alternative fuel. The fuel required amounts to 568 loose volume m<sup>3</sup>. It is stored in an 80 m<sup>2</sup> shed and comes from local plantings. For the summer period, an oil boiler of 36 kW was installed to provide hot water.

### Financing

---

The overall cost of the modernisation was 112,020 Euro. The municipality was able to cover 34% of that sum, 22% were subsidized from governmental budget, and the rest (44%) came from a preferential loan offered by the "Voivodeship Fund for Environmental Protection and Water Management".



## Lessons learnt

---

One big plus of the new heating system is that the fuel costs dropped by half and the users are very pleased with the automatic and trouble-free operation of the boiler. During the guarantee period, the wood chopping machine was exchanged for one with more power. Another important advantage of this investment is the creation of added value in the region.

### Technical data:

Technology	biomass heating plant
Capacity	300 kW
Fuel	willow
CO <sub>2</sub> emission reduction	217 tons/year (compared to coal)
Year of installation	2004

### Financing:

Type of financing	<ul style="list-style-type: none"><li>• Own (municipality) funding: 34%</li><li>• Preferential Loan from Regional Fund for Environmental Protection and Water Management: 44%</li><li>• Subsidy: Governmental budget: 22%</li></ul>
Investment costs	112,020 Euro

### Contact for further details:

---

Baltic Energy Conservation Agency  
ul. Budowlanych 31  
PL 80-298 Gdansk, Poland  
Tel.: +48 58/347 55 35  
Fax: +48 58/347 55 37  
[bape@bape.com.pl](mailto:bape@bape.com.pl), [www.bape.top100.net.pl](http://www.bape.top100.net.pl)



## 19 | A biomass boiler for a rehabilitation hospital

### Background

---

Up to 100 children are treated in the Kacergine Rehabilitation Hospital in Lithuania. The old heating system, consisting of three oil-fired boilers, had to be exchanged. Due to increasing oil prices – the annual oil consumption was of approx. 100 tons of light oil – a decision was taken to switch to a biomass heating system, combined with solar collectors. The new heating system works in an integrated mode which improves the possibility to run the system on low capacity during spring and autumn. The biomass



boiler is closed down during summer and it is easy to carry out necessary maintenance work then. The project was started in 2001 and the plant is in operation since November 2002.

### Biomass technology

---

The new biomass boiler with a capacity of 600 kW was installed in a prefabricated container which also houses the automatic fuel storage, the fuel handling system, the flue gas cleaning, the fans, the multicyclone and the control system. The automatic biomass boiler is fired with wood residues supplied from woodworking companies. 850 MWh of thermal energy are produced annually. In summer, hot water is provided by using solar collectors. The environmental benefit of this project is the reduction of CO<sub>2</sub> and SO<sub>2</sub> emissions equal to 314 respectively two tons/year.

### Financing

---

The Swedish National Energy Agency and the Swedish company "WSP Environmental" prepared the project and installed the biomass & solar system. The project was financed from allocations from the Baltic Billion Fund, with the main purpose to stimulate trade and business developments in the Baltic region (i.e. Estonia, Latvia, Lithuania, Poland, the Ukraine and North-Western Russia), focusing on Swedish companies. The total cost for the implementation of this project was 600,000 Euro.



## Lessons learnt

---

After the renovation of the boiler-house, the installation of the heat network and the biomass boiler, the annual expenses for energy were three times lower than before. During summer time, from May to September, solar collectors supply about 30-35% of hot water demand.

### Technical data:

Technology	biomass boiler
Capacity	600 kW
Fuel	wood waste
CO <sub>2</sub> emission reduction	314 tons/year
Year of installation	2002

### Financing:

Type of financing	allocations from the Baltic Billion Fund
Investment costs	600,000 Euro

### Contact for further details:

---

Vl Kacerginės vaikų sanatorija "Zibute"  
J.Zikaro 14, LT-53449 Kacergine, Lithuania  
Tel.:+370 37 569296  
[sanatorija.zibute@gmail.com](mailto:sanatorija.zibute@gmail.com), [www.lei.lt](http://www.lei.lt)



## 20 | Pellet heating for churches and parish hall

### Background

---

The church community of Östra Torsås south of Växjö owns 4 churches, 4 parish halls as well as other buildings. Old, inefficient oil boilers were in use for heating and with increasing fuel costs, the administration of the church had to decide either to close down one or two churches or to invest into the heating systems to reduce operation costs. The church administration decided to convert the heating systems in two churches to pellet boilers. Churches have an intermittent need of heating, therefore, the heating systems must be able to heat up the building quickly. The parish hall, however, is in need of continuous heating and other solutions, for example a heat pump, would have been possible as well. However, the same person is responsible for the operation of all heating systems and as there is less impact on the environment in the long run, thus the parish hall was equipped with a pellet boiler, too.



### Biomass technology

---

A new 60 kW pellet boiler which is operated and regulated by an automatic control system was installed in one of the churches. In case of a disruption, a fault report is sent to the person in charge. The pellets are stored in an existing nearby shed which is connected by an underground pipe with the boiler room. The pellets are transported over a distance of 60 meters pneumatically to an interim storage in the heating room.

### Financing

---

The financing of the new heating system was done by the church administration, supported by a 30% grant from the government. This grant is only given to public buildings for projects dealing with energy efficiency or for the substitution of an oil boiler or an electricity heating. The initial planning was done by ESS (Energikontor Sydost - Energy Agency for Southeast Sweden).



## Lessons learnt

---

It is better to use the same heating technology for different buildings of the church administration instead of implementing different heating systems because otherwise the costs for training of the employees would increase. A successful switch from oil to biomass heating needs the support of the employees who are in charge of the operation and who might be afraid of an increasing amount of work or operation problems. In this case however, continuous information and active involvement of the employees into the planning process led to good results.

### Technical data:

Technology	biomass boiler
Capacity	60 kW (church and parish hall)
Fuel	pellets
CO <sub>2</sub> emission reduction	3 tons/year (church) 21 tons/year (parish hall) (compared to oil)
Year of installation	2006

### Financing:

Type of financing	national co-financing 30% (church and parish hall)
Investment costs	32,000 Euro (church) 29,000 Euro (parish hall)

## Contact for further details:

---

Energy Agency for Southeast Sweden  
PG Vejdes väg 15  
S-351 96 Växjö, Sweden  
Tel. +46 470 72 33 20  
[info@energikontor-so.com](mailto:info@energikontor-so.com), [www.energikontor-so.com](http://www.energikontor-so.com)



## 21 | Pellet heating plant for apartment buildings

### Background

---

Torpsbruk is a small village in the south of Sweden with about 360 inhabitants. The Energy Agency for Southeast Sweden (ESS) made (in cooperation with the municipality of Alvesta) a study on possibilities to use renewable energy sources for heating in some of the apartment buildings in Torpsbruk. The result was a pellet heating plant supplying 64 flats with heat.



### Biomass technology

---

To reduce the costs for heating and to protect the environment, the local housing company AllboHus AB exchanged the old oil heating system to a biomass heating plant, servicing 10 terraced houses and five apartment buildings. The biomass heating plant consists of two boilers, a 750 kW pellet boiler and the old oil boiler which is used to cover peak and low load demand. This ensures that the biomass plant works very efficiently throughout the year. The boilers are installed in a separate building in the green area between the apartment buildings. The annual heating demand of about 875 MWh is covered by wood pellets (about 200 tons/year) which are stored – together with the boilers – in the boiler house. 95% of the total heat demand is covered by biomass.

### Financing

---

The financing of the plant was done by the housing company AllboHus, supplemented by a 30% grant from the government (national co-financing). The initial planning was done by ESS. AllboHus AB is investor, initiator and operator at the same time.



## Lessons learnt

---

To keep investment costs low, low pressure pipes were used and local manufacturers were involved.

### Technical data:

Technology	biomass district heating plant
Capacity	750 kW
Fuel	pellets
CO <sub>2</sub> emission reduction	230 tons/year (compared to oil)
Year of installation	2004

### Financing:

Type of financing	national co-financing 30%
Investment costs	450,000 Euro

## Contact for further details:

---

Energy Agency for Southeast Sweden

PG Vejdes väg 15

S-351 96 Växjö, Sweden

Tel. +46 470 72 33 20

[info@energikontor-so.com](mailto:info@energikontor-so.com), [www.energikontor-so.com](http://www.energikontor-so.com)

## 22 | Pellet heating in the Dalecarlia hotel

### Background

---

In 2004, the management of Dalecarlia, a 4 star hotel with a spa in Tällberg in the middle of Sweden, decided to exchange the old inefficient oil heating system for a biomass heating. Motivations were to decrease heating cost and also with regard to the environmental and quality policy of the hotel. A solution based on contracting was chosen. An ESCO invests, operates the plant and delivers heat.



### Biomass technology

---

The ESCO, the fuel company Statoil, carried out the installation of the pellet boiler with a capacity of 400 kW and also set up a 40 m<sup>3</sup> storage in the basement of the hotel. The pellets are delivered in bulk by a lorry. The new pellet heating supplies the hotel and the spa with heat and domestic water. The substitution of the old oil boiler with the new pellet heating led to a reduction of CO<sub>2</sub> emissions of about 400 tons per year.

### Financing

---

The financing was done by the ESCO, there were no investment cost for the hotel owners. The replacement of the old heating reduces the annual heating cost by about 25,000 Euro which means that the price for heat delivered is far below the heat price of the former oil heating. Further advantages for the customer are that the maintenance of the heating plant and all risks are taken over by the energy company. After the end of the contract period, the owner of the building has an option to buy the installation at a fixed (depreciated) price or to negotiate a new heat delivery contract.



## Lessons learnt

---

As the hotel owner did not want any visible storage buildings, the challenge was to find a good and functional solution within the limited available space in the basement. The main advantage of contracting is to modernise the heating system without any investments for the client and at lower annual costs for heating. Other advantages are predictable costs, no risk and no need of own technical expertise.

### Technical data:

Technology	biomass boiler
Capacity	400 kW
Fuel	pellets (approx. 300 tons/year)
CO <sub>2</sub> emission reduction	400 tons/year
Year of installation	2004

### Financing:

Type of financing	contracting
Investment costs	200,000 Euro
Contract duration	12 years

## Contact for further details:

---

Gävle Dala Energikontor, GDE  
Herrgårdsvägen 122  
SE-77698 Garpenberg, Sweden  
Tel.: +46/ 225 260 80  
[www.gde-kontor.se](http://www.gde-kontor.se)



## Project Overview

REGBIE+ stands for Regional Initiatives Increasing the Market for Biomass Heating in Europe and was launched in January 2007 as a follow-up project of REGBIE. It involves 13 partners from 11 EU countries and aims at strengthening the regional uptake of various biomass heating technologies. REGBIE+ is supported by the Intelligent Energy Europe programme.

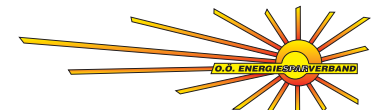
## Objectives

- Support the EU Biomass Action Plan
- Strengthen and start regional bioenergy initiatives
- Remove technical and non-technical market barriers
- Stimulate regional demand and supply structures
- Raise general awareness on biomass

## Target Groups

- Key actors in policy and regional economy
- Investors groups at regional level
- Installing and planning companies
- Fuel suppliers
- General public, householders, schools

Further information / download: [www.regbieplus.eu](http://www.regbieplus.eu)



The whole responsibility for the content of this publication lies with the authors. It does not represent the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

Impressum:  
 O.Ö. Energiesparverband  
 Landstrasse 45, 4020 Linz  
 Tel. 0732-7720-14380, Fax: 0732-7720-14383  
 office@esv.or.at, www.esv.or.at  
 ZVR 171568947