

# Supply chain management for wooden energy sources

## Potential wood sources in the canton of Redange

About 70% of the forest area in the canton of Redange is in private ownership, while the remaining 30% public forests mainly belong to the communes and are administrated and cultivated by the national forest administration. For large parts of the private forests, their owners are not taking care of for many different reasons. These parts of the forests are actually not contributing to the wood production.



A further potential are the wooden greenery cuttings from streets, parks and other communal areas, from landscape conservation or private households. In Luxembourg, seven intercommunal syndicates covering 33 communes have joined together to form the Center & Western Inter-Communal Syndicate for Nature Conservation-**SICONA**. The communes were inspired by a variety of motives: protecting their country side, supporting efforts at a national and European level to protect species and natural habitats and contributing to the sustainable development of Luxembourg. The intercommunal syndicate Redange is member of SICONA Centre.

## Wood supply for the district heating system in Beckerich

### Key data of DHS Beckerich

The woodchip plant in Beckerich is complementary to the biogas plant and provides ideal heat for a much larger number of households.

- Year of commissioning: November 2008
- Boiler capacity: 2MW
- Water tank: 9.900 l
- Buffer tank: 2x 54.000 l
- Expansion tank: 5 x 5000 l
- Chip size: G50-G100
- Connected households: 123
- Connected SME: 7
- Connected communal buildings: 17
- Proportion of energy: 49, 70% Biogas and 50, 30% wood chip
- Heat sold in 2010: 5.659.827 kWh equivalent of heating oil = 565.983 l
- Wood chip heat production: 2.730.000 kWh equivalent of heating oil 273.000 l
- Residual product: ashes, partly used as fertilizer in the fields – 10 m<sup>3</sup>



## **Energy wood suppliers for the DHS Beckerich**

Mobilizing wood is a general effort, which requires the cooperation of all relevant actors. Energy wood for the DHS in Beckerich is delivered by five different suppliers / supplier groups:

- **SICONA** – Nature Conservation Syndicate - Wooden greenery cuttings from streets, parks and other communal areas - +/- **1500 Sm<sup>3</sup>/a** (receive payment - see table below)
- **Pont et chaussée Redange** - Administration of Civil Engineering - Wooden greenery cuttings from streets, parks and other communal areas - **300 Sm<sup>3</sup>/a** (no payment)
- **Community of Beckerich Forestry** – Waste wood - **1000 Sm<sup>3</sup>/a**
- **Logging - Landscape Gardener Binsfeld** - Wooden greenery cuttings - **1000 Sm<sup>3</sup>/a** (no payment)
- **Inhabitants of Beckerich** - Wooden greenery cuttings - **500 Sm<sup>3</sup>/a** (no payment)

It is part of the philosophy of the DHS Beckerich to use regional available resources as far as possible. So more than 50 % of the energy wood come even from local level - from the community and the inhabitants of Beckerich and a company located in Beckerich (landscape gardener). Pont et Chaussée delivers wood from the Canton of Redange, SICONA from the Canton of Redange and other areas from Luxemburg.

### Communal (and private) wood potentials in Beckerich

Beckerich has a forest potential of 700 ha, 300 ha belonging to the municipality and 400 ha belonging to private forest owners. The forest management of the municipality owned forest is done by a forest ranger. So, the community uses wood from its own forest for its DHS.

In a future step it is foreseen that the wood district heating system will be supplied on a local level also by private forest owners. This could motivate the private forest owners to manage their small forest (what is not made to a far extent now), help them reduce their heating costs, contribute to the functioning of the communal infrastructure and bring their contribution to the local community. (A SEMS “Regional Conference” targeting exactly this topic was held receiving big resonance.)

#### Logging - Landscape Gardener Binsfeld, Oberpallen/Beckerich

In 1980 Lucien Binsfeld settled as an independent in forestry with focus on felling of trees, with machines or hauling horses, plantation forestry and wood in Oberpallen /Beckerich. Since 1982, his wife joined him to manage the business. She also practiced forestry work and had her own horse for hauling. By 1998, they expanded their area of operations by developing the area around private homes (landscape gardeners). In 2004, Suzette and Lucien opened a store of plants inside and outside a small nursery in Oberpallen/Beckerich.



*Figure: Forest management with horse*

## Transport of energy wood for DHS Beckerich

The following chart gives an overview on the supply chain for the DHS in Beckerich.

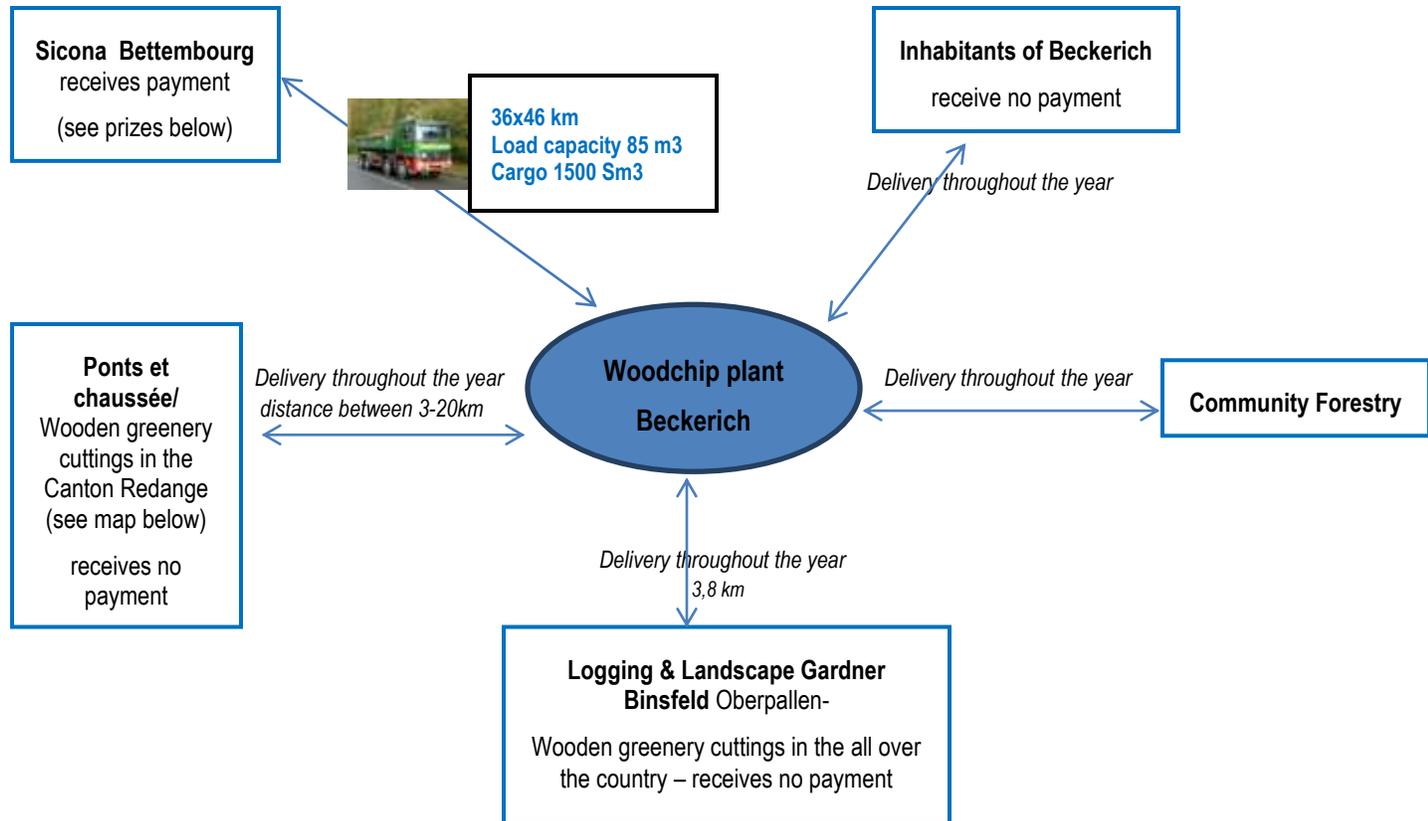


Chart: Supply chain of energy wood for DHS Beckerich

- Sicona Bettembourg delivers 1500 SM3 once a year. The transportation of the wood chip is done by truck which has a load capacity of 85m3. The distance of the route is 46km.
- Ponds et chaussée delivers during the pruning periods. The pruning is done in the entire Canton. (See map below)
- Logging & Landscape Gardner Binsfeld delivers almost all year round and from the entire country.
- Inhabitants of Beckerich during the pruning periods.
- Community Forestry. All year round.

### Transport distances

The following map gives an overview on the transport distances of energy wood for the DHS in Beckerich within the Canton of Redange.

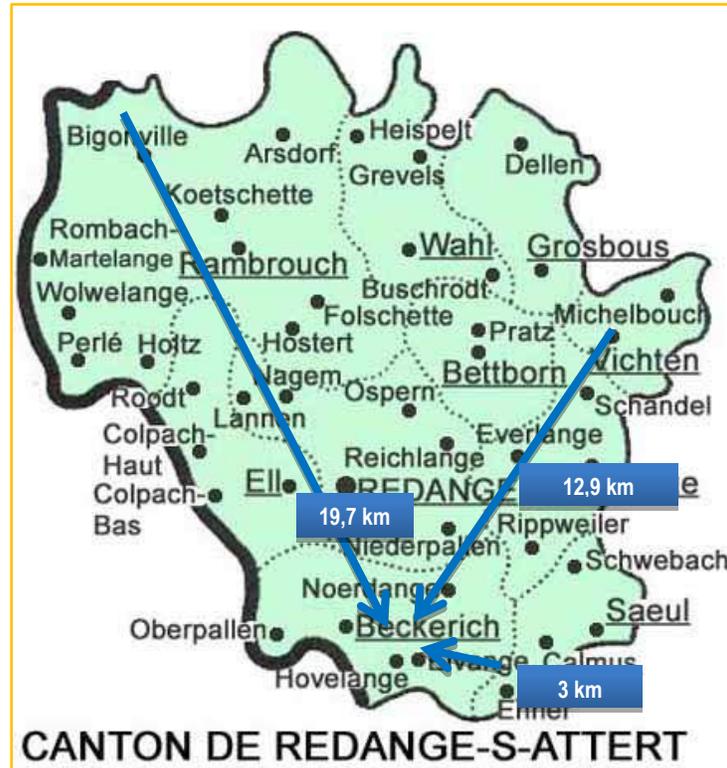


Figure: Map of Canton of Redange – transport distances

### Prices for energy wood deliveries

Among the energy wood suppliers for the DHS Beckerich only Sicona Bettembourg is paid for the wood delivered.

Table: Price for wood

<b>Price for wood delivered on site:</b>	0-20 €/m <sup>3</sup>
<b>According to municipal deliberations:</b>	
• Wood sheets (oak, beech, hornbeam)	38,50€/T + VAT
• Softwood (spruce, Douglas fir, pine)	30€/T + VAT
• Mixed wood	
○ from hardwood > 50%	34€/T+ VAT
○ from hardwood < 50%	30€/T + VAT

## **Shredding & storing**

The storage hall for wood chips is located directly next to the district heating boiler. Its dimensions are 27m x 24 m x 10 m.

Wood is transported to the storage hall by the different suppliers as well as from in house. The store was designed to take deliveries of up to +/- 4000 m<sup>3</sup>. Wood is shredded on site and stored on the exterior, irrespective of weather conditions, till the time it goes into the storage.



*Figure: Storage hall for DHS Beckerich*

# Further wood based DHS in the Canton of Redange

## 1. Wood supply for district heating system in Pr eizerdaul

### *Key data of DHS Pr eizerdaul*

- Year of commissioning: 2002
- Boiler capacity: 300 kW
- Auxiliary boiler: 300 kW
- Silo volume: 100m<sup>3</sup>
- Buffer volume: 7000 l
- Connected communal buildings: 10
- Proportion of energy:
  - Wood: 89,14%
  - Heating oil: 10,14%
  - Solar: 0,72%
- Annual consumption: 960 Sm<sup>3</sup>/a  
equivalent to 86.400 l fuel/a  
+/- 91% of heat
- Connected to the heat network of the pri
- Annual CO<sub>2</sub> savings: +/- 175 t



## ***Wood land management and supply:***

The community of Prézérdaul has a forest potential of 237 ha. High quality wood is used to supply the DHS "Op der Fabrik" in the community of Prézérdaul. The forest management is done by a forest ranger. Prézérdaul is also part of the network SICONA Centre.

## ***Delivery & storage for wood chip for DHS Prézérdaul***

Storage Hall Capacity: +/- 1600 m<sup>3</sup>

5 % of the wood chip is transported to the storage hall by the different suppliers as well as from in house. 95 % of the wood chip is picked up twice a year by the municipality from different suppliers and own forest. The transportation distance is 15 km. The wood is shredded and stored to dry in the forest until it goes into the storage hall.

## ***Energy wood providers for wood chip DHS Prézérdaul***

- **Community Forestry** – High quality wood – 85%
- **SICONA** – Nature Conservation Syndicate - Wooden greenery cuttings from streets, parks and other communal areas – 10%
- **Private persons** - Wooden greenery cuttings – 5%

## 2. Wood supply for district heating system in Redange

### *Key data of DHS Redange*

- Year of commissioning: 2008
- Boiler capacity: 320 kW
- Buffer volume: 15.000 l
- Silo volume: 120 m<sup>3</sup>
- Connected communal buildings: 5
- Proportion of energy: 100 % wood chip
- Heat consumption 2009: 1 500 Sm<sup>3</sup>

### *Wood land management and supply*

The community of Redange has a forest potential of 139 ha. Sanding wood (pulpwood) is used to supply the district heating network in the community of Redange. The forest management is done by a forest ranger. The forest ranger is in charge to provide every year 1300 Sm<sup>3</sup> wood chip. The community organizes the transport twice a year. For this purpose the community requests the service of a specialized transportation company. The wood is shredded near the storage hall. The wood chip is stored to dry inside the storage hall. The storage capacity is +/- 2500-3000 Sm<sup>3</sup>. Redange is also part of the network SICONA Centre.

The Pellet district heating network of Nagem/Redange is supplied by the local company Husting Reiser S.A. one of the leading suppliers of wood pellets in Luxembourg.