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Biomass to the Masses

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Regional Profile of the Biomass Sector in Styria

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1 Introduction

47,6 % or about 4 mio. ha of Austria's total state area of almost 8,4 mio. ha are covered by forest. Therefore, biomass use has a long tradition in Austria and is primarily based on domestic forest and further wood resources, mainly residues from the wood processing industry like wood chips, saw dust and waste liquor from the pulp and paper industry. In contrast, agricultural biomass, such as energy plants, agricultural residues and wastes, as well as wood from short-rotation coppice, have only been utilised rather scarcely so far, although they represent a potential for energy production (BFW 2011; Tempel 2011).

Out of all nine Austrian federal countries, Styria is the one with the most forest area with 61,4 % of its total area of about 1,6 mio. ha covered by forest. On district level, forest cover reaches from 37 % to 77 % of area with Bruck an der Mur being the most densely afforested Styrian district (see Figure 1).

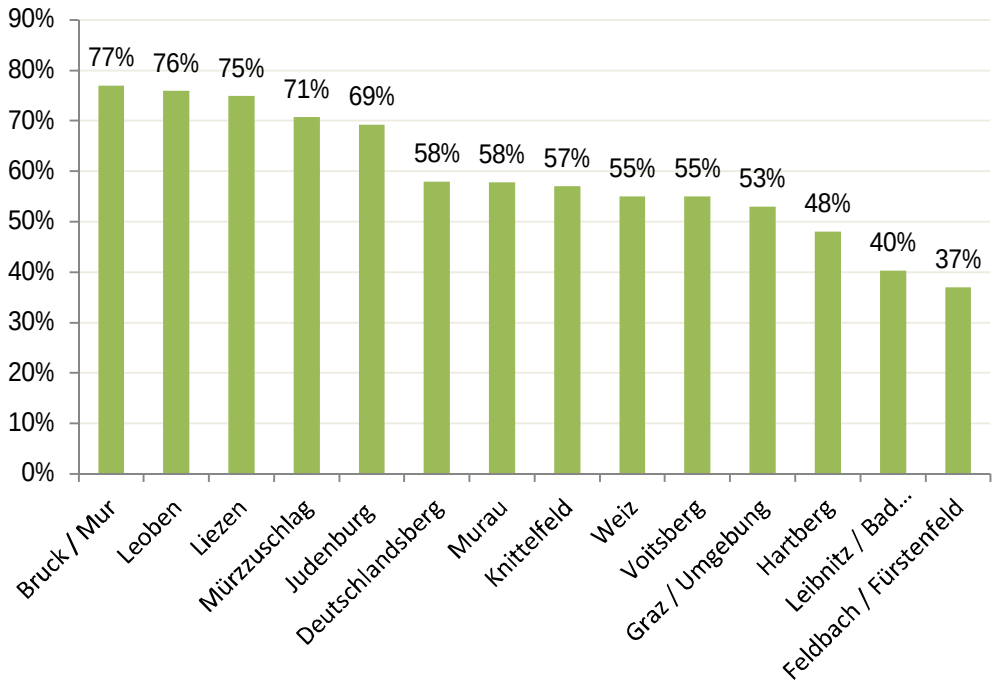


Figure 1: Share of forest area in Styrian districts **Source: BFW 2011**

2 Condition and structure of Styria´s forests

2.1 Geography and topography

The topography of Upper Styria is mainly characterized by high mountains and steep slopes. In this part of Styria, the use of harvester and forwarder is possible in only about 30 %-40 % of the forest area. The majority of fellings must be carried out manually with chain saws and hauled by means of tractor and wrench or by cable crane which incurs higher harvesting and transport costs. Due to the

high elevation of the area, logging activities are additionally hampered by very cold winters with lots of snow. The terrain in Lower Styria is much more favorable for logging activities as the area is mainly hilly with less steep slopes and rather mild winters. The use of highly mechanized harvesting techniques is possible in the vast majority of forests. Despite the adverse terrain conditions, a much higher percentage of the annual increment is used in Upper Styria than in Lower Styria. The reasons are significant differences in the forest owner structure and in the average size of forests owned (Oberwimmer et al. 2010).

2.2 Forest condition

Forests in Styria as well as forests all over Austria are, in contrast to the global trend, constantly growing, both in forest area and wood stocks, although more wood than ever before is harvested nowadays. This good condition is the result of the sustainable utilization: about 90 % of the overall annual increment are harvested in Styria. However, large forest enterprises and federal forests are already harvesting more than the annual increment, but this is mainly caused through wind throw and bark beetle calamities and does not necessarily threaten sustainability, if this trend does not continue (Büchsenmeister 2011).

2.3 Forest ownership structure

Styria´s forests are owned by about 40 000 different owners. Forest ownership in Styria, as well as in the rest of Austria, is dominated by private-owned small-scale forests up to 200 ha. Over 55 % of the Styrian forest area are small-scale forests, 35 % are areas > 200 ha owned by private forest enterprises and 9,3 % are federal forests, which means that over 90 % of Styria´s forests are privately owned (see Figure 2).

The ownership structure, as well as the average forest size, differs throughout Styria: in Upper Styria, the average size of private owned forests ranges from 15 ha to 27 ha “Bauernwald” [farm woodland] and from 36,8 ha to 91,2 ha for “Bauernwald u. Großwald” [farm woodland and forest businesses/large scale forest owners] on district level , while the corresponding figures for Lower Styria are 2,9 ha to 11,4 ha ("Bauernwald"/farm woodland) and 3,2 ha to 15,2 ha ("Bauernwald u. Großwald"/farm woodland and forest business/large scale forest owners) (Oberwimmer et al. 2010).

In Lower Styria, the forest properties of small scale forest owners are often further subdivided into unconnected or just loosely connected woodlots (average size of woodlots = 3 000 m²!). On one hand, this patchwork of woodlots makes the establishment of forest roads more difficult and costly (or even impossible, if the neighboring forest owner is not interested in forest roads), and on the other hand many individual forest owners are not interested in using their forests as a source of income. As a result, in average less than 50 % of the annual increment are harvested in Lower Styria, whereas in Upper Styria more than 2/3 of the annual increment are used with forest businesses or large scale forest owners exploiting up to 90 % of the annual increment (Oberwimmer et al. 2010).

Although there is a huge potential for timber utilisation in Styria´s small-scale forests, only a small amount of the annual increment is used. This is mainly due the low wood mobilization rate in privately owned small-scale forests (Rauch and Gronalt 2005). One reason for the low timber

mobilization are structural disadvantages in small-scale forests such as a weak marketing position, low timber volumes per owner, lack of forest management knowledge, difficulties in promotion and low machine utilization ratio (Kar 1974). Increasing harvesting cost and lack of time for wood harvesting as well as aging forest owners also lead to low timber mobilization rates (Bolkesjo and Baardsen 2002; Suda and Warkotsch 2002). On the other hand, more and more people who don´t have any knowledge or experience in forestry are becoming forest owners because of structural changes in society. These owners often see forests as a place for recreation or to spend their spare time in (Hogl et al. 2003).

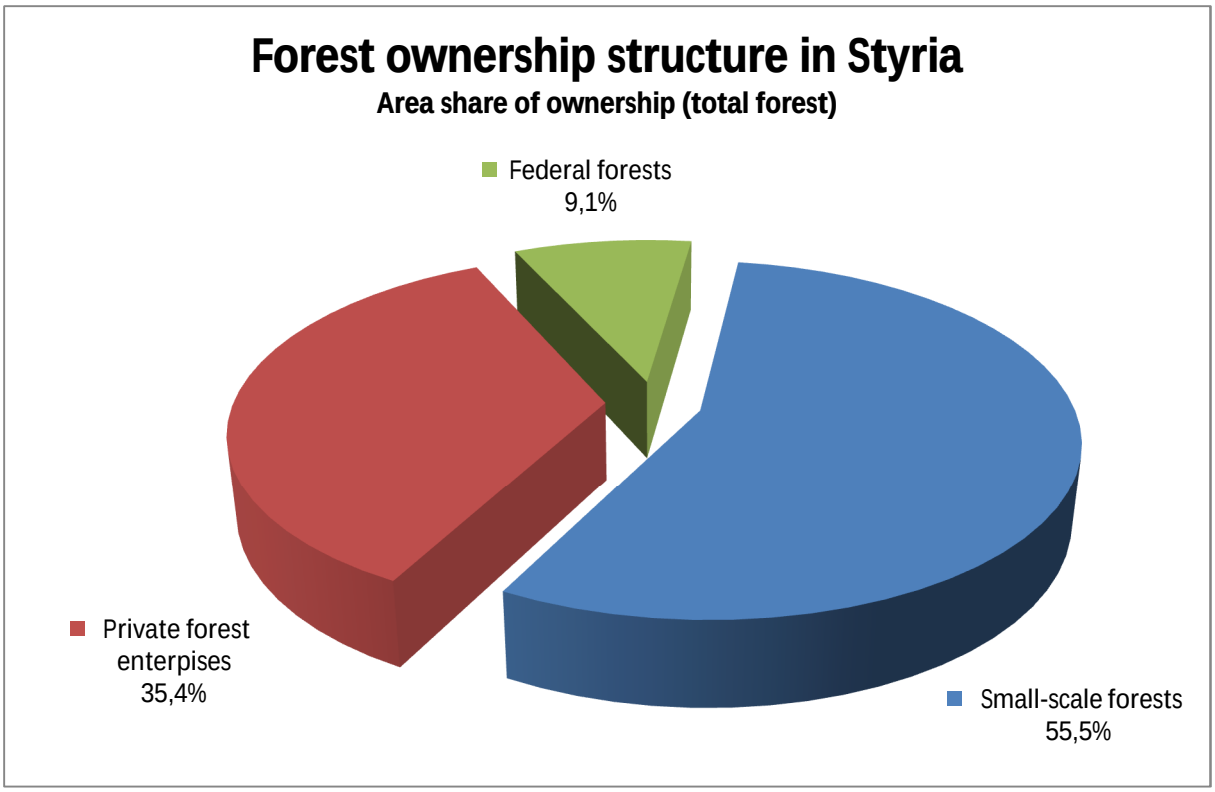


Figure 2: Forest ownership structure in Styria **Source: BFW 2011**

2.4 Forest owner cooperations (FOCs)

In order to overcome a number of disadvantages of small-scale forest owners (e.g. lack of market information and know-how regarding silviculture, inefficient harvest equipment, lower round wood prices for small log volumes, etc.), to tackle the structural change in the wood industry (mergers and acquisitions in the sawmilling and pulp industry) and to ensure a reasonable rural livelihood, the Chamber of Agriculture encouraged their members to establish forest owner associations in the early 90s (Oberwimmer et al. 2010).

Nowadays eleven regional forest associations in total exist, covering all Styrian districts. Waldverband Steiermark acts as the umbrella organization of these associations. Currently, about 27 % of all forest owners are members of Waldverband Steiermark. However, these 27 % forest owners provide 44 % of marketable round wood in Styria. Furthermore, in comparison to non-members a much higher percentage of the annual increment is used (Oberwimmer et al. 2010).

3 Biomass resources

As mentioned above, Styria has a long tradition in woody biomass use from forestry, which is still the main source for solid biofuels, although other resources are utilized as well. In Austria, 80 % of the solid biomass used for energy production stem from wood respectively forest biomass, while agriculture provides about 10 % of the biomass for energetic use.

3.1 Forest biomass

The total wood stock in Styria amounts to about 303 mio. m³ which equals 352 m³/ha. 85 % of the stocks are coniferous woods while 15 % are broad leafed woods (see Figure 3). The main tree species in Styria is spruce. The annual increment is about 8,2 mio. m³ in total or 9,4 m³/ha. About 64 % of Styria´s stocks of 303 mio. m³ are standing in small scale forests (BFW 2011).

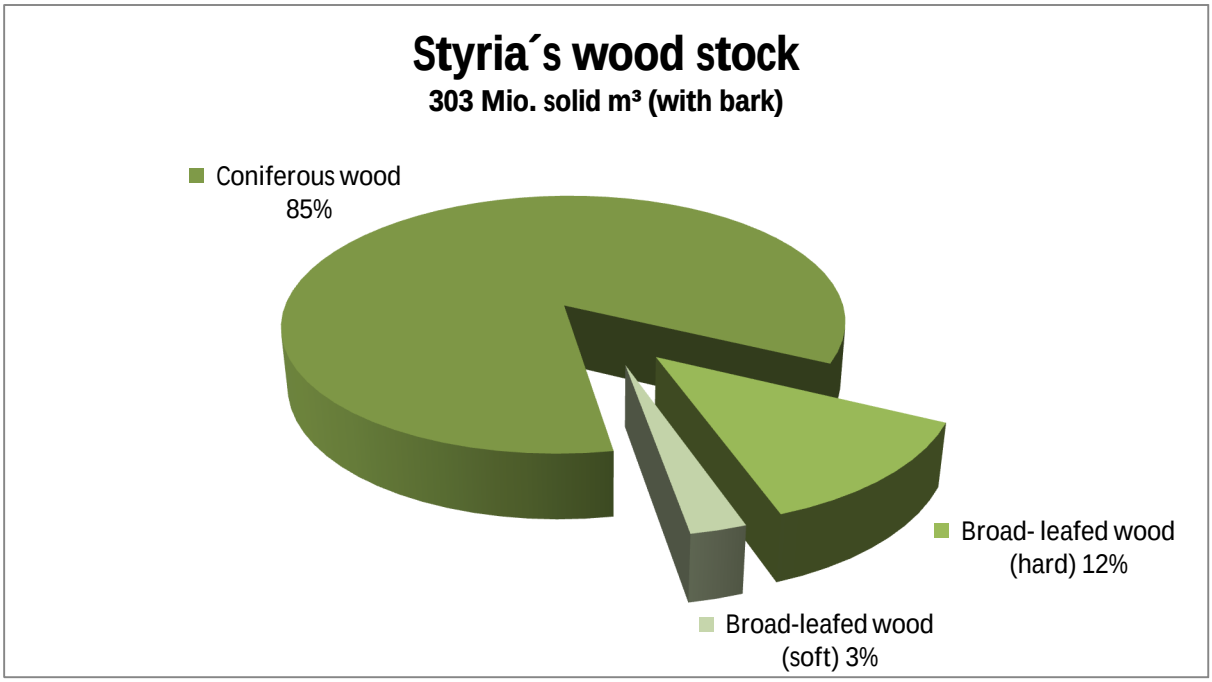


Figure 3: Wood stock in Styria **Source: BFW 2011**

In Styria, about 5 mio. solid m³ are harvested per year, which equals 90 % of the overall annual increment. In small-scale forests, about 78 % of the increment are harvested. About 21 % of the harvested timber is used for energy production (see Figure 4).

Rauch (2013) calculated the potential amount of wood that could additionally be harvested in Austria´s forests for energetic use, considering the mobilization rate, competition between the energetic sector and the wood processing industry as well as technical and economic feasibility. The calculation is based on a calculation model by Gronalt and Rauch (2007). The results for Styria showed that the theoretical potential amounts to 887 600 solid m³ of forest biomass per year. Considering the increasing demand and the competition between energetic and material use as well as competition through newly built heating plants, the freely available, technically and economically feasible potential under competition amounts to 98 700 solid m³.

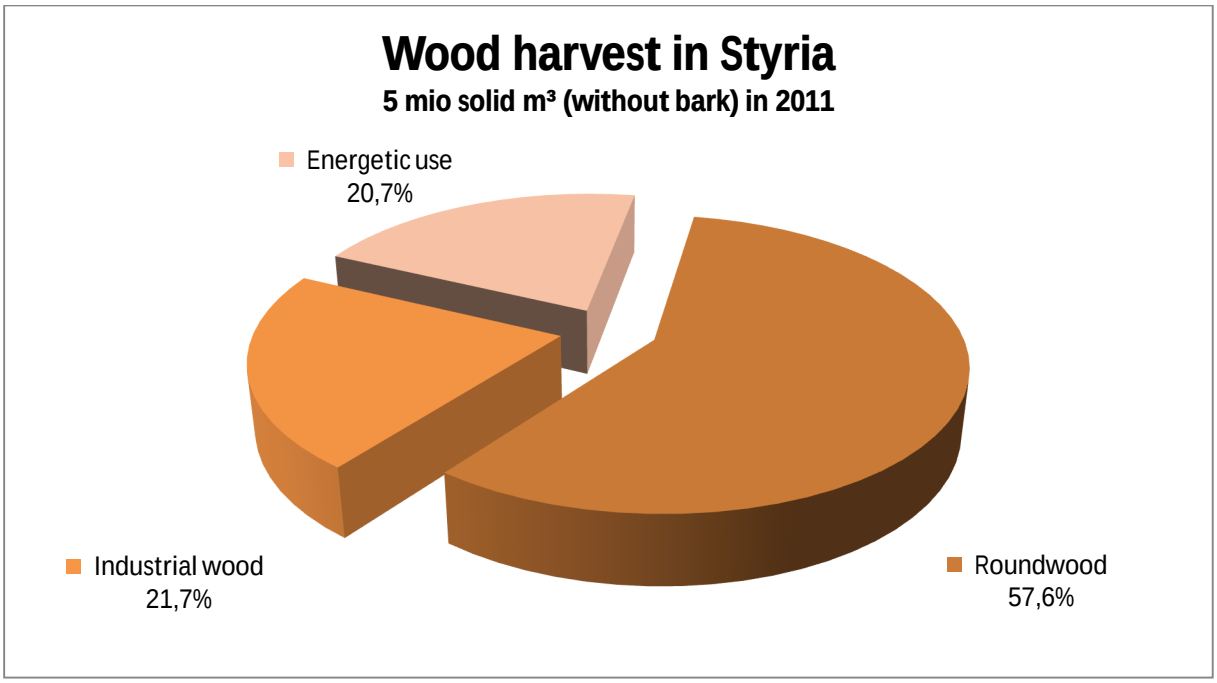


Figure 4: Annual wood harvest in Styria **Source: BMLFUW 2012**

3.2 Short-rotation coppice

According to Statistik Austria (2012a), a total area of 1 335 ha of short rotation coppice existed in Austria in 2011. The main tree species used are poplar and willow, rotation time reaches from two to ten years (Tretter and Lang 2010).

Currently there are only about 320 ha of short-rotation areas in Styria (Deim 2011). However, the potential area that could be theoretically used for short-rotation plantations in Styria is estimated to about 17 000 ha (Tretter and Lang 2010), while the realistic potential is significantly lower and is estimated to about 5 000 – 8 000 ha (Metschina 2012). The yield of short-rotation plantations is in the range of 15 – 20 t biomass per year and ha (8-12 t dry matter) under good conditions (Tretter and Lang 2010).

3.3 Wood residues

The long tradition of forestry and woodworking industry also lead to a multitude of sawmills scattered over Austria. The residues that come as a byproduct in these sawmills provide the raw material for wood pellets as well as for wood fiber and chip boards (Steiner and Pichler 2009). Sawmill residues can also be directly used for energy production, for example in CHP plants.

According to Jonas (2003) no additional potential of wood residues is available for energetic use in Austria, as residues are already used to the full extent, either for material or energy purposes.

3.4 Agricultural biomass

In contrast to wood, solid agricultural biomass has rarely been used for energy production in Styria. Due to the fact that wood harvesting cannot be increased infinitely, energetic use of agricultural biomass could gain more importance in the future, mainly in lesser afforested agricultural areas of Styria.

On one hand, residues from agricultural production, like corncobs or straw, could be used for energy purposes. Corncobs can be chipped and used for heating purposes in larger plants, similar to wood chips. About 1,5 t of cobs which contain about 4 500 kWh incur per ha corn. The medium-term potential area for corn in Styria is estimated to 12 000 ha. Another source for agricultural biomass is hey from grasslands under nature protection that is no longer used for animal feeding. This hey could be pelletized and used for heating purposes. The energy per ha grassland is estimated to about 4 000 kWh, the mid-term potential area is estimated to about 3 000 ha (Jauschnegg 2012).

On the other hand, energy plants that are exclusively planted for energetic utilization, for example miscanthus, represent another potential resource. Short to mid-term potential area in Styria is estimated to approximately 600 ha (Jauschnegg 2012).

4 Wood and Biomass use in Styria

4.1 Production and demand of biomass in Styria

4.1.1 Wood chips

In 2011, about 438 000 solid m³ of wood chips have been produced from forest biomass in Styria (Landesstatistik Steiermark 2012). No specific data regarding the quality of the produced wood chips is available, but due to the fact that private households as well as around 50 % of district heating plants and CHP plants in Styria use premium wood chips (Metschina 2013b), mainly wood chips of high quality are produced.

4.1.2 Firewood

The 2011 production of firewood logs amounted to about 598 000 solid m³ in Styria, which is used for the heat generation in over 100 000 Styrian households (Landesstatistik Steiermark 2012; Gach et al. 2011).

4.1.3 Pellets

Austria´s pellet market has been continuously growing since the mid-90s and has reached a highly developed level regarding pellet quality as well as the quality of the heating devices (boilers, stoves). The pellet consumption market is mainly confined to the residential heating sector, the main heating device for pellets being automatically stocked pellet boilers with a heat output of up to 50 kW (Steiner and Pichler 2009).

Austria´s pellet market is characterised by its local nature, which means that there are no long transports of raw material to the pellet plants and of the pellets to the end consumers. In Austria a well-established home market for pellets exists. Nevertheless the production capacity of the pellet plants exceeds the national consumption, which leads to trade flows between Austria and the neighboring countries, mainly Italy, Germany and Switzerland (Steiner and Pichler 2009; proPellets Austria 2013b).

According to Statistik Austria (2012b), almost 213 000 t of pellets were produced in five Styrian pellet plants in 2011. About 160 500 t (~75 %) of 2011´s production were exported, while on the other hand 133 100 t of pellets were imported. Styria´s pellet consumption was around 116 000 t respectively 55 % of the inland production in 2011.

In contrast to the data from Statistik Austria, interviews with three Styrian pellet producers showed that only 5-35 % of the annual production are exported. Further research would be needed in this respect, as it is yet unclear where the discrepancy in export data stems from.

The total number of installed pellet boilers in Styria amounted to about 14 800 in 2011 (proPellets Austria 2012).

4.2 Energetic use of Biomass

About 128 500 Styrian households (25 %) are directly heated with woody biomass: 104 500 households use firewood, 12 000 households are equipped with pellet heating systems and 12 000 households are heated with premium wood chips. In addition, 45 000 Styrian households are indirectly heated by 550 district heating plants, which means that 35 % of the Styrian households are heated with solid biomass (Gach et al. 2011).

According to Metschina (2013b), 657 district heating plants exist in Styria nowadays. 490 are district heating plants up to 400 kW thermal power, 95 plants are in the range between 400 kW and 1 MW and 72 plants have a thermal output larger than 1 MW. In addition, 16 CHP (combined heat and power) plants using woody biomass exist in Styria.

Overall biomass use for energetic purposes in Styria amounts to about 7,3 mio. bulk m³, (which equals about 3,5 mio. solid m³). 2,7 mio. bulk m³ (wood chips, bark, sawmill residues) are used in heating plants >1 MW thermal output and CHP plants, 1,4 mio. bulk m³ are used in the form of firewood logs in private heating systems, 2,1 mio. bulk m³ are used as premium wood chips in private households and around 560 000 bulk m³ are used as wood pellets in private pellet boilers/stoves (see Figure 5) (Metschina 2013b).

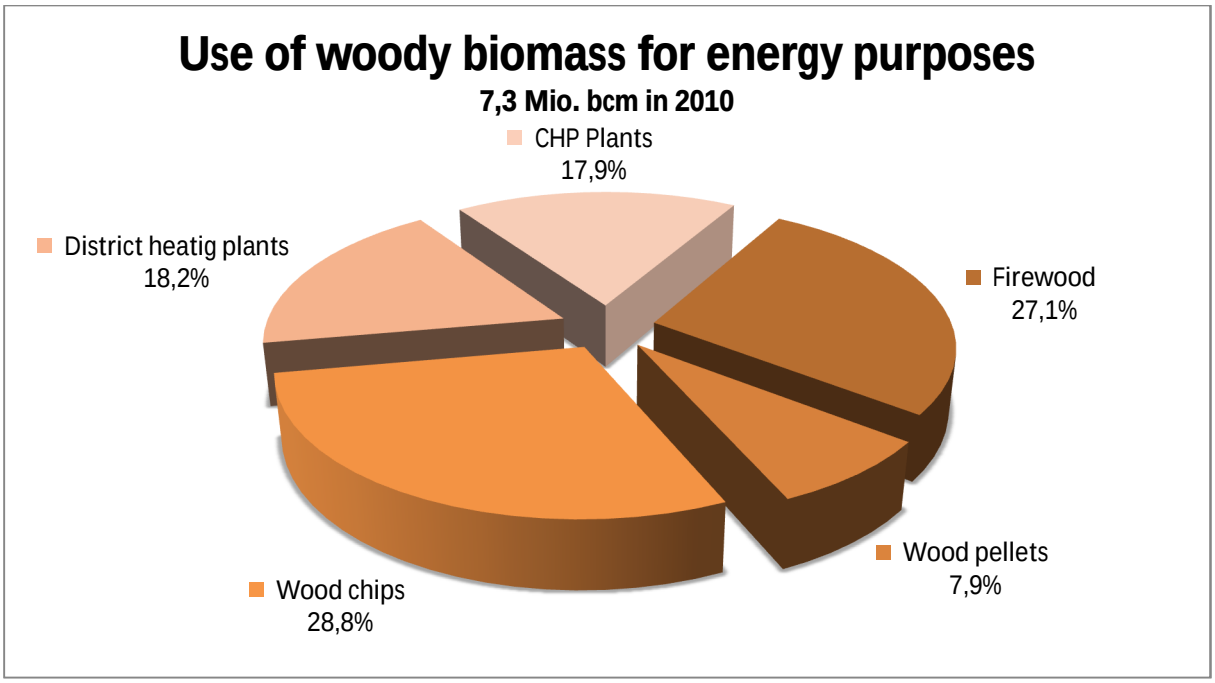


Figure 5: Energetic use of biomass in Styria in 2010 **Source: LK Steiermark 2011**

4.3 Costs of solid biofuels

4.3.1 Price for wood chips

Pricing of wood chips depends on a number of different factors, such as wood species, water content and grain size. Also, wood chips can either be traded in bulk m³, in kWh or by weight (in t or t dry matter) and therefore, prices can differ substantially between different traders. In addition, the market for wood chips and also firewood is known for its regional and informal character, as many Styrian forest owners produce wood chips and firewood themselves and often sell them under the actual market price.

Raw material prices, in this case for industrial log wood, substantially depend on the price for pulp wood which is used in the paper and pulp industry. Due to increasing demand for biomass, competition between material and energetic use of wood has risen and lead to increasing prices. The price for wood chips also depends on the total number of fellings: energy wood usually incurs as a by-product, which means if a larger amount of timber is harvested, also a larger amount of energy wood incurs which leads to lower prices. Wind throw and bark beetle calamities have a similar effect as they also lead to a higher amount of energy wood on the market. Weather conditions in winter also play an important role: while cold winters can lead to raw material shortages and higher prices, particularly mild winters may lead to an oversupply (Handlos 2013).

The Austrian Biomass Association publishes a comparison between average prices of different renewable (wood chips, firewood, pellets) and non-renewable energy carriers online on a monthly basis. In March 2013, the average price for wood chips in Austria was 3,56 €/kWh (Österreichischer Biomasse-Verband 2013b).

According to Waldverband Steiermark (2013), prices for wood chips reached from 77 to 105 €/t dry matter in February 2013 in Styria.

4.3.2 Price for wood pellets

In contrast to wood chips, the pellet market is much more transparent due to the fact that pellets are a clearly standardized product which consists almost solely of sawmill residues from spruce and is only traded in t in Austria.

ProPellets Austria calculates average Austrian pellet prices on a monthly basis for loose and bagged pellets for private customers as well as prices for loose pellets for industrial customers (purchases > 17 t). Prices are published every month under http://www.propellets.at/en/pellet-prices/. The current price (April 2013) for loose pellets for private customers is 240,08 €/t Pellets (proPellets Austria 2013a).

Arbeiterkammer Steiermark (2013) also collects prices for loose pellets in Styria on a monthly basis by contacting Styrian pellet dealers and publishes the results online. One t of pellets cost 235,20 € on average in April 2013 in Styria.

4.4 Technical standards for solid biofuels

Numerous technical standards regarding the characteristics of solid biomass for energetic use exist on European as well as on national level. The most important standard in the European context regarding the characteristics of solid biofuels is EN 14961 "Solid Biofuels – Fuel specifications and classes" which consists of six parts. Besides the general part which classifies the origin and quality of raw materials used for the production of biofuels, the standard specifies the characteristics of wood pellets, wood briquettes, wood chips, firewood and non-woody pellets in separate parts. Therefore, EN 14961 sets EU-wide quality standards for solid biofuels for the first time (Metschina 2013a).

4.4.1 Standards for wood chips

Relevant standards for wood chips are EN 14961 part 1 "General Requirements", as well as part 4 "Wood chips for non-industrial use" which replaced the Austrian standard ÖNORM M 7133 "Chipped wood for energetic purposes - Requirements and test specifications". The most important product parameters of wood chips specified in these standards are moisture and ash content, bulk density and net calorific value. EN 14961-4 specifies four different quality classes for wood chips: A1, A2, B1 and B2. A1 is the highest quality class which ensures that only virgin wood is used as raw material and guarantees a maximum water content of 25 %, a maximum ash content of 1 % as well as a defined grain size. Class A2 wood chips mainly differ in regard to a higher water and ash content while class B1/B2 wood chips may also be made from different raw materials such as industrial wood, short-rotation coppice and used wood (Alkangas 2010).

As a supplement to EN 14961, ÖNORM C 4005 "Wood chips and hog fuel for energetic use in heating appliances with a thermal output over 500 kW — Requirements and test methods" was implemented in 2013 for large-scale applications in Austria (Metschina 2013a; Umweltbundesamt 2012).

4.4.2 Standards for wood pellets

For wood pellets, besides EN 14961-1, part 2 “Wood pellets for non-industrial use” applies on EU-level. Relevant standards on national level are ÖNORM M 7135 “Compressed wood or compressed bark in natural state - Pellets and briquettes -Requirements and test specifications”, M 7136 “Compressed wood in natural state – Woodpellets – Quality assurance in the field of logistics of transport and storage” and M 7137 “Compressed wood in natural state – Woodpellets – Requirements for storage of pellets at the ultimate consumer” (Umweltbundesamt 2012).

Similar to wood chips, EN 14961-2 specifies quality classes A1, A2 and B for wood pellets. A1 is the highest quality class and suited for the use in small furnaces in private households. Class B designates pellets for industrial use in large furnaces, and therefore a defined standard for industrial pellets exists for the first time on a European basis.

4.4.3 Conversion factors

The national standard ÖNORM M 7132 specifies factors for the conversion between different volumes of various biofuel assortments. These factors are guiding values and allow the conversion from solid to bulk cubic meters (Österreichisches Normungsinstitut 1998). The Federal Ministry of Agriculture, Forestry, Environment and Water (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft) provides conversion factors for the conversion between volume, weight, dry matter as well as energy content of different biomass assortments. These factors are also available in the form of an Excel-Sheet, which also allows for easy price calculation (Hagauer et al. 2009). The Austrian cooperation platform for forestry, wood and paper (FHP 2007) also provides factors based on ÖNORM M 7132 and M 7133 for the conversion between different biomass assortments.

5 Forest infrastructure and logistics

5.1 Forest road infrastructure

Styria has one of the tightest forest road networks in Austria with 55 m/ha on average. According to Mr. Luidold (Forest Chapter of the Chamber of Agriculture Styria 2008) the total length of the forest road network amounts to 55 000-60 000 km, of which 43 000 km can be navigated with trucks. The most common forest road widths are 2-3 m (54 %) and 3-5 m (41 %). The majority of the forest roads are paved with gravel or broken stone (approx. 70 %). Additionally, Styria has approx. 34 500 km of skid trails (small tracks in the forest primarily used to get the wood out of the forest) (National Forest Inventory 1996). In areas with steep slopes the density of forest roads is higher due to the use of less mechanized harvesting techniques. This regards especially areas in Upper Styria. On the other hand, Lower Styria shows a much lower forest road density for reasons already outlined before. The establishment of new forest roads is still not finished in Styria (Oberwimmer et al. 2010).

Despite all statistics available and the annual investments made in new forest roads and in the maintenance of existing ones, no data at all exists regarding forest road attributes like weight limit, max. truck length, accessible with/without trailer, max. inclination, curve radius, etc. However, this

missing information would be crucial for a holistic supply chain with an efficient planning and routing of transport capacities and truck equipment (Oberwimmer et al. 2010).

5.2 Biomass supply chain

Three different supply chains have been analysed for Styria In the scope of the FOROPA-Project. Detailed process models of each chain, as well as corresponding SWOT analyses, can be found in the annex.

5.2.1 Actors in the supply chain

The following actors are involved in the traditional Styrian wood logistics chain (Oberwimmer et al. 2010):

- small/medium/large scale forest owner or forest enterprise
- logging and hauling company
- transport company
- primary wood processor (sawmill, pulp industry, energy conversion)
- secondary wood processor (timber merchant/builder/carpenter)
- consumer

Regarding the logistics for biomass for energetic use, additional actors such as chipping companies, pellet plants or biomass trade centers are involved, depending on the actual chain.

5.2.2 Chain 1: premium wood chips

This chain (Figure 6) focuses on the production and distribution of high quality wood chips which are produced entirely from stem wood and are well-suited for the use in small-scale furnaces in private households. The first step in this chain is the harvesting of biomass, in this case in the form of log wood of lower quality that is not suited for the use in sawmills. Harvesting can either be carried out by the forest owner himself or a logging company. In the next step, log wood is transported to a Biomass Trade Center, where it is stored in the form of wood logs to reach low moisture content. The wood is then chipped and stored at the Biomass Trade Center. After customer order, wood chips are transported to the customer. Transport is either organized by the Biomass Trade Center or carried out through the center itself.

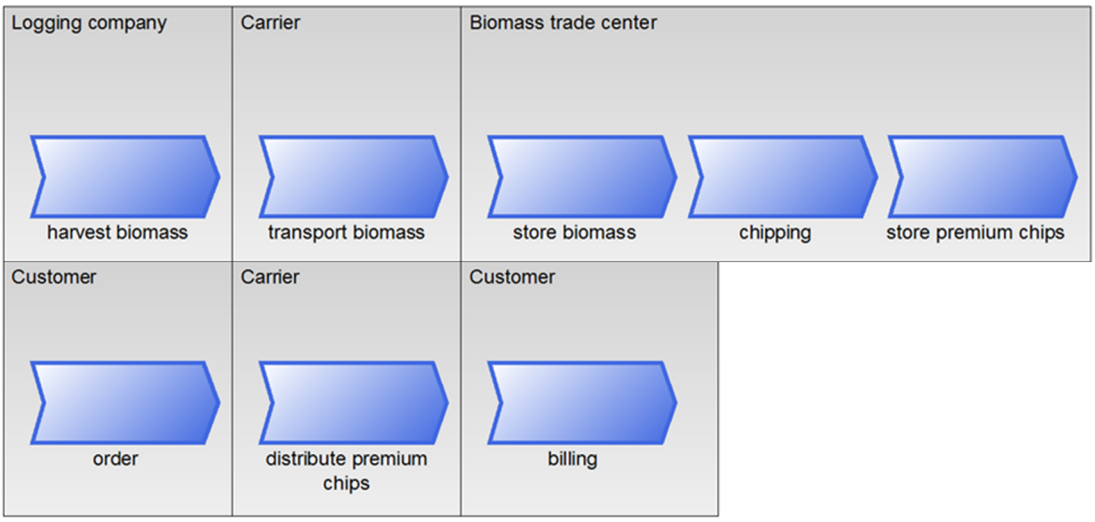


Figure 6: Supply chain for premium wood chips

5.2.3 Chain 2: wood chips from slash

The second chain (Figure 7) deals with wood chips made from slash (branches, leafs, tree tops etc.) which is a byproduct of wood harvesting. These chips are of lower quality than premium chips and can only be used in larger furnaces, mostly medium to large-scale power plants. In the first step, wood is harvested and the whole trees transported to a forest road by cable crane where they are de-limbed and cut to length. Slash in form of branches and tree tops is ideally stored in piles at the roadside, which allows for easier chipping. In the next step, the slash is chipped by a chipping company, either on the floor or directly into the transport vehicle. The wood chips are then transported to the customer. Alternatively, slash can also be dealt through Biomass Trade Centers as shown in the chain for premium wood chips.

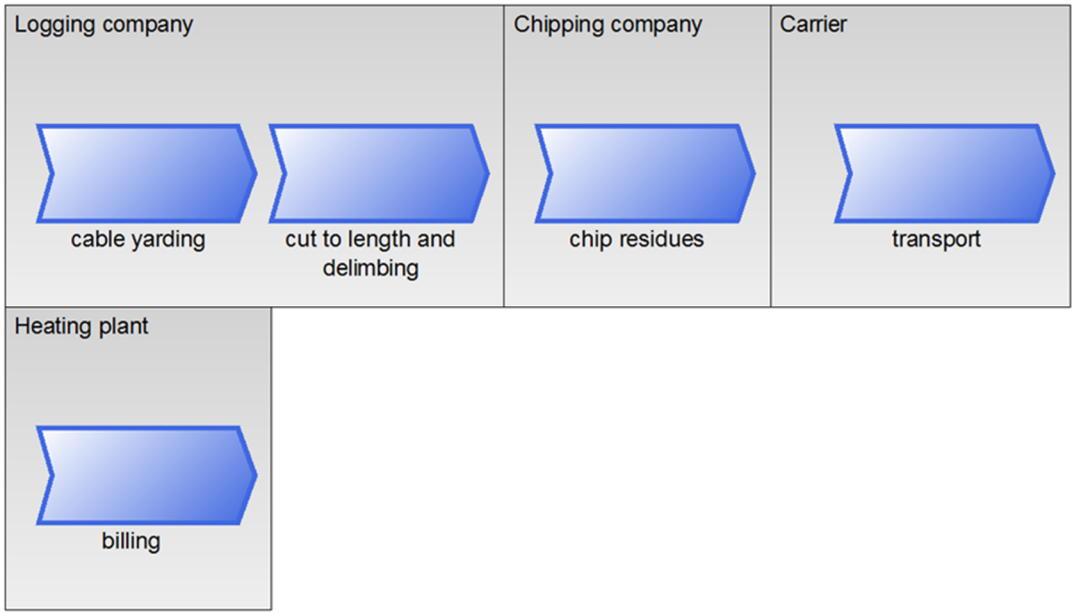


Figure 7: Supply chain for wood chips from slash

5.2.4 Chain 3: wood pellets

The third chain (Figure 8) deals with the production and distribution of wood pellets. Currently, only high quality pellets that can be used in small-scale pellet furnaces/stoves are produced in Austria. Pellet plants are usually located directly at sawmills in Austria, were saw dust and wood shavings, which are the main resources for pellet production, incur as a byproduct and are usually transported online by means of pipelines or high pressure air-blowers to the pellet plant. After the order is placed by a customer, pellets are loaded into a silo truck and transported directly to the customer. Transport can be carried out by the pellet producer himself or a carrier. If the producer is not selling directly, transport, as well as intermediate storage, can also be carried out through an external pellet trader.

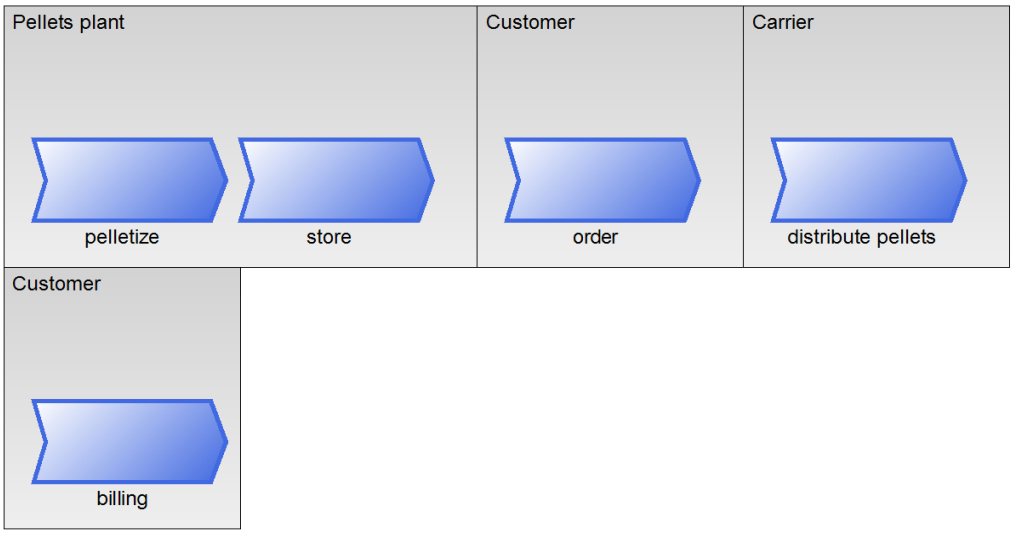


Figure 8: Supply chain for wood pellets

6 Stakeholders

The following stakeholders play an important role in the production, distribution and promotion of renewable energies, especially biomass, in Styria respectively in Austria.

6.1 Stakeholders in Styria

6.1.1 Waldverband Steiermark

Waldverband Steiermark acts as umbrella organization of over 50 already well-established local FOCs, which on the other hand are united in eleven regional forest associations, which cover all Styrian districts. Waldverband Steiermark was founded in 1990 and counts about 12 800 members who own about 160 000 ha of forest altogether. The regional associations act as contact for local members of Wadlverband, which allows for direct contact along the value chain. The main tasks of Waldverband Steiermark are member support, administration and coordination of public relation activities (Waldverband Steiermark; Oberwimmer et al. 2010).

Operative tasks, such purchasing and selling roundwood, are carried out through Waldverband Steiermark as well. It is one of the most important sales companies in the Styrian wood market, trading over 800 000 solid m³ per year. In addition to timber marketing, Waldverband Steiermark also offers different forest management services (Waldverband Steiermark; Oberwimmer et al. 2010).

6.1.2 Landwirtschaftskammer Steiermark (Chamber of agriculture Styria)

The chamber of agriculture is the legal interest group for farmers and people employed in forestry. Nine chambers, one for each federal country, exist in Austria. The main tasks of the chamber are the promotion of ecological and agricultural initiatives as well as support and permanent education of its members (LK Österreich 2012).

6.1.3 Biomass Trade Centers

The so-called Biomass Trade Centers play an important role in the Styrian biomass supply chain. The concept behind these trading centers is the local marketing and distribution of forest biomass from small-scale forests owned by farmers/families. In total, eight biomass centers exist in the different regions of Styria. The main assortments of biomass traded by these centers are firewood and wood chips. Not every center holds all these assortments while others also offer additional assortments like wood pellets or agricultural residues. For more information see http://www.biomassehof-stmk.at/ (Waldverband Steiermark Verein 2010).

6.2 National stakeholders

6.2.1 Österreichischer Biomasse-Verband (Austrian Biomass Association)

The focus of the Austrian Biomass Association is lobbying, promotion and information with respect to renewables with focus on biomass. The clear objective is to reach the complete transition to renewable energies, particularly through the increased use of biomass (Östereichischer Biomasse-Verband 2013a).

6.2.2 proPellets Austria

proPellets Austria is a network of the Austrian wood pellet industry with the aim to contribute to the energy transition in the heating sector and to reduce the dependency on fossil fuels by spreading pellet heating systems. Members of proPellets are pellet producers, pellet dealers and pellet boiler/stove manufacturers as well as actors that are otherwise involved in the industry (proPellets Austria 2012).

6.2.3 Austrian Energy Agency (AEA)

The Austrian Energy Agency is an energy research and policy institution in which the federal and the provincial administration and important institutions and corporations from a variety of economic sectors cooperate. AEA prepares the ground for decisions in politics, public administration and the industry with detailed research and by highlighting important dependencies and connections

between topics. It implements national and international projects and programs, provides targeted information campaigns and PR work, and develops strategies for sustainable concepts (AEA 2012).

7 Future biomass demand

The Styrian energy policy is embedded in the European energy and climate protection strategy. According to the agreed triple goals of the 2020 strategy of the EC, the measures of the Styrian Energy Plan 2005-2015 and the Energy Strategy 2025 are committed to the following targets:

- Share of renewables of 34 % on the gross consumption until 2020
- Increase in energy efficiency by 20 % until 2020
- Reduction of greenhouse gas emissions by 20 % until 2020

Between 2005 and 2010, the share of renewables on the overall energy consumption climbed from 23,4 % to 28 % in Styria. Based on these figures it is expected that the goal of 34 % should be reachable until 2020. The current energy plan prioritizes hydro energy in comparison to other renewables (Oberwimmer 2010).

Based on the energy demand derived from the dynamic development of biomass heating plants in the last decades, a study estimated an additional demand of woody biomass of approx. 1 mio. solid m³ in 2010 and 2 mio. solid m³ in 2020 compared to the base year of 2005 in Styria. According to this study, about 1 mio. solid m³ of energy wood can be supplied by an increased utilization of the annual increment. However, other sources of energy wood must be tapped to supply the additional amount of 1 mio. solid m³ until 2020. These additional sources may comprise the use of landscape residues, recycled wood, and energy wood plantations. Figure 9 gives an overview of the current demand and the forecast until 2020 for biomass by heating system. The figure shows that the largest demand will be for wood chips with approx. 2,1 mio. solid m³ in 2020. The demand for pellets will increase to approx. 600 000 solid m³ and about 1,2 mio. solid m³ of biomass will be consumed by CHP-plants. The market for fire wood is expected drop to 1 mio. solid m³ in 2020 (Oberwimmer 2010).

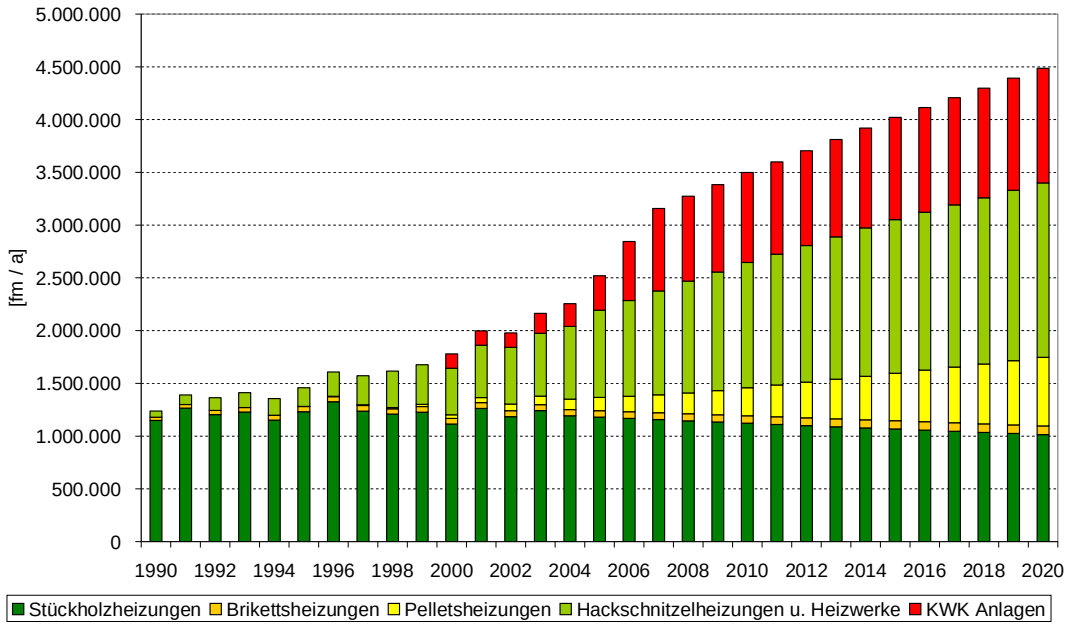


Figure 9: Forecast of biomass demand by heating system in Styria Source: LK Steiermark

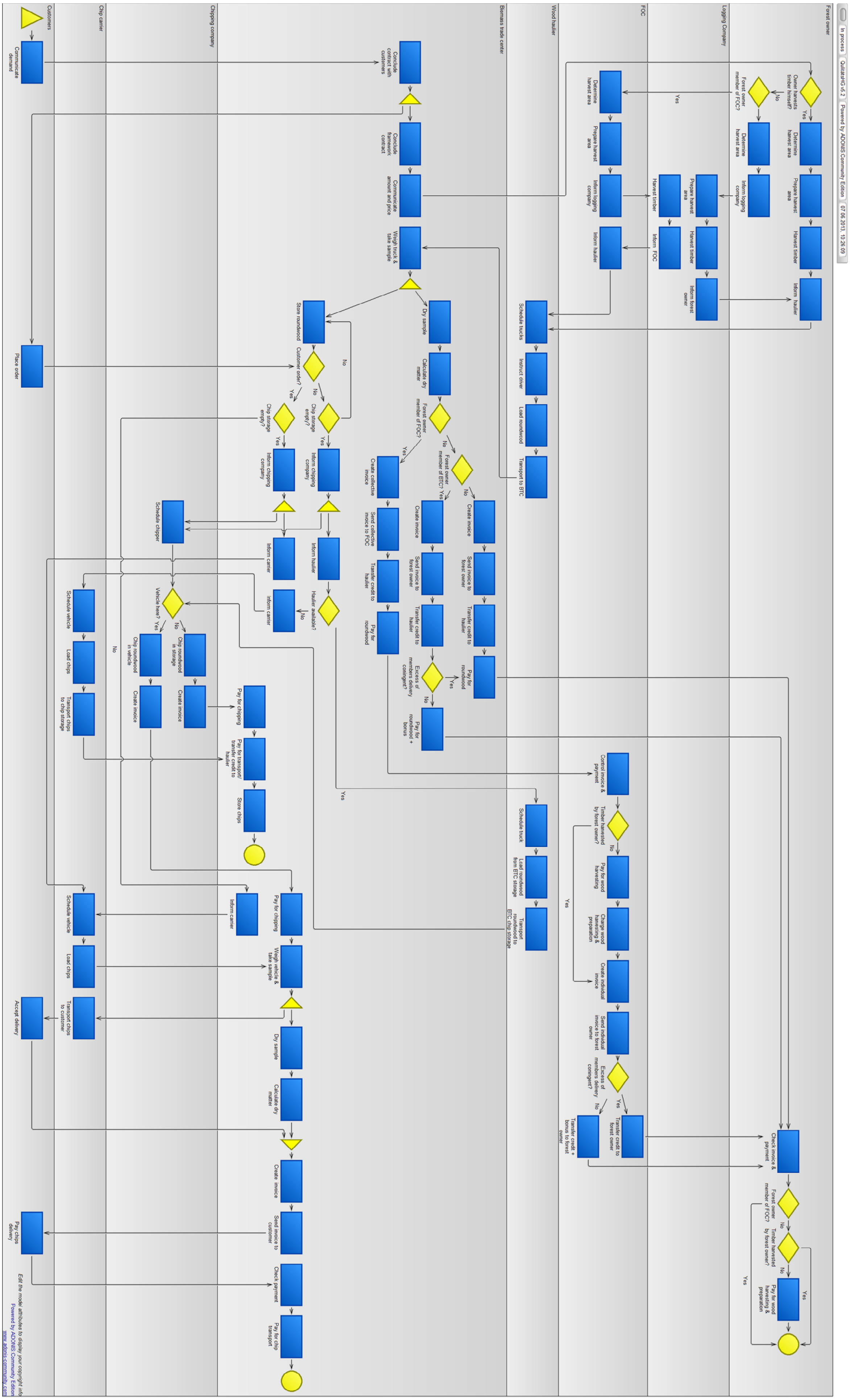
8 Annex

8.1 Annex 1: regional SWOTs

Results of the SWOT analyses, internal and external issues characterising the supply chain for premium wood chips in Styria

Internal strengths	**Internal weaknesses**
S1. High quality of the produced wood chips S2. Short transport routes S3. Good delivery/customer service S4. Cooperation between FOC and biomass trade centers S5. Utilisation of otherwise not marketable timber qualities S6. Direct customer contact	W1. High feedstock costs delivered to plant W2. Information deficits and lack of coordination in the supply chain W3. Feedstock supply depends on weather conditions W4. Low capital adequacy of biomass trade centers W5. Difficulties to communicate differentiation value (higher price for quality wood chips) W6. Biomass trade centers don´t have fixed opening hours W7. Lack of cooperation between different biomass trade centers W8. Low use of intelligent ICT in the supply chain
External opportunities	**External threats**
O1. Trend towards biomass heating systems O2. Decrease of timber import potentials O3. High regional biomass resource potentials O4. Growing ecological attitude of government and society O5. New customer groups (e.g. wood gas HP)	T1. Increasing feedstock price T2. Increasing competition through service providers and imports T3. Restrictive capital market T4. Seasonal demand and short-term orders of wood chips T5. Low market availability of biomass potentials T6. Changes in support policies

8.2 Annex 2: Process Models


Forest owner
Logging Company
FOC
Wood haulier
Biomass trade center
Chipping company
Chip carrier
Customers

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