





Regional Profile of the Biomass Sector in South Tyrol, Italy

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1 Introduction

The province of Bolzano-Bozen is located at the northernmost point in Italy. The province is bordered by Austria to the east and north, specifically by the Austrian states Tyrol and Salzburg, and by Switzerland (canton of Grisons) to the west. The Italian provinces of Belluno, Trento, and Sondrio border to the southeast, south, and southwest, respectively. Entirely located in the Alps, the province's landscape is dominated by mountains. The highest peak is the Ortler (3,905 m) in the far west, which is also the highest peak in the Eastern Alps outside the Bernina range. Even more famous are the craggy peaks of the Dolomites in the eastern part of the region. The landscape itself is mostly cultivated with different types of shrubs and forests.

The Province of Bolzano-Bozen, also referred to as Alto Adige or South Tyrol, is an autonomous province. It is one of the two provinces that make up the region of Trentino-Alto Adige/Südtirol, which is itself an autonomous region. The official names include the information that the province is autonomous. Unlike all other provinces of Italy, Bolzano-Bozen is granted a considerable level of self-government, consisting of a large range of exclusive legislative powers and a fiscal regime.



Figure 1: Map of South Tyrol (I) Source: <u>http://gis2.provinz.bz.it/geobrowser</u>, 01.05.2013

The province has an area of 7,400 square kilometres and a total population of approx. 500,000 inhabitants. Its capital is the city of Bolzano (German: Bozen; Ladin: Balsan or Bulsan). The majority of the population speaks an Austro-Bavarian dialect of German. About a quarter is Italian-speaking and a small minority speaks Ladin as their mother language. In the wider context of the EU, the province is one of the three members of the Euroregion of Tyrol-South Tyrol-Trentino, which corresponds nearly exactly to the historical region of Tyrol.

In terms of GDP per capital the province of Bolzano is the richest region of Italy. The majority of people are employed in a variety of sectors, from agriculture – the province is a large producer of apples, its wines are also well known – to industry and services, especially tourism. The unemployment level in 2012 was 4.1 %.

2 Condition and structure of regional forests

South Tyrol has got an overall forest area of 336.689 ha which makes up approx. 45,5% of the total land area. The total inventory stock, according to the last investigation by the regional forest department, is more than 105,000,000 solid cubic meters (scm). This results in an average stock of approx. 310 scm per ha. The annual growth, counting all diameters above 5 cm, is calculated with 1,85 million solid cubic meters, leading to an average growth of 5,5 scm per ha.

In South Tyrol, every tree to be harvested must be authorized

by the forest department and tagged by the foresters. The average amount tagged over the past five years (2008-2012) is 660.000 solid cubic meters, whilst the amount harvested is slightly lower with 635.000 scm. In the chart below can be seen that the total amount harvested has been constantly increased from 2008 to 2011 whilst in 2012 the first time for several years the amount has dropped.





Table 1: Amounts of wood tagged and harvested

The biggest part of the South Tyrolian forests is characterized by softwood, only two percent are hardwood. The predominant tree species is spruce with about 60% of the overall amount, followed by the larch (19%) and pine (10%).





In terms of harvesting method, the floor cable pull is the most used practice. In very steep terrain, skyline cranes are used. Horses, log-lines and helicopters are only rarely used, mostly for special applications.



Figure 3: Distribution of harvesting method in South Tyrol (I) in 2012 Source: <u>http://www.provinz.bz.it/forst/wald-holz-almen</u>; 01.05.2013

Forest laws build the basis for its sustainability. More than 90% of the forest and hydro-geologic area are under restricted use, defined in the province forest law (Landesgesetz LG 21/96). The goal of these laws is:

- To maintain the ecosystem,
- To protect the soil,
- To protect the water drainage,
- To use the forests and pasture land in a sustainable way,
- To preserve the flora and the fauna,
- And to protect the environment against damage in dangerous areas.

In South Tyrol, forests exceeding 100 ha must be managed according to the forest treatment plan in the province forest law, independent of the ownership. Subject of this plan is to get information about tree population and tree stock and to investigate regarding the forests function, productivity, growth, stability and sustainability. These forests mostly belong to corporation.

For forests below 100 ha size a so called 'forest register' has been established which manages their cultivation and use. It is used as a basis and an easier way to get the necessary information and is also used for felling authorizations.

Both the forest treatment plan and the forest register are valid for 10 years before they have to be renewed and are important instruments for a sustainable management.

2.1 Geography and topography

Located in the middle of the Alps, South Tyrol is a mostly mountainous region. The territory is characterized by high mountains and steep slopes. 75% of the total forest area lies between 1,200 and 2,100 meters of altitude, the declination of the slopes is mostly above 35%, which is the technical limit for the use of harvesters. In 75% of the forest area, highly mechanized harvesting methods are not possible, therefore other harvesting techniques are necessary (e.g. sky cranes, chain saw, tractor).



Forest altitude levels

Height above mean sea level

Classes of declination of the forest



Quelle: INFC, 2007 - Le stime di superficie - CFS - Ispettorato Generale, CRA - ISAFA, Trento

Quelle: INFC, 2007 – Le stime di superficie - CFS – Ispettorato Generale, CRA - ISAFA, Trento

2.2 Forest condition

The forest condition in 2012 can be considered as good in the whole province. Only about 9% of the forest area has been subject to biotic (e.g. bark beetle, moth, insects) and abiotic defects (e.g. snow pressure, wind throws). The forest condition is the result of a constantly increase of specific forest management issues. Furthermore, the targeted harvesting has led to an increasing quality. In 2012, the positive trend to more harvesting has been continued.

2.3 Forest ownership structure

In South Tyrol, there are more than 21,000 forest owners. Most of the forest belongs to single private owners (more than 18,000) of which most part are farmers. This leads to the fact that the regional association of farmers (Südtiroler Bauernbund, SBB) is the biggest and most important stakeholder (*see 5 Stakeholders*) regarding forest. In terms of property, private owners build the biggest part with more than 50%. Public bodies own 28% whilst private bodies, church and co-ownerships build up only a minor part. For private forest owners like farmers the effort of cutting, transportation and selling often exceeds the economic value. Other private owners use it as financial security and/or are not interested in an economic use of their property.

Figure 4: Forest altitude levels and classes of declination of the forest in South Tyrol (I) Source: <u>http://www.provinz.bz.it/forst/wald-holz-almen;</u> 01.05.2013

Legal position (2013)



Figure 5: Legal position in relation to the overall forest area in South Tyrol (I) in 2013 Source: <u>http://www.provinz.bz.it/forst/wald-holz-almen/eigentumsverhaeltnisse.asp</u>; 01.05.2013

Nr.	%	Forest enterprise size
9.298	40%	Between 0 and 2,5 ha
4.145	18%	Between 2,6 and 5,0 ha
4.021	17%	Between 5,1 and 10,0 ha
4.048	17%	Between 10,1 and 25,0 ha
1.235	5%	Between 25,1 and 50,0 ha
351	2%	Between 50,1 and 100,0ha
142	1%	Between 100,1 and 250,0 ha
52	0,2%	Between 250,1 and 500,0 ha
45	0,2%	Between 500,1 and 1.000,0 ha
28	0,1%	> 1.000,1 ha

Due to the high amount of forest owners, the average forest property is between 3-5 ha. Only very little forest enterprises own more than 50 ha (2,5 %).

Table 2: Forest ownership structure in South Tyrol (I) in 2012

2.4 Forest owner cooperations (FOCs)

At present, there is one forest management association in Mühlwald/Selva dei molini (BZ). It has been founded in 2006 according to examples in Germany and Austria. Nowadays there are 41 members with a total of 1,800 ha of forest land out of 3,000 of the whole community. The harvesting is done by each member himself, whilst the promotion and selling is done in common. From 1997 to 2005 approx. 2,000 solid cubic meter were harvested in the village. From the beginning of the forest management association in 2006 until 2010 more than 5,500 scm were harvested respecting the total amount allowed for harvesting of 6,250 scm. As a result of the common wood promotion and due to bigger lots, also the prize for the round wood could be significantly increased.

3 Biomass resources

3.1 Forest biomass

In South Tyrol there is a substantial potential of biomass from the forest. Exact numbers are not available at this stage, but are under elaboration in ongoing projects and will be provided and added to this report as soon as results are available.

Due to the small scale forest properties and the not existing forest owner associations (see 2.4 forest owner co-operations), innovative forms to satisfy the biomass demand had to be found. A milestone has been in 2010 when the first frame contract between the regional association of farmers (Südtiroler Bauernbund, SBB) and the South Tyrolian energy association (Südtiroler Energieverband, SEV, former Südtiroler Biomasseverband) was established (for a copy see annex 3). In this frame contract, the first of its kind, the DHP's agreed to accept biomass in form of round wood and wood chips from farmers. Besides others peculiarities the type of biomass accepted, the validity of the contract, terms of delivery, prize and amount accepted were defined.

3.2 Short-rotation coppice

At present there are no short rotation coppices in South Tyrol. Due to the mountainous terrain South Tyrol has a very limited usable surface. In first line the available surface is used for population and agricultural production, especially apples and wine (South Tyrol is one of the biggest producers of apples in Europe. It's share on the total European production is about 10%). Another reason is that in a touristic area like South Tyrol, areas are preferably used as grasslands rather than SRC's. However, neither now nor in future short rotation coppices are politically desired.

3.3 Wood residues

An future potential is the harvesting slash (treetops, branches and needles). Due to the increasing mechanized harvesting techniques with the full-tree method (the whole tree is extracted from the forest and transported to a nearby forest road) and the use of sky cranes and processors, the harvesting slash is available in concentrated amounts at the forest road. On one hand this harvesting technique is the reason for intense discussions, especially regarding nutrient removal in shallow terrains, on the other hand the harvesting slash provides a needed resource for wood residues.

Another source for wood residues are the local sawmills. All over South Tyrol, there are approx. 90 sawmills cutting approx. 350,000 solid cubic meters of round-wood. Due to the regional demand for heat and the very dense district heating plant net almost 100% of the available residues are used for energetic use.

Wood residues from further wood working sector e.g. joiners are mostly used for internal heating.

3.4 Agricultural biomass

The high demand of solid biomass and the use of agricultural biomass for district heating plants and private households is from time to time source of discussions on political level. Agricultural biomass mostly derives from apple and wine growing areas. If the plants have been treated with chemical sprays (which they are in most cases), then the biomass is considered as waste and therefore cannot be used for energetic use in DHP's. Some South Tyrolian associations would be interested in a study about the influences of pesticides in the smoke gas, but until now no study could be initiated. The overall amount of yearly available biomass sums up to approx. 130,000 solid cubic meters .

3.5 Other sources (if available)

As another biomass source wooden houses could be taken into account. The constantly increasing amount of wood constructions will lead to an increasing amount of waste wood and increase the actual amount of approx. 90,000 solid cubic meters. Due to actual applied national and regional laws this potential can only be used in waste incinerating plants, although the wood is mostly not treated at all witch chemical products. Maybe in future technical and legislative solutions will be found for the thermal use of untreated waste wood.

4 Wood and Biomass use in South Tyrol (IT)

4.1 Production and demand of biomass in Italy / South Tyrol

In South Tyrol, district heating plants and private households produce approx. 1,287.1 GWh of heat. On the total amount of provided thermal energy, wood holds a share of 23.1%. The demand of woody biomass actually sums up to a total of 1,090,000 solid cubic meters.

Though the information about the biomass and round wood flow in the forestry is very good documented, the track gets lost in the further steps. The mass flux of woody biomass and round wood throughout the following branches like transportation companies, sawmills, joiners, wood construction companies as well as agricultural biomass and other wood processing enterprises is not recorded in any statistics. Target in this area must be the analysis of the overall mass flux for the wood industry delivering answers to the following:

- Overall statistics about the wood industry (incl. location of cut round wood in the forest and wood processing companies filtered by branches => map!)
- amount and value of round wood processed in the region,
- amount, origin and value of round wood imported and exported,
- destinations and source of round wood imported and exported,
- amount and value of energy wood used in the region,
- amount, origin and value of energy wood imported and exported,
- time calculation and registration methods for the wood industry.

4.1.1 Wood chips in district heating plants (DHP)

1994 is the most important year regarding the development of the biomass use in South Tyrol. In this year, the first district heating plant has been going on line (Fernheizwerk Rasen). Now, almost 20 years later, there are 71 DHP's producing 734 GWh of heat and 57.4 GWh of electrical power. The total consumption of woody biomass in DHP's accounts to approx. 580.000 solid cubic meters (scm) or 1,450,000 loose cubic meters (lcm), divided into wood chips, saw dust and bark, all deriving from either local sawmills of from imports.

The biggest amount of woody biomass is processed by trucks with build-on shredder directly at the DHP. Never the less there are several DHP's where only wood chips can be delivered due to missing storage areas.

Two reasons for the high density of DHP's in South Tyrol can be named. One are the public aids and another are the incentives on renewable energy feed-in tariffs. As these incentives are still valid it can be assumed, than the upgrading of the DHP's in terms of electricity production will continue and therefor the biomass demand will still increase in future.

4.1.2 Firewood

The mostly used form of firewood in private households are logs. They sum up to around 80% of the overall amount. For the future it can be expected that this amount will be reduce slightly, on one hand due to energetically reconstruction measures of houses, on the other hand because some private households might decide to join a district heating plant.

4.1.3 Pellets

In 2011 the production of pellets in Italy was estimated with approx. 500,000 tons. Whilst the overall amount is consumed within the countries boundaries, it is still not enough to satisfy the national demand which exceeds 1,900,000 tons annually. The primary consumers of wood-pellets in Italy are private owners and small scale installations for centralized household-heating.



Figure 6: Pellet production in Italy Source: http://www.costopellet.it/analisi-mercato/mercato-pellet-italia-2011

The amount of pellet ovens sold has had almost an exponential development from 1999 until 2006 when the maximum of new installations has been reached with more than 300,000 units (see chart below). From 2007 until 2011 the number of new installations has decreased significantly but keeping on a steady level for the whole period. The number of pellet plants installed in Italy is approx. 1,500,000 units of which more than 70% are located in northern Italy.



Figure 7: Number of pellet ovens sold (blocks) and development of pellets consumed in Italy Source: <u>http://www.costopellet.it/analisi-mercato/mercato-pellet-italia-2011</u>

In the province of South Tyrol there is only one company which is producing pellets on commercial level which is Nordpan AG in Olang/Valdaora. The company makes part of the Rubner holding and produces approx. 8,500 tons per year of which 100% is sold in South Tyrol. According to an investigation performed in 2010 the pellet consumption is estimated with approx. 70,000 tons annually including loose pellets and bags. (Walder S., 2013)

4.1.4 Other assortments of solid biomass

There are no other nameable solid biomass productions.

4.2 Energetic use of Biomass

In 2009, a broad investigation on the type and the amount of lignocellulosic biomass ovens in private households has been initiated by the TIS innovation park (Censimento e monitoraggio di impianto a biomassa legnosa nella provincial di Bolzano). During this project, 24 villages has been investigated which allowed to make an estimation on the whole territory. In 2009, 80.4% of the type of biomass used has been logs (Scheitholz), other 7.6% has been waste wood whilst 6.0% was pellets and 3.9% briquettes. Divided in the single kinds of heating system, the picture can be displayed as following:



Figure 8: Biomass resource divided by heating system Source: TIS innovation park: Censimento e monitoraggio di impianto a biomassa legnosa nella provincia di Bolzano

Based on information from 2011, the 71 district heating plants in South Tyrol supply almost 14,000 households, which are about 20,000 people, with heat.

4.3 Costs of solid biofuels

The Italian association for energy of agroforestry AIEL as national organization surveys the prize development. The values are updated on a monthly basis and represent the average of the submitted values. Just like in other regions, in the table below it can be seen that the prizes for pellets (M10), logs (M20, P330) and wood chips (M30, P16-45) have been more or less constantly whilst prizes for gas and oil have increased significantly.



Figure 9: Development of primary energy sources (2000 – 2012) Source: www.aiel.cia.it



GPL: in aree metanizzate
 Pelletin sacchi: consegna entro 30 km
 Legna da ardere M20: consegna entro 20 km - autocarro 45 m³

 Cippato M35: consegna entro 20 km - autocarro 45 m³
 Cippato M35: consegna entro 20 km - autocarro 45 m³

Figure 10: Development of primary energy sources in 2013 Source: www.aiel.cia.it

4.3.1 Price for wood chips

Based on the information from the South Tyrolian chamber of commerce, in May 2013 the prize for wood chips in bark, fresh delivered to the district heating plant is between $18.50 \in$ and $20.83 \in$ per loose cubic meter (lcm) whilst the prize for wood chips without bark, fresh delivered to the DHP is between $20.43 \in$ and $22.10 \in$ per lcm.



Figure 11: Development of the prizes of wood chips in bark (left) and without bark (right) Source: <u>www.handelskammer.bz.it</u>

4.3.2 Price for wood pellets

The prize for wood pellets is revealed monthly by pelletshome (www.pellethome.com). The prize is displayed as an average of all incoming information. In November 2012 (last updated information) the prize for pellets on national level has been 225.00€ per ton.

In South Tyrol the prize for wood pellets from untreated sawdust, loose delivered to the district heating plant were in a range from 233.00€ to 253.00€ per ton.



Figure 12: Prize for pellets from untreated sawdust, loose delivered to DHP Source: www.handelskammer.bz.it

4.4 Technical standards for solid biofuels

In terms of solid biomass fuels there has been a lot of movement in the past years. The first national standards have been elaborated in the year 2000, when Italian thermo-technical committee (Comitato Termotecnico Italiano) has developed the first recommendations and consequently has elaborated the two standards UNI TS 11263 for pellets and UNI TS 11264 for briquettes, logs and wood chips. Until then, only Austrian and German standards where applied.

As a consequence, on strong initiative from Italy and supported strongly by Austria, the European Committee for Standardization (Comité Européen de Normalisation, CEN) together with its technical board CEN/TC 335 "solid biofuels" has begun to elaborate a series of standards shared on European level and specifying solid biofuels.

At present, there a mainly two standards which must be respected in Italy: The UNI EN 14961 and the UNI EN 15234. UNI EN 14691's subject are the specific technical requirements of the products about e.g. the origin of the biofuel, humidity, ash content mechanical durability and physical properties. UNI EN 15234 is focused on the steps to take place in order to assure the quality standards. The standards have been elaborated in 2011 and 2012 and are the most important standards for wood pellets, wood briquettes, firewood (logs) and non-woody pellets.

The standards are divided as following:

- UNI EN 1469-2 and UNI EN 15234-2 focus on lignocellulosic pellets;
- UNI EN 1469-3 and UNI EN 15234-3 focus on briquettes;
- UNI EN 1469-4 and UNI EN 15234-4 focus on wood chips;
- UNI EN 1469-5 and UNI EN 15234-5 focus on firewood;
- UNI EN 1469-6 and UNI EN 15234-6 focus on pellets from non-lignocellulosic biomass (e.g. from herbs or fruits).

Furthermore, there are more standards related to soli biofuels (see annex 4).

4.4.1 Standards for wood chips

Besides UNI EN 14961-1, relevant standards for wood chips can be found in UNI EN 1469-4 and UNI EN 15234-4. This standard defines four quality classes (A1, A2, B1, B2) for wood chips from wood for non-industrial use. For every class it also defines specific chemical-physical properties on basis of the dimensions.

4.4.2 Standards for wood pellets

Besides UNI EN 14691-1, the standards for pellets for non-industrial use are described in UNI EN 1469-2 and UNI EN 15234-2 focus on lignocellulosic pellets. For pellets there exist three quality classes (A1, A2, B). The two classes A1 and A2 define pellets from either untreated or virgin wood which has not been treated chemically; class B also considers pellets derived from chemically treated wood. It needs to be outlined, that class B is not valid in all EU-countries, as some of them prohibit the use of chemically treated wood. In this case, so called A-deviations are in use with respect to the national laws and rules.

4.4.3 Conversion factors

The conversion factors on Italy respect on one hand the manual for firewood and wood chips, publicized by AIEL, on the other hand the respective standard is the Austrian ÖNORM M7132 and M7133. The standards define various conversion factors from round wood (ita: legno tondo) over cut wood (ita: spacconi), normally 1m long, to short cut firewood (ita: legna) and up to wood chips (ita: cippato). The conversion factors can be seen in the table below.

Assortimento			Legna spaccata corta		Cippato	
			accatastata	riversata	fino (G30)	medio (G50)
	m ³	msa	msa	msr	msr	msr
1 m ³ tondo	1	1,4	1,2	2,0	2,5	3,0
1 msa spacconi 1 m	0,7	1	0,8	1,4	(1,75)	(2,1)
1 msa legna spaccata corta	0,85	1,2	1	1,7		
1 msr legna spaccata corta	0,5	0,7	0,6	1		
1 msr cippato di bosco fino (G30)	0,4	(0,55)			1	1,2
1 msr cippato di bosco medio (G50)	0,33	(0,5)			0,8	1

Nota: una tonnellata di cippato G30 con M 35% corrisponde a circa 4 msr di cippato di abete rosso e a circa 3 msr di cippato di faggio.



Figure 13: Conversion factors Source: www.aiel.cia.it

5 Forest Infrastructure and logistics

5.1 Forest road infrastructure

South Tyrol's location in the middle of the Alps and its elevation profile leads to high logistic efforts when it comes down to the wood industry and the exploitation of the forest. Difficult to reach areas, small private properties and unfavorable relation between work and economic value avoid extensive projects. In order to guarantee an economic use of the natural resources, South Tyrol has invested in a high density forest road network over the past years. Currently the density of goods traffic and forest roads is about 42 meters per ha.

Road type	Length in km	Amount of sections	
Goods traffic road (truck)	3.514	6.080	
Goods traffic road (tractor)	331	841	
Forest road (truck)	4.816	3.263	
Forest road (tractor)	4.912	8.471	
Sum	13.573	18.655	

Truck roads: grade up to 15%, width > 3.5m; hard deck including shoulder Tractor roads; grade up to 35%, width > 2.5m; no hard deck

Table 3: Road type and length in South Tyrol by Dec. 2009

In 1989 the first recordings of streets and roads were made. Under the leadership of the regional department for forest planning, all municipal streets, highways, state roads and railroads were recorded including hiking, alp and forest trails. The percentage of opening regarding the primary transportation in the forest area is divided into 3 categories. Until 100 m primary transportation

distance 43% are economically developed, until 400 m 85% and till 800 m 91% are economically developed.

Furthermore new technologies shall be found and implemented for a web based information system using global information system (GIS) and global positioning system (GPS) data.

5.2 Biomass supply chain

Description of the examined supply chain(s) with short description and ADONIS process map

5.2.1 Actors in the supply chain

The actors involved in the regional supply chain from forest to district heating plant are:

- Forest owners
- Regional department of forestry
- Logging companies
- Transport companies
- District heating plants
- Chipping companies
- End consumer

5.2.2 Chain 1: Small forest owner delivers energy wood to DHP where it is chipped

In this chain the forest owner (farmer) delivers round wood (firewood) to the district heating plant. In this case, the forest owner does the harvesting by himself or assigns the work to a harvesting company. During the harvesting, the low quality round wood (firewood) is stored separate. Bases of a frame contract, the forest owner can deliver at any time any amount of firewood to the DHP. The delivery is done by a transport company. At the DHP, the round wood is stored until a chipping company is contracted who will chip the firewood.



Figure 14: Supply chain small forest owners - DHP

5.2.3 Chain 2: harvesting slash

Using the harvesting slash is not too common at the moment in South Tyrol. There are only a few DHP's which accept it. Nevertheless the harvesting slash is a resource which shows a big potential for the region and therefore should be utilized. In this supply chain, the harvesting company uses a sky crane to harvest the trees and transports them to the forest road, where a processor de-limbs the trees and cuts the trunks in length. The harvesting slash is stored at one place. Now there are two possibilities: a chipping company drives in the forest and chips the wood residues right at the work place, with an appropriate truck the chips then are transported to the DHP where then the chips are stored. Another possibility is that the harvesting slash is transported to the DHP and is chipped there.



Figure 15: Supply chain harvesting slash

6 Stakeholders

6.1 Regional stakeholders

6.1.1 SEV - Südtiroler Energieverband (South Tyrolien biomass association)

On 27.03.1998, five years after the first district heating plant when on line, the six DHP operators formed the "association of DHP's South Tyrol". In Sep. 1999 then, the "South Tyrolian biomass association" was formed. Since 2002 the South Tyrolian biomass association is member of AEBIOM, the European biomass association by what Italy is the only European country to have two members in the AEBIOM. In November 2003 the SEV joins the Italian biomass association FIPER. In September 2010, the Raiffeisen energy assiciation (Raiffeisen Energieverband) and the SEV sign a cooperation. In November 2011, this cooperation is brought one step ahead and out of the two associations one energy association is formed in order to represent the interests of the producers on one hand and the consumers on the other hand. The result is a common competence and service center with regional impact.

6.1.2 Südtiroler Bauernbund (SBB, South Tyrolian association of farmers)

As approx. 80% of the forest owners are farmers, the South Tyrolian farmers association is the most powerful and most important stakeholder in relation to forest products and biomass. The South Tyrolian association of farmers is one of the biggest associations in South Tyrol, representing the interests of more than 21.000 members. Apart from the representation of interests on political level the SBB is very active on several levels like municipalities, districts, provincial, national and European level. This wide network guarantees a close collaboration with the forest owners, although the focus of the main activities lies on the

6.1.3 Landesabteilung für Forstwirtschaft

Related to the forest the regional department of forestry is the most important institution. The operational activities of are done by 71 forest stations all over the region. The department of forestry guarantees a constant contact to the forest owners (mostly farmers) and continuous supervision of the activities in the forest and it's condition on one hand, on the other hand it guarantees that all the functions of the forest (economic, protection, recovery, other functions) are respected. Due to the strict rules applied for harvesting, the controlling activities by the foresters and the high responsibility of the forest owners, illegal logging in practice is not existing.

6.2 National stakeholders

6.2.1 FIPER (Federazione Italiana produttori di energia da fonti rinnovabili)

Founded in 2001, the Italian Federation of Producers of Renewable Energy (FIPER) brings together and represents the majority of Italian electricity and heating energy producers by renewable source. FIPER represents 21 heating energy producing companies, 39 mountain area town councils of the regions of Piemonte, Val d'Aosta, Trentino/Alto Adige and Emilia Romagna. Furthermore there are 60 thermal power stations associated with the Federation and 180.000 users of heating, sanitary water and electricity.

FIPER is recognized as authoritative category and representative actor by the Italian Agriculture Commission's Chamber and Senate and by local and regional sector authorities.

6.2.2 ITABIA (Italian Biomass Association)

The Italian Biomass Association ITABIA exists since 22 years. It's objective is to stimulate and promote the bioenergy sector, in detail the production, the acquisition, recycling, transformation and the use of biomass. ITABIA's objectives are mainly focused on the protection of the environment as well as social and economic issues. The associations activities result in promoting analyses and developments for innovative technologies, formulate strategies and sectorial and territorial research plans, elaborating studies, researches and experiments, organize exhibitions, seminars and workshops, coordinate work-groups and networks on national and international level and dissemination activities focused on the development of the bioenergy sector, especially by scientific publications, journals, magazines and newsletters.

6.2.3 AIEL (Associazione Italiana Energie Agroforestali)

The Italian association for energy of agroforestry AIEL represents the interests of the agroforestry supply chain in the European, national and regional institutions. Its aim is to promote the valid laws in favor of the development of the market. AIEL also participates actively at the development of the agroforestry supply chain: installations for households, heaters, biomass producers, installers and care takers, pellet EN-plus and project managers. AIEL also offers technical support-services for feasibility studies, purchase and selling contracts, new technologies, emissions and further more.

7 Future scenarios

As defined in Brussels in 2007 at the EU summit, the overall objectives for European energy supply are:

- Reducing the greenhouse gases by 20% up to 2020 compared to the 1990 levels
- Increase the share of renewable energies on total energy to 20% by 2020
- Increase the energy efficiency by 20% by 2020
- Increase the share of biofuels to 10% on total fuel consumption by 2020

These targets are global targets for the entire EU. Each member state has to convert them into national targets. (Sabine Schwarz 2010)

In 2008 12% of the total end-energy consumption has been produced by biomass. The regional orientation has hereby been significantly different from the national one. In South Tyrol, the resource is mainly used in form of wood and all its derivative form. The main focus has been the energetic use of logs, wood chips and pellets. At present, the amount of wood growing in the region exceeds by far the amount used.at present, approx. 45% of the growing stock is used. With respect to the principle of sustainability, the limit is estimated with about 80% of the growing stock, which would be approx. 1.48 Mio solid cubic meters (scm).

According to the local Climate strategy 2050 the current renewable energy share on energy consumption is 59% (without transport), by 2020 it should be 75% and by 2050 the aim is to reach almost energy autarchy in South Tyrol, which means over 90% of the energy consumption should be covered by renewable energy sources (excluded transport and including energy saving measures). (Sabine Schwarz 2010)

In order to estimate the future development of the energetic use of biomass, the economic value is a crucial factor. In a mountainous region like South Tyrol, the harvesting and hauling of the timber represents a central challenge. It is almost impossible in terms of economy without specific financial contributions. In order to increase the amount of exploitation of the forest there are also other requirements:

- Better organization between forest owners (farmers) and DHP's
- Improvement of the forest management of private forest owners
- Increasing co-operation between forest owners
- Initiatives to emerge forest owner co-operations for common forest management
- Long-term supply contracts between forest owners and biomass/wood sector
- Improvement of the competitiveness of the companies by improving the company's internal cost structure

In case the contributions should diminish before innovative solutions like have been developed, the forest might suffer a significant obsolescence. (Klimaplan, Energie-Südtirol-2050)

8 Annex

8.1 Annex 1: regional SWOT(S)

8.1.1 Processes

S1. South Tyrol has a very high amount of district	W1. The quality standards of energy wood in the		
heating plants (DHP). In the 116 communities there	region differs in parts within the region. There is a		
are over 70 DHP's.	high variation to other neighbouring northern		
S2. The increased usage of energy wood and the	Italian and Austrian regions.		
development of the specific market has increased	W2. At present there is very little use of the harvesting		
the maintenance in the private forests	slash. Some DHP's agree to accept it and mix it		
S3. Due to the increasing biomass and energy sector	with biomass chips. Most times branches, needles		
the innovation potential has increased and some	and tops are left at the forest road to rot $ ightarrow$ bad		
new ideas have been realized like f.e. small forest	pictures in a touristic area, high potential for		
owner associations.	further biomass. Increasing the amount of		
S4. There is an increasing interest at district heating	harvesting slash would lead to problems with the		
plants to extend the facilities to electric power	emissions		
generation (ORC, wood gasification) due to the	W3 The public contribution for DHP's does not		
high public contributions. Some plants are already	consider any information about the actual		
working.	biomass potential in the region.		
	W4. There is a direct competitiveness between DHP's		
	and sawmills regarding round wood. As farmers		
	can supply DHP's directly with energy round		
	wood, they often don't differ between energy		
	wood and high quality saw timber just for a couple		
	of trunks. They deliver the whole load to the DHP.		
	W5. Many DHP's don't have a storing area to dry chips.		
	They have been built in order to be able to burn		
	chips with a relatively high humidity (>30%). This		
	leads to a higher consumption than DHP's burning		
	chips with low humidity due to the direct link		
	between humidity and gross calorific value.		
	W6. The billing of the energy wood does in many		
	DHP's not consider the energetic value of the		
	biomass but just the volume.		
	W7. South Tyrol is not able to provide all DHP's with		
	regional biomass due to missing information		
	about the biomass potential in the region. This		
	makes South Tyrolian also very dependant of		
	foreign biomass suppliers.		
O1. The development of innovative processes for the	T1. The high amount of public contributions lead to		
harvesting slash could lead to the valorisation of a	many investments which under regular economic		
high potential of high quality biomass.	aspects and under consideration about the		
O2. Adapting the assignment of public contributions	regional availability of the biomass might not be		
for DHP's to the actual biomass potential could	made (common problem)		
strengthen the existing ones regarding the biomass	T2. Upgrading the DHP plants with electrical power		
supply and lower the dependency of foreign	production will increase the demand of biomass		
biomass suppliers.	even more. First of all the dependency on foreign		
O3. Co-operations of DHP's for biomass purchase	suppliers will increase. But also the interference		

O4. Implementation of trigeneration (heat, power,	with neighbouring plants and the derived timber
cold) systems in DHP's	production will increase. Transportation costs will
O5. Use of wood biomass to produce alternative fuels	increase and this will turn back on prices. Also
O6. Evaluate the possibility to dry the biomass prior to	negative effects on ecological aspects can be
burning with unused heat	expected
	T3. The production of electrical power in summer
	means that the "side product" heat will be
	emitted to the environment due to missing need
	T4. The increasing production of electrical power can
	lead to an overpowering of the existing electricity
	network because the system has not been built for
	decentralized power production
	T5. The high dependency on wood chips from abroad
	(no sufficient regional resource)
	T6. The cascade use of wood will not be considered. As
	the demand of heat and electricity are of high
	priority (basic services) not only energy wood but
	also high quality timber will be used in DHP's
	T7. The actual contribution for micro networks is not
	possible in South Tyrol if the potential location is
	within the range limits of a DHP plant. Often the
	limits are defined so wide that micro networks
	might be much more economic.

8.1.2 Intelligent communication technologies (ICT) and network communication

	-
S1. The most of the drivers in the transportation sector	W1. There is no use of navigations systems within the
are locals and know the forest roads perfectly,	transportation sector. The people working there
therefor at present there is no need on ICT systems	have very low interest in adapting and accepting
S2. There are very short distances between the	ICT systems
regional players, the reachability is quite easy	W2. Most communication between the actors of the
S3. 99,9% of the forest roads are GPS tracked	value chain bases oral discussions or phone calls.
S4. GEOBROWSER: interactive 2D and 3D online tool	W3. There is no data exchange standard for the wood
with detailed information about forest, water, road	sector
network, geology, civil protection, natural hazards	W4. Due to W11., there is no automatic data exchange
and much more	between the players in the Value Added Chain
	(VAC)
	W5. Many harvesting companies do not use computers
	at all, many only use them rarely. Also other
	information systems are not used.
	W6. Small saw mills only use basic PC-systems and
	basic information systems without special focus
	on their branch.
	W7. Most of the measurement for round wood and
	energy wood is done by hand and not supported
	by appropriate equipment or installations
	W8. Due to the mountainous region often there is a
	problem with the communication networks (dead
	zones)
	-

O1. The availability of information in the forest sector	T1. Most of the players in the forest and wood working
is quite good, but there is a huge demand on	sector know each other since many years \rightarrow the is
reliable information in the wood sector. Therefor	a high level of trust
gathering information about energy wood	T2. Senior entrepreneurs and regular workers are not
potential in South Tyrol and the elaboration of	able to use complicated communication systems,
maps displaying information about the biomass	therefor there is also the problem that they
potential, the technical usable forest area and the	naturally reject all enthusiasm to introduce new
property distribution are necessary. (The	technologies
information list is not complete and can be	T3. Players are very sceptical regarding new
extended)	applications and cloud services
O2. In a second step, all this information should be put	T4. Different units are often used for the same
together and in form of layers they should be	assortments within the players in the region
combinable.	T5. The future development of the transportation
O3. Development and implementation of a monitoring	companies will be difficult, more drivers from
system for the wood and biomass needs and	outside the region will be employed due to low
offers	interest of regional people and
O4. Just in time delivery of round wood and energy	
wood. To realize this option a smart information	due to lower personal costs. Taking into
network must be	consideration this
created to support the information exchange	fact, the personal knowledge about the forest
O5. Elaboration of a common data exchange standard	network will get lost.
	T6. If the wood and biomass sector in South Tyrol will
	not be able to adapt to the present state of the art
	ICT-systems provided, it will risk to loose
	competitiveness due to uncompetitive prices
	T7. The small companies in the region are not
	interested in modern ICT because they don't see
	the profit. Only activities directly related to their
	work brings profit!

8.1.3 Logistics

S1. High density of forest roads, high grade of accessibility	W1. No defined Supply Chain Management (SCM) for
even in remote locations	the wood and biomass industry
S2. All roads are GPS tracked and the information is	W2. No information about the mass flux for wood
available to public through Geobrowser	and biomass. This makes it extremely difficult to
(http://www.provinz.bz.it/raumordnung/kartografie	make any forecast for future activities
/geo-browser.asp)	W3. No cost analysis and no time registration:
S3. The small companies operating locally, Therefore	difficult cost calculation
there is a good knowledge of the road and forest	W4. Unsatisfying data exchange between enterprises
road system	and authorities, no data exchange standards
	W5. No software support in the small companies
	W6. Mountainous area includes high transportation
	costs
O1. Development of a detailed mass flow analyses,	T1. Increasing costs will threaten development
covering information about the wood and biomass	T2. Competition instead of co-operation → fear of
flow, e.g. the amounts of emerging quantities	losing market power
O2. Implementation of new technologies i.e. wood pile	
management, GIS	
O3. Develop common strategies for small forest owners	
O4. Good opportunities for new technologies for	
optimization of wood flow	

8.2 Annex 2: Process model(s)



RAHMENVERTRAG

zwischen:

- dem Südtiroler Bauernbund, mit Sitz in Bozen, K.-M.-Gamper-Str. 5, im folgenden SBB genannt, vertreten durch den Obmann Leo Tiefenthaler und
- dem Südtiroler Biomasseverband, mit Sitz in Toblach, Bahnhofstraße 8, nachstehend Biomasseverband genannt, vertreten durch den Präsidenten tempore Herrn Hanspeter Fuchs

folgende Partner unterstützen die Zielsetzungen des Rahmenvertrags

- GSS
- Autonome Provinz Bozen vertreten durch die Abt. 32
- Maschinenring Südtirol

Zielsetzung:

Versorgung der Südtiroler Heizwerke im Biomasseverband und Abnahmegarantie für die Privat-Waldbesitzer im Südtiroler Bauernbund, mit dem ökologischen und ökonomischen Grundgedanken, die Biomasse möglichst über kurze Wege zu transportieren und einheimische erneuerbare Energieträger zu nutzen. Damit wird ein Beitrag zum Umweltschutz geleistet, die Nutzung des nachwachsenden Rohstoffes Holz, vor allem auch die Waldpflege gefördert, damit unsere Wälder auch in Zukunft ihre vielfältigen Funktionen erfüllen können. Zudem werden die lokalen Wertschöpfungsketten gestärkt.

Vertragsgegenstand:

Es werden südtirolweit Rahmenbedingungen für die Lieferung von Waldhackgut (in Form von Rundholz oder in gehackter Form), von Seiten der privaten Waldbesitzer oder über den Maschinenring Südtirol und seinen Gesellschaftern an die Fernheizwerke, welche Mitglieder im Biomasseverband Südtirol sind, festgelegt. Bestehende Verträge fallen nicht unter diesen Rahmenvertrag und bleiben bestehen.

Der Rahmenvertrag legt Grundsätze für den Abschluss von Lieferverträgen fest, die auf Bezirksund Ortsebene direkt von den Lieferanten mit den einzelnen Fernheizwerken abgeschlossen werden.

Beschreibung der Ware:

Die Lieferverträge können als Ware Rundholz ohne Nadeln und Reisig oder Hackschnitzel beinhalten. Für den Fall, dass Hackgut geliefert wird, muss es sauber, ohne Nadeln und Reisig, im lufttrockenen Zustand (Holzfeuchtigkeit unter 35%) und mit einer maximalen Größe von 80 mm und im Prinzip frei von Fremdkörpern (Steinen, Metallen) sein. Rinde ist bis zum Ausmaß von 15% im Hackgut zulässig. Wird Hackgut mit grüner Nadelmasse (Weidesäuberungen) geliefert, ist dies separater Verhandlungsgegenstand der jeweiligen Partner.

Verhandlungszeitraum:

Der diesjährige Vertrag gilt vom 01.06.2009 bis zum 01.06.2012. Der Rahmenvertrag verlängert sich stillschweigend um je ein Jahr, wenn er nicht 6 Monate vor Ablauf von einem der Vertragspartner schriftlich gekündigt wird.

Lieferung:

Die weiterführenden Vertragsbedingungen betreffend die Lieferung werden in Verträgen auf Bezirksebene oder Ortsebene zwischen den Lieferanten im Sinne dieses Abkommen und den Abnehmern im Sinne dieses Abkommens abgeschlossen. Die Anlieferung soll über einen möglichst langen Zeitraum des Jahres möglich sein, um teures Zwischenlagern zu vermeiden.

Messung:

Bei der Lieferung von Rundholz wird die Messung der anzuliefernden Menge von einer beiderseits anerkannten Vertrauensperson vorgenommen; wobei dies in der Anlaufphase die jeweils zuständige Forststation sein kann.

Zahlung:

Die Zahlung erfolgt spätestens 60 Tage nach Rechnungslegung. Die Rechnungslegung kann sofort nach der Lagerung des Holzes auf einem geeigneten Platz und nach der Übermittlung des Maßes gestellt werden.

Preis:

Als Mindestpreis für das Jahr 2009 gelten 42 € ohne Mehrwertsteuer je fm Rundholz franco Fernheizwerk oder vereinbarten Lagerplatz. Sofern die Ware als Hackschnitzel angeliefert wird, gilt ebenfalls der obgenannte Preis, wobei festgelegt wird, dass 1fm Rundholz 2,7 Srm Hackschnitzel entsprechen, also ein Umrechnungsfaktor von 2,7 herangezogen wird. Für das Hacken zahlt der Fernwärmewerkbetreiber an den Lieferanten einen Aufpreis von 1,85 € je angelieferten Schüttraumraummeter.

Mengen und Information:

Die Südtiroler Fernheizwerke, welche dem Südtiroler Biomasseverband angeschlossen sind, verpflichten sich sämtliches aus dem Privatwald und dem Wald im Besitz öffentlicher und privater Körperschaften anfallende Hackgut zu übernehmen. Größere Heizwerke sollen eine Pufferfunktion ausüben, wenn es bei kleineren Heizwerken bezüglich der angelieferten Menge an Biomasse aus heimischen Wäldern zu Kapazitätsengpässen kommt.

Der Biomasseverband übermittelt dem Südtiroler Bauernbund und getrennt für jedes Fernheizwerk, welches Mitglied im Verband ist, jährlich zum 2. Mai die im Rahmen dieser Vereinbarung und der untergeordneten Vereinbarungen aus den Südtiroler Wäldern angelieferte Holzmenge.

Streitfälle:

Für sämtliche Streitfälle ist eine Schiedskommission einzuberufen, welche aus dem Präsidenten des Biomasseverbandes und dem Obmann des SBB, sowie dem Leiter der Abteilung Forstwirtschaft der Autonomen Provinz Bozen als Vorsitzenden besteht.

Bei eventuellen ordentlichen Streitfällen wird Bozen als Gerichtsstandort gewählt. Im Zweifelsfalle gelten die Südtiroler Holzhandelsgebräuche.

Information der Mitglieder der Vertragspartner sowie der Fernwärmeabnehmer

Die Vertragspartner vereinbaren, im Jahr 2010 eine gemeinsame Kampagne für ihre Mitglieder und für die Fernwärmeabnehmer zur Erreichung der Zielsetzungen dieses Abkommens durchzuführen. Die Kosten der Kampagne betragen maximal 30.000 €, welche von den Vertragspartnern je zur Hälfte getragen werden. Die Vertragspartner bemühen sich zudem um Förderungen und Sponsorgelder für die Umsetzung dieser Kampagne.

	Für die Käufer: Hanspeter Fuchs
Suctincler Bauernburg Süctiroler Datum: 13:09/2009	Südtiroler Biomasseverband Südtiroler Biomasseverband Consorzio/Biomassa Alto Adige Biomassa Alto Adige Biomasse & Via Stazione 8 Signa / Holsen / Sobbiaco Tel. 0474/973274 / Fax 0474/976570 @mail: info@biomasseverband.it Mwst. Nr Part IVA 01753230216

8.4 Annex 4: Standards related to solid biofuels publicized by CEN and incorporated by UNI

Code	Title
UNI EN 14588:2010	Biocombustibili solidi - Terminologia, definizioni e descrizioni
UNI EN 14774-1:2009	Biocombustibili solidi - Determinazione dell'umidità - Metodo di essiccazione in stufa - Parte 1: Umidità totale - Metodo di riferimento
UNI EN 14774-2:2010	Biocombustibili solidi - Determinazione dell'umidità - Metodo di essiccazione in stufa - Parte 2: Umidità totale - Metodo semplificato
UNI EN 14774-3:2009	Biocombustibili solidi - Determinazione dell'umidità - Metodo di essiccazione in stufa - Parte 3: Umidità del campione per l'analisi generale
UNI EN 14775:2010	Biocombustibili solidi - Determinazione del contenuto di ceneri
UNI EN 14778:2011	Biocombustibili solidi - Campionamento
UNI CEN/TS 14779:2005	Biocombustibili solidi - Campionamento - Metodi di preparazione dei piani di campionamento e dei certificati di campionamento
UNI EN 14780:2011	Biocombustibili solidi - Preparazione del campione
UNI EN 14918:2010	Biocombustibili solidi - Determinazione del potere calorifico
UNI EN 14961-1:2010	Biocombustibili solidi - Specifiche e classificazione del combustibile - Parte 1: Requisiti generali
UNI EN 14961-2:2011	Biocombustibili solidi - Specifiche e classificazione del combustibile - Parte 2: Pellet di legno per uso non industriale
UNI EN 14961-3:2011	Biocombustibili solidi - Specifiche e classificazione del combustibile - Parte 3: Bricchette di legno per uso non industriale
UNI EN 14961-4:2011	Biocombustibili solidi - Specifiche e classificazione del combustibile - Parte 4: Cippato di legno per uso non industriale
UNI EN 14961-5:2011	Biocombustibili solidi - Specifiche e classificazione del combustibile - Parte 5: Legna da ardere per uso non industriale
UNI EN 14961-6	Solid biofuels - Fuel specifications and classes - Part 6: Non woody pellets for non-industrial use non-industrial use
UNI EN 15103:2010	Biocombustibili solidi - Determinazione della massa volumica apparente
UNI EN 15104:2011	Biocombustibili solidi - Determinazione del contenuto totale di carbonio, idrogeno e azoto - Metodi strumentali
UNI EN 15105:2011	Biocombustibili solidi - Metodi per la determinazione del contenuto di cloro, sodio e potassio solubili in acqua
UNI EN 15148:2010	Biocombustibili solidi - Determinazione del contenuto di sostanze volatili

UNI EN 15149-1:2011	Biocombustibili solidi - Determinazione della distribuzione granulometrica - Parte 1: Metodo del vaglio oscillante con apertura maggiore o uguale a 1 mm
UNI EN 15149-2:2011	Biocombustibili solidi - Determinazione della distribuzione granulometrica - Parte 2: Metodo del vaglio vibrante con apertura minore o uguale a 3,15 mm
UNI EN 15149-3:2011	Biocombustibili solidi - Metodi per la determinazione della distribuzione granulometrica - Parte 3: Metodo del vaglio rotativo
UNI EN 15150:2011	Biocombustibili solidi - Metodi per la determinazione della massa volumica delle singole particelle
UNI EN 15210-1:2010	Biocombustibili solidi - Determinazione della durabilità meccanica di pellet e di bricchette - Parte 1: Pellet
UNI EN 15210-2:2011	Biocombustibili solidi - Determinazione della durabilità meccanica di pellet e bricchette - Bricchette
UNI EN 15234-1:2011	Biocombustibili solidi - Assicurazione della qualità - Parte 1: Requisiti generali
UNI EN 15234-2	Solid biofuels - Fuel quality assurance - Part 2: Wood pellets for non- industrial use
UNI EN 15234-3	Solid biofuels - Fuel quality assurance - Part 3: Wood briquettes for non-industrial use
UNI EN 15234-4	Solid biofuels - Fuel quality assurance - Part 4: Wood chips for non-industrial use
UNI EN 15234-5	Solid biofuels - Fuel quality assurance - Part 5: Firewood for non-industrial use
UNI EN 15234-6	Solid biofuels - Fuel quality assurance - Part 6: Non-woody pellets from non-lignocellulosic biomass
UNI EN 15289:2011	Biocombustibili solidi - Determinazione del contenuto totale di zolfo e cloro
UNI EN 15290:2011	Biocombustibili solidi - Determinazione dei macroelementi - Al, Ca, Fe, Mg, P, K, Si, Na e Ti
UNI EN 15296:2011	Biocombustibili solidi - Conversione dei risultati analitici da una base all'altra
UNI EN 15297:2011	Biocombustibili solidi - Determinazione dei microelementi - As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V e Zn
UNI CEN/TS 15370-1:2006	Biocombustibili solidi - Metodo per la determinazione della fusibilità delle ceneri - Parte 1: Metodo delle temperature caratteristiche
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