REGIONAL ANALYSIS

SEVERNA PRIMORSKA (GORIŠKA STATISTICAL REGION)

Index

1. Result of tender 3

2. Fields of operation of Soča Valley Development Centre: 3

Business development 3

3. Existing regional analysis for Goriška statistical region 5

4. Description of analysed region 6

Project partner 6

Territory and people 6

Economy and development 8

Landscape 9

5. Biomass potential 10

Methodical procedure 11

Forest potential 11

Vine shoot and wine marc potential 12

Wine cellars 12

6. Use of wood in Slovenia 18

SWOT Analysis 22

Biomass flow in Northern Primorska (Goriska statistical region) 22

Larger users of biomass by municipalities 23

7. Information on regional potential and demand for energy as well as problems due climate change 32

Production and demand in Slovenia in general 32

Energy production in Northern Primorska (Goriška statistical region) 35

Present State 35

Potential 36

SWOT Analysis 41

8. Climate Change in Slovenia – possible trends 42

Climate change trends in Slovenia according to European Commission's Joint Research Centre 42

Overview of various energy sources and relationship with climate change 45

1. Result of tender

On 5th of August Razvojna agencija ROD sent offers to three potential external experts. As usually the criteria was the price. We chose Posoški razvojni center (Soča Valley Development Centre), one of four development agencies in region of Severna Primorska.

Public institution Soča Valley Development Centre (Posoški razvojni center) was founded with a decree in 1999. Its mission is to stimulate the development of business, human resources and countryside in three Soča Valley municipalities: Bovec, Kobarid and Tolmin. It also connects development projects of individual municipalities and operates the Development program of Soča Valley 2007–2013 (Soča 2013), prepares and implements priority projects in regional and state development plans and candidates for European and home development help.

In cooperation with three local development agencies in 2000, it has connected in Regional Development Agency of north Primorska, which covers 13 municipalities of the north Primorska (the Goriška statistical region).

2. Fields of operation of Soča Valley Development Centre:

Business development

Soča Valley Development Centre coordinates different activities and executes projects with the intention of accelerating business in the area of municipalities Bovec, Kobarid and Tolmin. It informs businessmen, offers them help with preparation and signs them up for tenders for financial and other encouragements. It stimulates development of business zones, development of local groups and development partnerships.

Human resource development

In the field of human resource development, Soča Valley Development Centre coordinates different activities and implements projects that are linked to social and economic

development of upper Soča Valley.They are oriented mainly in gradual stopping of negative trends that were present in this area in the past decades. The matter is depopulation of the area, leaving of young people, which consequentially leads to shortage of appropriate cadre, ageing of population etc.

Rural development

Soča Valley Development Centre coordinates different activities with the purpose of accelerating rural development. It offers help with preparation of documentation for application to different tenders to individuals, associations and other non-government organizations. It cooperates with municipalities, professional and other institutions in the upper Soča Valley and widely with implementation of activities and projects that are connected with countryside development.

Regional development

We wish to establish a model of sustainable development in the region, which enables balanced improvement of economic, social and environmental prosperity of people. It includes spatially and regionally compliant development, which means stimulation of economic development, creating new workplaces, reducing social exclusion, and social cohesion with access to employment and quality life for all inhabitants, reducing development differences inside the region and increasing and maintaining environmental capital, which is a must for life.

Their business premises are situated in Tolmin.

3. Existing regional analysis for Goriška statistical region

Name	year	content	RUBIRES use
Energreen, State of the art of wood biomass preparation and use in Slovenia	2005	Biomass flow	partly
Študija izvedljivosti daljinjskega ogrevanja na lesno biomaso v poslovni coni Poljubinj	2007	Feasibility study for biomass use in business zone	Partly
Študija izvedljivosti daljinjskega ogrevanja na lesno biomaso v kraju Bovec	2007	Feasibility study for biomass use in town Bovec	Partly
Študija izvedljivosti daljinjskega ogrevanja na lesno biomaso v kraju Kanal	2007	Feasibility study for biomass use in town Kanal ob Soči	Partly
Analiza potencialov lesne biomase na območju občin Bovec, Cerkno, Kanal ob Soči, Kobarid in Tolmin	2007	Potentials analysis of wood biomass in municipalities	partly
Daljinsko ogrevanje na lesno biomaso v Mirnu	2009	Investment study for biomass heating in Miren	partly
Energetski koncept mestne občine Nova Gorica	2008	Energy concept of municipalitiy Nova Gorica	partly
Energetski koncept občine Tolmin	2004	Energy concept of municipalitiy Tolmin	partly
Energetski koncept občine Šempeter Vrtojba	2004	Energy concept of municipalitiy Šempeter Vrtojba	partly

Energetski koncept občine Ajdovščina	2007	Energy concept of municipalitiy Ajdovščina	partly
Energetski koncept občine Brda	2009	Energy concept of municipalitiy Brda	partly
Energetski koncept občine Kanal	2008	Energy concept of municipalitiy Kanal	partly
Energetski koncept občine Miren Kostanjevica	2008	Energy concept of municipalitiy Miren Kostanjevica	partly

4. Description of analysed region

Project partner

Project partner 11

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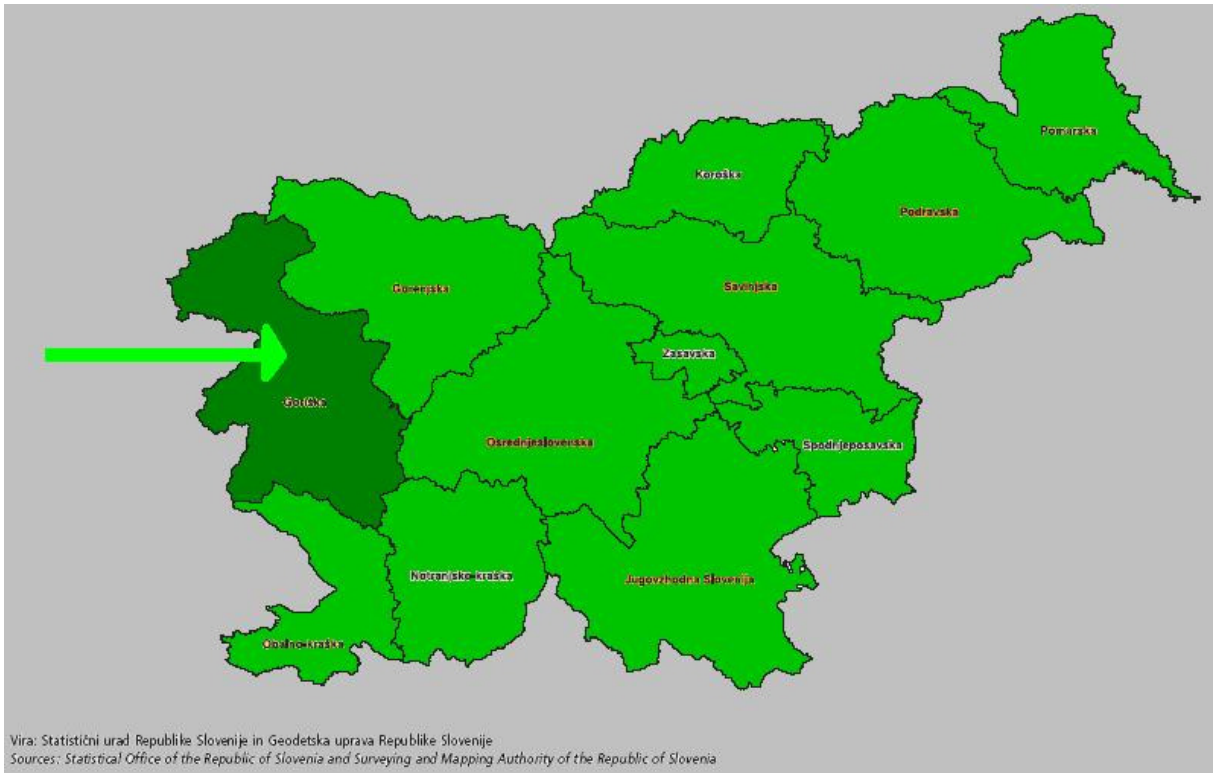
Territory and people

Northern Primorska (Goriška statistical region) is situated on the north-western part of Slovenia bordering Italy. It consists of 12 municipalities: Ajdovščina, Bovec, Brda, Cerkno, Idrija, Kanal ob Soči, Kobarid, Miren-Kostanjevica, Nova Gorica, Šempeter-Vrtojba, Tolmin and Vipava. The region unites 4 administrative units: Tolmin, Idrija, Nova Gorica, Ajdovščina. Severna Primorska (Goriška statistical region) covers 11.5% of the total Slovenian teritory.

Municipality	Area, km2	Population	Density of population
Ajdovščina	245	18705	76
Bovec	367	3312	9
Brda	72	5749	80
Cerkno	132	5005	38
Idrija	294	11989	41
Kanal ob Soči	147	6007	41
Kobarid	193	4409	23
Miren-Kostanjevica	63	4869	78
Nova Gorica	280	32193	115
Renče Vogrsko	29,5	4135	140
Šempeter-Vrtojba	15	6446	433
Tolmin	382	11951	31
Vipava	107	5422	51
Entire region	2297	116057	50

Map 1: Statistical regions of Slovenia



Economy and development

The Northern Primorska (Goriška statistical region) prepared Regional development programme (RDP). It is the basic document on the regional level, stating the priorities and the opportunities of development, the vision, strategic aims and the strategy to achieve all that.

There are five development priorities indicated in the RDP:

1. Knowledge for development and enterprise;
2. Innovation in the economy;
3. Excellence in tourism;
4. Holistic development of the countryside;

5. Permanent environmental and spatial development and the infrastructural amenities of the region.

Landscape

Most of the region (northern part) has alpine landscape with hills and valleys; therefore it is less appropriate for intensive farming.

On the other hand southern part of the region has sub-Mediterranean climate and is used for intensive production of vegetables, fruit and grapes. The valley of Vipava and Goriška Brda are well known for wine production.

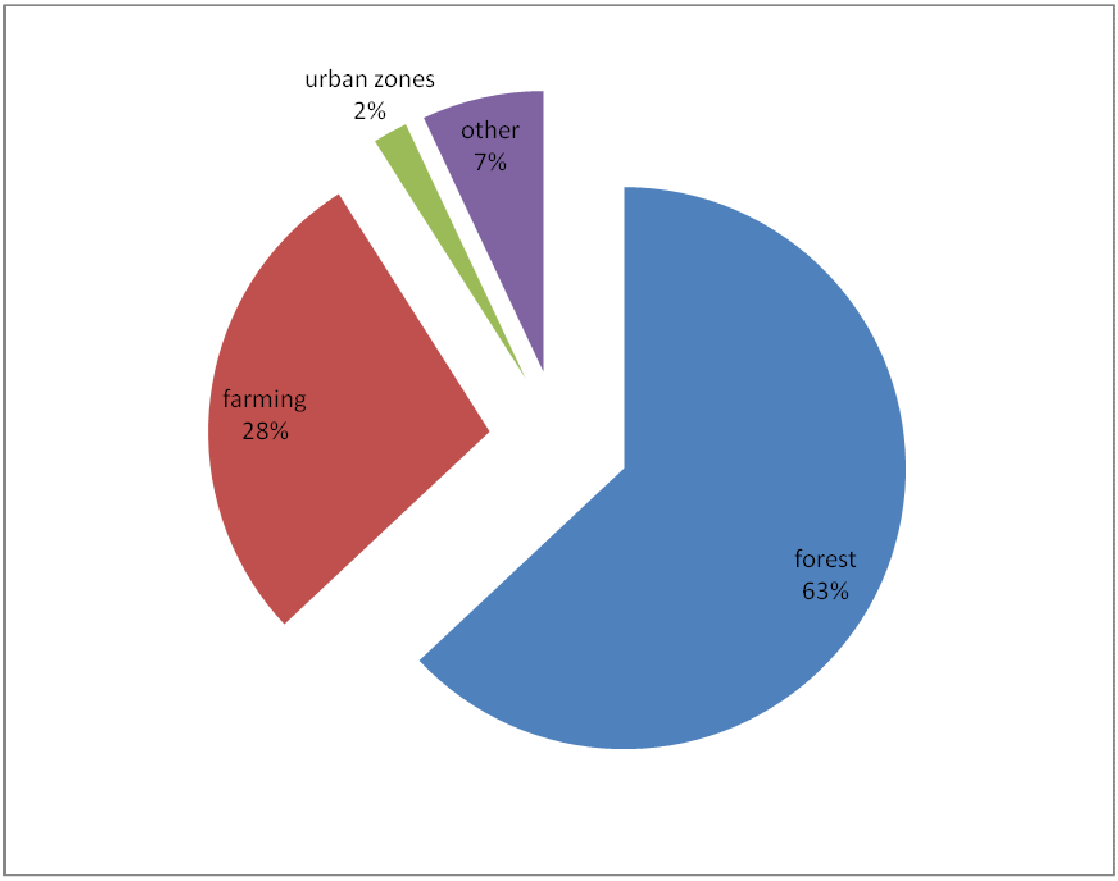
63% of the area is covered with forests of which 61.2% are in private property, 25.7% belong to the state and 13.2% to the municipalities.

28% of the entire area of Northern Primorska (Goriška statistical region) area is used for farming. There are 83% of meadows, 11% of fields, 3% of orchards, and 3% of vineyards.

The farms are mostly small; 72% of the range between 1 to 5 hectares of land, 17.3% of the range between 5.1 to 10 hectares and only 10.7% farms of range over 10 hectares.

47.1% of the region's landscape is a part of Natura 2000 Programme and National park Triglav.

Chart 1: Structure of the landscape



Source: National forest service

5. Biomass potential

According to the landscape there are two biomass potentials in Northern Primorska (Goriška statistical region):

- Forests (63% of landscape)
- Farming (28% of landscape)

A big part of Severna Primorska (Goriška statistical region) is covered in Alpine landscape and only a smaller part of a landscape that is appropriate for farming is in the Vipava valley. Therefore the forests represent the biggest biomass potential in the region.

Methodical procedure

- **Analysis of the regional biomass potential**
- **SWOT analysis**
- **Local energetic concept analysis**

Forest potential

Slovenia belongs to the most forested countries in Europe. 1,169.196 hectares of forests cover more than a half of its territory (forestation amounts to 57.7%). Most Slovenian forests are located within the area of beech, fir-beech and beech-oak sites (70%), which have a relatively high production capacity. After Finland and Sweden, Slovenia has the third highest forest coverage in Europe.

According to the data of forest management plans by the Slovenia Forest Service, the growing stock of Slovenian forests amounts to 300,795,298 cubic metres or 257 cubic metres per hectare. The share of growing stock of coniferous trees is 47.4%, and 52.6% of deciduous trees. In Slovenian forests there is an annual increment of 7,569,040 cubic metres of wood or 6.48 cubic metres per hectare.

In recent years the cut in Slovenian forests has totalled 3 million m3 of trees annually, 60% of which have been conifers and 40% deciduous trees. The cut falls behind the possible one according to forest management plans and it amounts to 70% of it and 40% of current increment.

According to the data collected by Slovenia forest service, Severna Primorska (Goriška statistical region) has the highest forest coverage of the area up to 78%. Area of Severna Primorska (Goriška statistical region) almost covers with working area of Tolmin regional forest service.

Map 2: Tolmin regional forest service

Source: Slovenia forest service

Vine shoot and wine marc potential

Northern Primorska (Goriška statistical region) is a region of many vineyards. Most of them are in private ownership. There are only two larger wine cellars in this region; one of them is the biggest wine cellar in Slovenia. Within project RUBIRES we wanted to analyse the possibility of acquirement of renewable energy from wine producing and wine making. In this framework we analysed vine shoot and wine marc. But since only little part of the vineyard area is owned by the two wine cellars, there wouldn't be enough of raw material. On the other hand gathering of raw material from the whole area would be economically unduly.

Wine cellars

Agroind Vipava 1894 d.d. Vipava

In the Vipava Valley the vine was cultivated already during Roman times as sources confirm. Roman writer Pliny Senior mentions noble wine from Vipava in his works. An important road ran through the Vipava Valley from Italy to the Panonnia. By this road the Romans built a

military settlement in 100 BC on the site of today's' city of Ajdovščina (Castrum ad fluvium frigidum). Old place names also remind us of the strong wine-growing tradition in the area. Gorica was probably named for its vineyards (called gorice in Slovene), which surrounded the town. In Vipava coat of arms from that time we can see a grape.

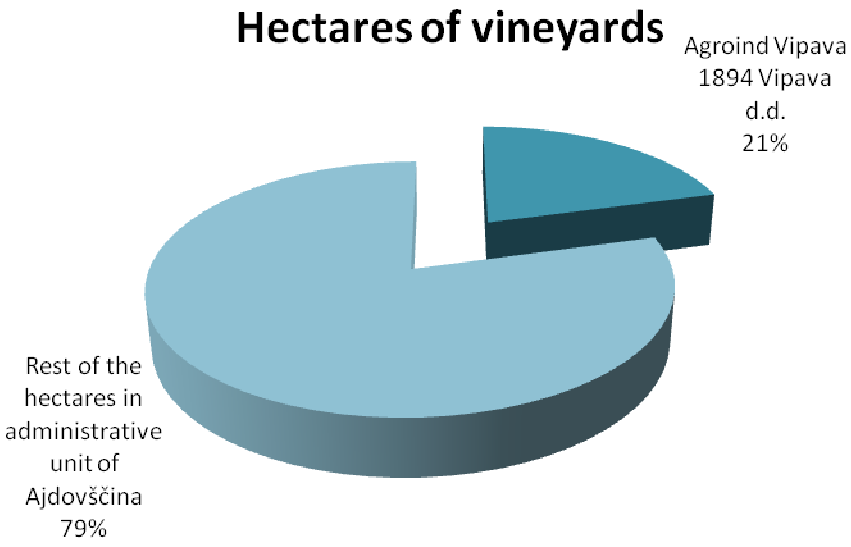
In the Vipava Valley area the vine was once grown as a hedge plant, on fields in the plains, next to wooden spikes or willows, mulberry trees or other trees and on sloped terraces.

With the technical development also the vine growing was developing. In order to be more successful, farmers and wine growers founded the Vipava Wine Cooperative. Till the First World War they had planted their vineyards and built their cellars and were able to sell wine even in Ljubljana, Kranj, Klagenfurt, Prague and Moravia. Vipava was the centre of wine-growing development. The wine cellar worked continuously even in the period between both World Wars. During the rich history of the Cooperative the estates merged and divided. In the whirlpool of economic changes at the end of the eighties the company Agroind Vipava 1894, Vipava started to exist, and ten years later it was transformed into a public limited company.

Wine Cellar Agroind Vipava 1894 d.d. Vipava owns hectares of vineyards in comparison to the whole administrative unit of Ajdovščina, as follows:

Hectares of vineyards owned by Agroind Vipava 1894 d.d. Vipava Wine Cellar:

	Agroind Vipava 1894 Vipava d.d.	Rest of the hectares in administrative unit of Ajdovščina	Hectares of vineyards in administrative unit of Ajdovščina - collectively
Hectares of vineyards	338,70	1.295,72	**1.634,42**
Portion (in %)	20,72	79,28	**100**



Source: Archive Agroind Vipava 1894 Vipava d.d.; Administrative unit of Ajdovščina

In comparison to the whole area, quite a big part is owned by Agroind Vipava 1894 Vipava d.d., almost a quarter.

Wine Cellar Goriška Brda

The beginnings of the cooperative system in the Brda region date back to 1922 when the tenants from the villages Fojana and Barbana established the first cooperative with limited liability called the Agricultural Society of Tenants and Small Landowners. In 1921 the idea was that 38 tied farmers-tenants with their families, who farmed the Count's land, should merge in a co-operative and solve the tenancy issue by helping each other. In 1923 they adopted the wine cellar-related rules. Two co-operative wine cellars, the first, a larger one, in Fojana and the second, a branch wine cellar in Barbana, were the only economic locations where they were able to evaluate and look forward to the results of their joint work and efforts, to wit, the joint wine yield. It was at these two locations that the destiny of the cooperative was decided on, for better or for worse. There were hard times ahead of them. The financial situation after WW I, the damage brought about by war, poor harvests and high interest rates for the loans they had taken out were the roots of the periods of crises. In 1933, compulsory administration was announced. 1939 was a turning point, as an auction was being prepared due to the inability of the members of the cooperative to discharge debts as they came due. On 7 May 1943 the debt was discharged in full and the former tenants became owners of the land they farmed, as yet, until that time, had but little

pleasure from it. Over the period from 1948 to 1950, 13 farming cooperatives, 1 cooperative agricultural plant and 1 farm estate were organised in the Brda region. Owing to the dissatisfaction of the farmers and poor economic results in agriculture, after 1952 more attention was paid to private producers. Committees were established, entrusted with the task of accelerating private agricultural production. The process of closing down farming cooperatives was initiated and by the end of 1955 most of them ceased to exist. Their land was apportioned to those interested in agricultural activities. A newly-established agricultural estate in Dobrovo was allotted a portion of their land, fixed assets and the necessary inventory. In 1955, the Brda co-operative wine production made the decision and started building a new up-to-date 4,400,000-million-litre capacity cellar which took in the first crop as soon as 1957. In 1963, the state-owned estates and agricultural co-operatives merged into the Agricultural Co-operative Goriška Brda, the today Wine Cellar Goriška Brda with the head office in Dobrovo. Together with the revitalization of the vineyards (from 60 to 100 ha per year), the capacity of the cellar has been growing from year to year. Today it boasts of a capacity of 18,000,000 litres. All these years the Wine Cellar was the leading driving force in viniculture and viticulture in the Brda region. With aggressive advertising the Wine Cellar saw to it that people became aware of the Brda region and its excellent wines which are successfully marketed al over the world.

Hectares of vineyards owned by "Goriška Brda" z.o.o. Wine Cellar

	Wine Cellar "Goriška Brda" z.o.o.	Rest of the hectares in administrative unit of Nova Gorica	Hectares of vineyards in administrative unit of Nova Gorica - collectively
Hectares of vineyards	1	3408,75	**3409,75**
Portion (in %)	0,03	99,97	**100**

Source: Archive Wine Cellar »Goriška Brda« z.o.o., Dobrovo; Administrative unit of Nova Gorica

If we compare hectares of their vineyards to the rest of the area, their share is quite small, even less that 1%.

Comparison between Wine Cellars

Hectares of vineyards owned by both Wine Cellars - comparison

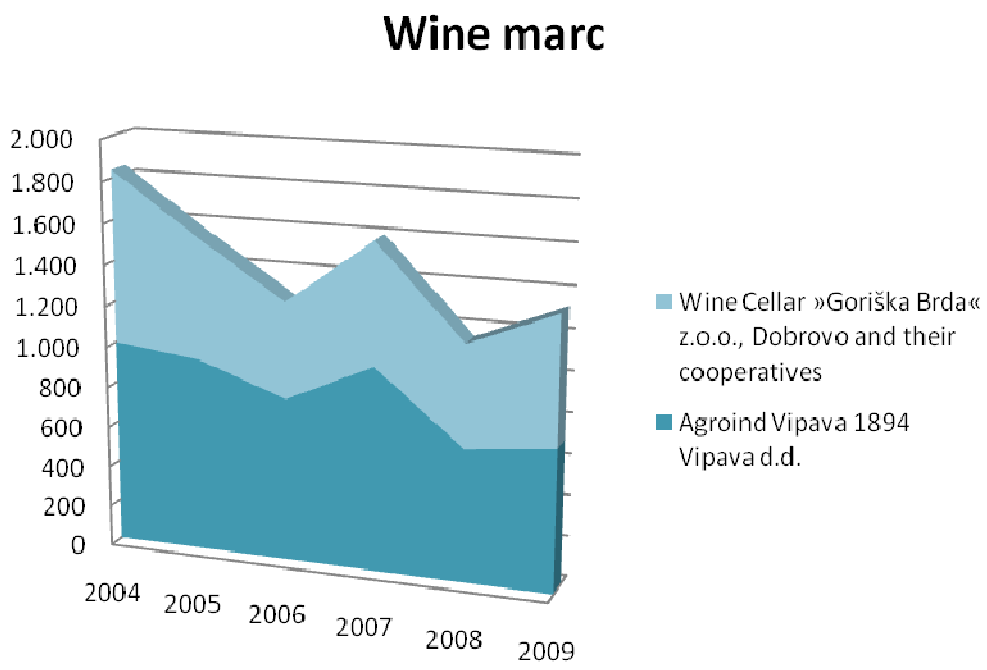
	Agroind Vipava 1894 Vipava d.d. in Wine Cellar "Goriška Brda" z.o.o. – collectively	Hectares of vineyards in private ownership	Hectares of vineyards - collectively
Hectares of vineyards	339,70	4.704,47	5.044,17
Portion (in %)	6,73	93,27	100

Source: Archive Agroind Vipava 1894 Vipava d.d.; Administrative unit of Ajdovščina; Archive »Goriška Brda« z.o.o. Wine Cellar, Dobrovo; Administrative unit of Nova Gorica

Produced amounts of wine marc in tons by years

Year	Agroind Vipava 1894 Vipava d.d.	Wine Cellar »Goriška Brda« z.o.o., Dobrovo and their cooperatives	Wine marc - collectively
2004	1.000	840	1.840
2005	950	595	1.909
2006	800	470	1.270
2007	1.000	595	1.595
2008	650	500	1.150
2009	700	630	1.330
Collectively	**5.100**	**3.630**	**8.730**

Source: Archive Agroind Vipava 1894 Vipava d.d.; Wine Cellar »Goriška Brda« z.o.o., Dobrovo



Up until 2007, Agroind Vipava 1894 d.d., Vipava Wine Cellar, was using their wine marc as a fertilizer in their own and their cooperates' vineyards. They had to take care of this bio-waste by their own and it was their cost all along. But in 2007 a company from Faenza (Ravenna, Italy) offered them to take all their wine marc and use them as raw material for producing biogas.

Wine Cellar "Goriška Brda" still uses their wine marc for fertilizing their own and cooperates' vineyards. A smaller part is used in process of distillation.

Production of vine shoot, however, depends on the ground it's growing in, the upbringing form, the sort of the vine … Because of all these parameters it is impossible to make even an approximate evaluation of the amount of vine shoot. Both wine cellars are included in integrated wine production, which means that the entire vine shoot stays in the vineyard. Returning of all organic substances back to soil is the whole meaning of integrated production. In Vipava Wine Cellar as well as in Brda Wine Cellar they grind vine shoot and grinded blend it with soil.

There were some attempts in Vipava in binding vine shoot and use them as logs, but there were problems like: binding machine was picking up too much soil, the logs were pressed

too hard and instead of drying they started to mould and rot, the expenses of binding were too high.

This was also the only attempt of using vine shoot in other way than grinding.

6. Use of wood in Slovenia

In Slovenia, especially on the countryside, wood is a very important and traditional source of energy. Around 30% of Slovenian households use wood for heating, but the potentials are much higher.

Due to long-term planning growing stock and increment in Slovenia are increasing for decades. The percentage of increment is at the same level and the possible cut is therefore higher.

In the last 50 years growing stock rose for 108%, while felling fluctuated from 2,000,000 m3 (1991) to 3,700,000 m3 (2006). Nowadays felling represents about 50% of the growing stock. Felling shows the economic and social use of forest resources in the national economy and local communities.

The study FAO Global Forest Assessment shows higher growing stock for Slovenian forests in comparison to European.

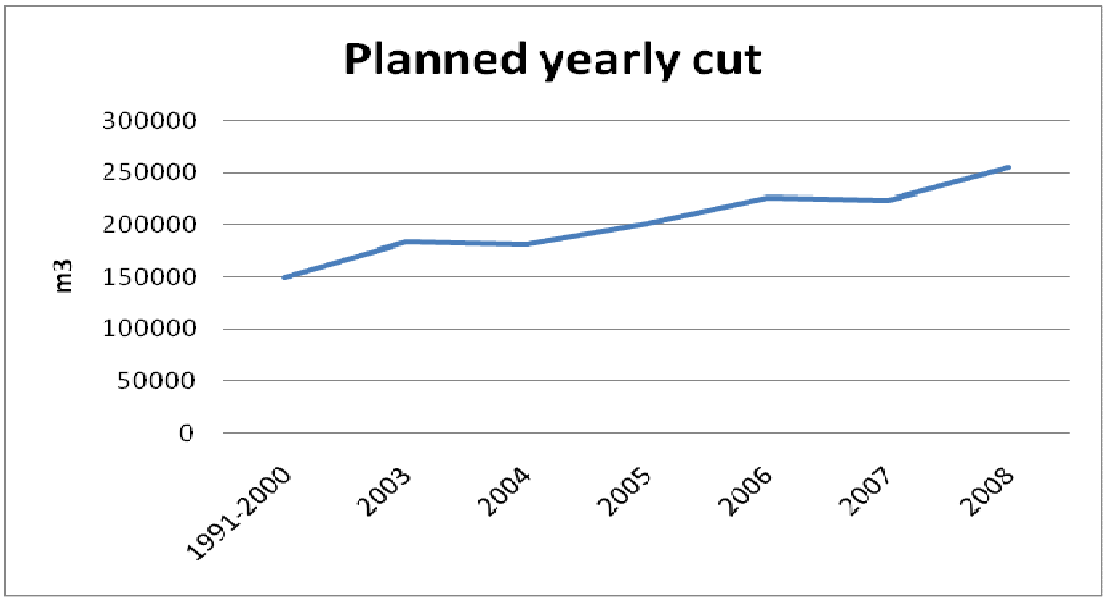
Planned yearly cut in the Northern Primorska (Goriška statistical region) by ownership

	state		municipality		private		together		
	i	d	i	d	i	d	i	d	∑
1991-2000	31.946	35.784	-	-	26.645	55.118	58.595	90.903	149.498
2003	28.682	47.002	3.561	2.042	32.388	69.402	64631	118446	183077
2004	28162	48068	2840	4412	29799	67592	60802	120072	180873
2005	39370	47994	2047	3158	35989	72777	77406	123929	201335
2006	40287	49512	3247	6136	40513	86754	84048	142402	226450
2007	42513	45295	4110	3353	52970	75772	99593	124420	224013
2008	44368	72699	5030	2090	48559	82294	97957	157083	255039

i…conifers

d…deciduous

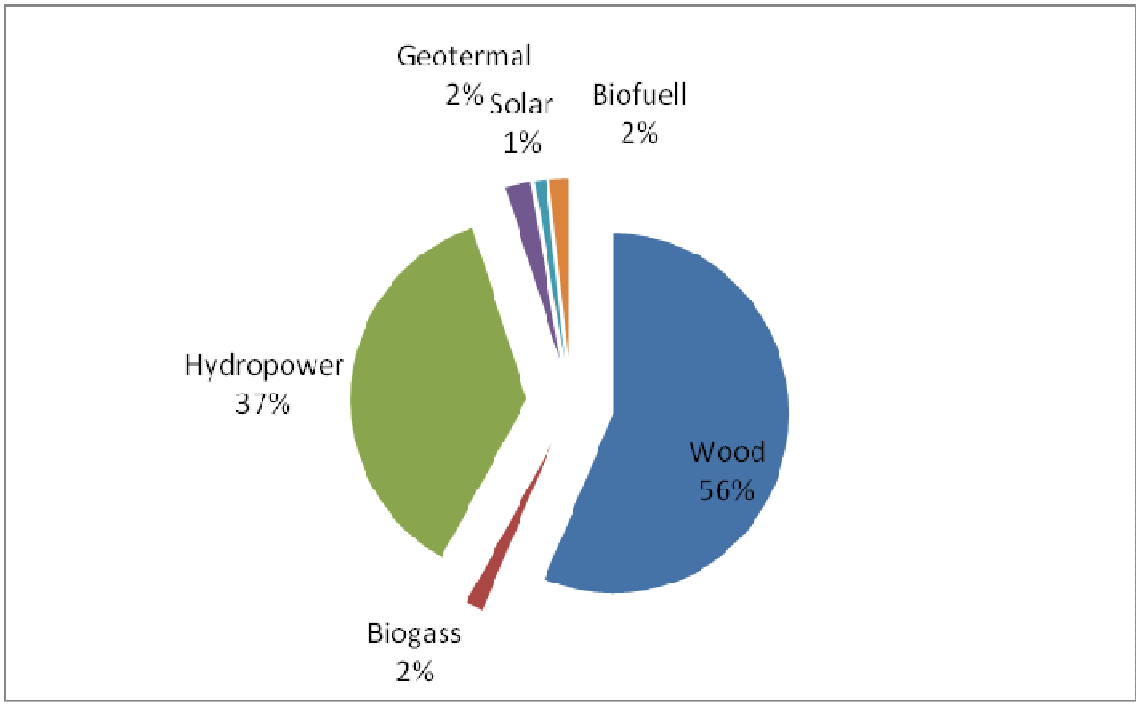
Planned yearly cut



Wood represents the most important renewable energy source in Slovenia. It is a result of a high percentage of forest coverage (58.4% in 2008). The largest part of biomass is used in households (76%) and industry (19%). Due to high prices of oil there has been an increase of biomass use in households, but the total sum is similar to earlier years. One of the reasons is also higher efficiency of heating systems.

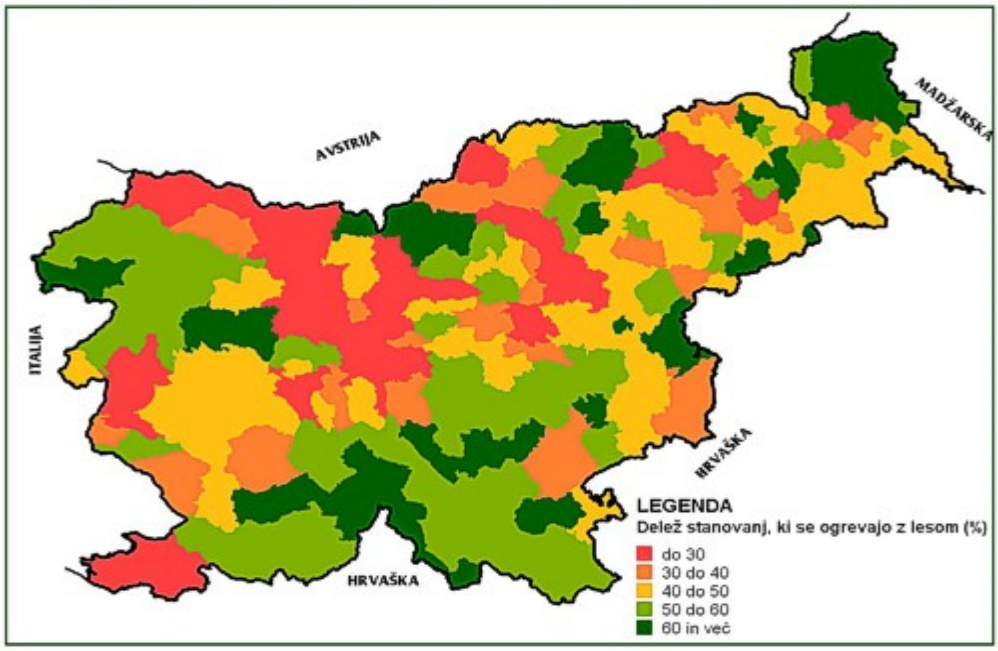
It is very hard to monitor the use of biomass in households, because landowners use and sell their own wood without retailers.

Renewable energy sources in 2007 for Slovenia



Source: SURS

Share of households heating with biomass



Source: National forest service

SWOT Analysis

Strength	Weakness
- renewable source - proximity to the source - potential cut - money flow stays in the region - strengthening of local economy	- fragmentation of land - dispersion of ownership - steep slopes - no organised biomass flow/market
Opportunity	**Threat**
- rising of purchase prices - overgrowing of landscape - sustainability of environment	- lack of control - natural balance - climate changes

Biomass flow in Northern Primorska (Goriska statistical region)

Biomass market in Slovenia can be divided onto two parts.

1. **From farmer to households**

Traditionally a big part of biomass is sold directly from farmer to households. Farmers pay their land taxes according to type of land and therefore they can sell the products (including biomass) directly to the buyer. This is a common way for smaller farmers and it is very hard to monitor it.

Survey from a project Nena (Alpine space) showed that there isn't much interest among farmers and small landowners, because they are sceptical about an organised biomass market. Now the unofficial market operates over established links and free advertising in media.

2. Organised Market

There are several companies that buy the biomass from the land owners and farmers, they process it and sell it on the market. The state and some municipalities also own forests and they usually find a contractor for the services in their forests.

An important part of the market is also a joint offer of technical solutions for heating and biomass supply. Especially for larger systems it is a common thing to provide a customer with all the support.

Slovenian Agency for efficient use of energy and renewable energy supported a project of internet biomass stock (http://ove.borzen.si/DesktopDefault.aspx). Companies can register for free and use it for three purposes:

- Biomass trading
- Free advertising
- Sharing useful information about biomass

When talking about the regional market, it is important to say that a big part of biomass is sold abroad to Italy and Austria for further use in different types of processing, also the remains from furniture production is exported to Italy.

One of the opportunities for an organised biomass market is bigger systems for heating that have been implemented recently.

Larger users of biomass by municipalities

Bovec

Bovec as a municipality owns a large area of forests and therefore it has a large potential of biomass use. There was a feasibility study for a larger system within the project NENA (Alpin space) and it is planned that a part of the town Bovec would be connected to the larger biomass heating system.

Ajdovščina

About 54% of energy is used for heating, 12% for warming the water and 34% in technology processes.

Use of energy sources in municipality of Ajdovščina	
wood	34,8 %
oil	19,5 %
gas	40,5 %
electricity	3,9 %
other	1,3 %

Source: Local energetic concept of Municipality Ajdovščina

Wood biomass is used in industry and in households for heating. It is estimated that households use about 26.000 m^3 or about 50% of needed energy for their heating and warming the water.

Use of energy sources for heating in public buildings (municipality of Ajdovščina)	
Oil	30,6 %
Earth gas	57,7 %
Fluid oil gas	11,7 %

Source: Local energetic concept of Municipality Ajdovščina

In industry biomass is used especially in wood processing sector Lipa Ajdovščina d.d and Excel d.o.o.. They use the remains from the production process – yearly 21.000 m^3. The local energetic concept also showed that there are still potentials for using biomass from Lipa Ajdovščina on other locations in municipality.

Also it is suggested that in higly concentrated areas bigger heating systems would be more efficient from existing smaller ones especially in case of using biomass from production processes.

Use of energy sources for heating in industry (municipality of Ajdovščina)	
Oil	2,1 %
Earth gas	78,0 %
Biomass	19,9 %

Source: Local energetic concept of Municipality Ajdovščina

Brda

About 50% of households in municipality use biomass for heating , but there is still a high potential of using more biomass according to the surveys from Institute for forestry.

Use of energy sources for heating in households (municipality of Brda)	
Oil	44 %
Electricity	2 %
Biomass	49 %
Other	5 %

Source: SURS 2002

Brda region is known for its wine production and therefore vineyards cover a large part of the landscape (1.615 ha in year 2000). It could be a potential for biomass but for now all the remains stay in vineyards for improving the soil.

Use of energy sources for heating in public buildings (municipality of Brda)	
Oil	69 %
Electricity	2 %
Biomass	1 %
Gas	28 %

Source: Local energetic concept of Municipality Brda

Use of energy sources for heating and production in industry (municipality of Brda)	
Oil	35 %
Electricity	55 %
Gas	10 %

Source: Local energetic concept of Municipality Brda

Kanal ob Soči

The use of biomass in households is relatively high, but there is still a potential, since forests cover about 75% of the landscape.

There was also a feasibility study within the project NENA (Alpin space) for the use of biomass. According to the study using of biomass has long-term potential in a larger system that would cover a part of the town of Kanal, especially public buildings.

Use of energy sources for heating in households (municipality of Kanal)	
Oil	28 %
Electricity	5 %
Biomass	63 %
Other	4 %

Source: SURS 2002

Use of energy sources for heating in public buildings (municipality of Kanal)	
Oil	69 %
Electricity	22 %
Gas	9 %

Source: Local energetic concept of Municipality Kanal

Use of energy sources for heating and production in industry (municipality of Kanal)	
Oil	0,3 %
Biomass	2,6 %
Gas	5 %
Other	92,1 %

Source: Local energetic concept of Municipality Kanal

There is one large factory Salonit in municipality Kanal that uses a lot of energy in its production and uses various materials (waste oil, waste fat, old tires, diesel, biomass, etc.). Therefore the percentage of category ''other'' is very high.

Miren-Kostanjevica

Use of energy sources for heating in households (municipality of Miren Kostanjevica)	
Oil	41,9 %
Electricity	21,2 %
Biomass	31 %
Other	5,9 %

Source: SURS 2002

Public buildings in municipality use mostly oil and gas for heating and also electricity. Also Miren-Kostanjevica has a potential of higher use of biomass. An investment study was prepared in July 2009 for a larger biomass heating in the town of Miren. There are five wood processing factories in the municipality and that is a good basis for installing a bigger heating system. The source of biomass would be factories and not directly landowners.

Use of energy sources for heating and production in industry (municipality of Miren Kostanjevica)	
Oil	12,9 %
Biomass	14,05 %
Gas	35,4 %
Electricity	37,65 %

Source: Local energetic concept of Municipality Miren Kostanjevica

Nova Gorica

Municipality of Nova Gorica has flat and mountain part. In the rural area there is no pipeline, therefore many households use biomass for heating. The problem is efficiency because the technology is mostly old. Many people own their forests and there are also some wood processing companies that are a great potential for different types of biomass.

Use of energy sources for heating in households (municipality of Nova Gorica)	
Oil	36,2 %
Gas	16,6 %
Biomass	37,8 %
Electricity	6,7
Other	2,7 %

Source: SURS 2002

The majority of the public buildings in municipality Nova Gorica use gas or oil for heating.

Use of energy sources for heating and production in industry (municipality of Nova Gorica)	
Gas	91,1 %
Other	8,9 %

Source: Energetic concept of Nova Gorica

Šempeter-Vrtojba

Use of energy sources for heating in households (municipality of Šempeter Vrtojba)	
Oil	75 %
Gas	13 %
Biomass	6 %
Other	6 %

Source: SURS 2002

The potential of using the biomass from the area of Šempeter-Vrtojba is relatively small, because the municipality is small and has small forest coverage. However it is very close to larger forest areas and could easily be a part of the wood processing chain.

Tolmin

Use of energy sources for heating in households (municipality of Tolmin)	
Oil	33 %
Gas	1 %
Biomass	66 %

Source: Energetic concept of Tolmin municipality

In recent years there have been many investments in modern smaller biomass heating systems and at the moment there is one bigger biomass heating system in Tolmin commercial zone. Within the project NENA there was also a feasibility study for the biomass heating system in the industrial zone, but for now the investment isn't planned.

Vipava

There is no energetic concept or any other similar study for now. According to the data from the municipality, almost all public institutions use gas for heating, only one school uses biomass due to remoteness.

7. Information on regional potential and demand for energy as well as problems due climate change

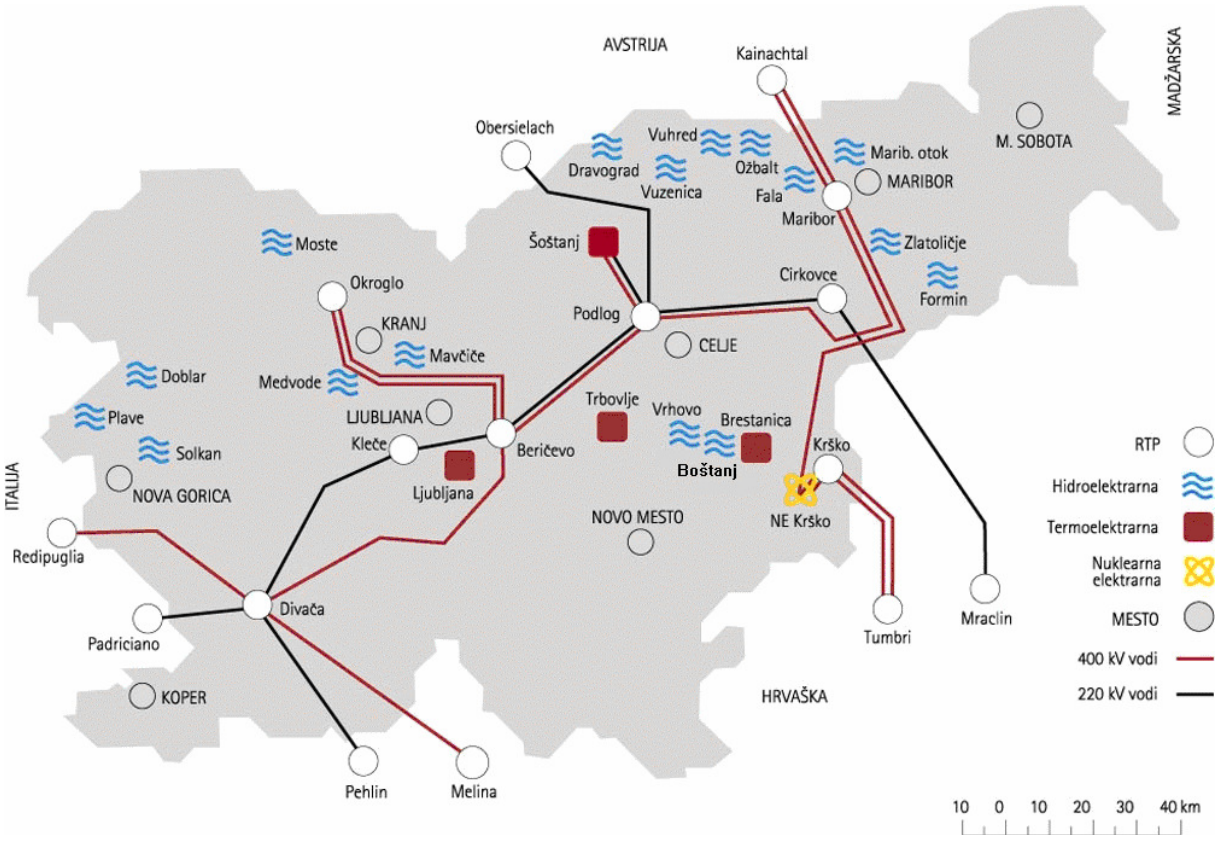
Production and demand in Slovenia in general

Energy consumption in Slovenia is showing the trend of constant growth in recent years. Also the rate of energy dependency on import is going up. The growth is a threat to a long-term goal of being more self sustainable at energy supply.

KEY ENERGY INDICATORS (Statistical office of the republic of Slovenia)	2000	2006	2007	2008
Energy production (1000 toe)	3122	3446	3456	3672
Total primary energy supply (1000 toe)	6360	7318	7336	7742
Energy dependency (%)	50,9	52,0	52,7	55,3
Energy intensity (toe/mio EUR 2000)	344	312	293	299
Total energy supply per capita (toe/capita)	3,23	3,64	3,62	3,81
MWh/mio EUR 2000	577	567	533	500
Electricity consumption per capita (kWh/capita)	5413	6615	6584	6369
Share of electricity from renewable sources in total electricty production (%)	28,6	24,5	22,5	26,3
Share of electricity from renewable sources in gross consumption of electricity (%)	31,7	24,4	22,1	29,1

The structure of different energy sources is similar to other countries of the Alpine area and is mostly related to the regional possibilities.

Bigger power plants in Slovenia



Fuels and energy production (STAT)	2000	2006	2007	2008
Brown coal (1000t)	736	588	483	489
Lignite (1000t)	3743	3934	4052	4032
Crude oil (1000t)	0,6	0,3	0,3	0,2
Natural gas (mio Sm^3)	6,8	4	3,4	2,6
Electricity (GWh)	12795	14117	14044	15357
Hydroelectric power plants (GWh)	3771	3536	3215	3959
Conventional thermal plants (GWh)	4476	5291	5400	5425
Nuclear power plant (GWh)	4549	5290	5428	5972
Heat (TJ)	9172	9424	8609	9121

Fuels and energy consumption (STAT)	2000	2006	2007	2008
Brown coal (1000t)	1099	1174	1082	974
Lignite (1000t)	3719	3992	4115	4161
Motor gasoline (1000t)	772	639	620	652
Diesel oil (1000t)	421	961	1168	1443
Light fuel oil (1000t)	675	592	421	515
Fuel oil (1000t)	85	52	19	10
Liquified petroleum gas (1000t)	92	83	83	84
Natural gas (mio Sm^3)	1014	1105	1124	1079
Electricity (GWh)	10664	13298	13337	12945
Heat (TJ)	8181	8017	7179	7812

Source: SURS

Energy production in Northern Primorska (Goriška statistical region)

Present State

Hydropower

Especially the northern part of the region is an Alpine area with high precipitation and therefore with great potential for use in hydropower plants. There is a company Soške elektrarne (the name is related to the river Soča) that manages with the hydropower potential of the region. Their activities are related to the maintenance of existing plants and also to the new possibilities and future investments. Recently they finished an investment in Pumped - Storage HPP Avče that is a net user of energy but it will be used to supply the peak points when the energy is the most expensive. Within the identified project for the near future there are:

- **The refurbishment of the existing hydropower plants**: replacement of the used out hydro mechanical equipment on the dams and the aggregates.
- **The introduction of a new hydropower plant operation concept** which envisages the unification of the hydropower plants on the Soča River. The advantages of a unified chain of hydropower plants are the optimization of the operating, the cost reduction and a more flexible allocation of the manpower.
- **The maintenance of the hydropower plants**: upgrading and up-to-dating of the information system, the introduction of new monitoring techniques, analyses and classification of the potential causes for failures/breakdowns and their consequences.

There is also a long term strategy that identified the possibilities of building new facilities:

- **The construction of hydropower plants on Učja River.**
- **The construction of a chain of hydropower plants on the Idrijca River.**

In addition there are several small hydropower plants on brooks in private ownership but part of the grid.

Biomass – wood

Wood is traditionally used mostly for heating in households since it is a local source and many people own land with a forest.

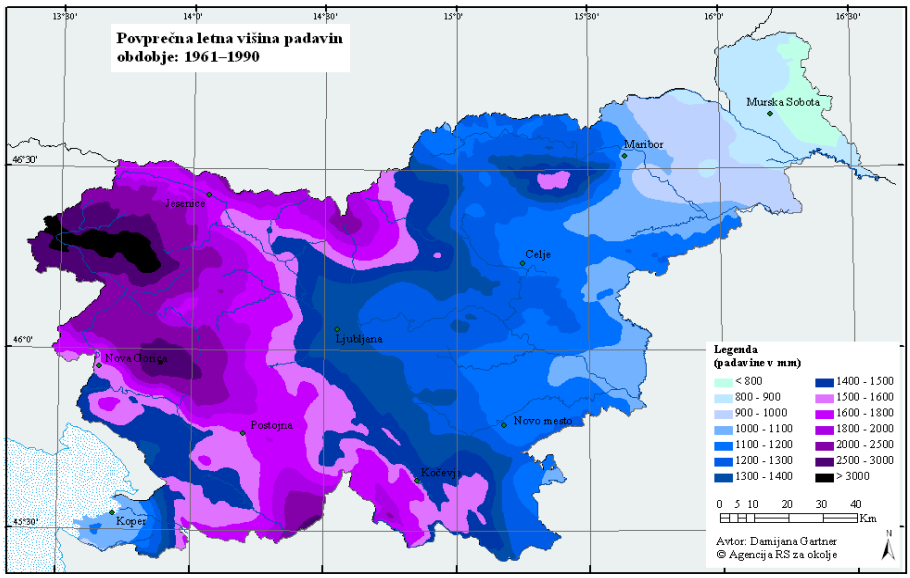
There are also some bigger facilities being implemented in recent years but this is still under development and is more a potential at the moment.

Potential

Hydropower

In the Alpine areas the use of water power is a part of a long tradition. The first potential is modernisation of existing power stations since the efficiency level can be increased. Examples showed that it can double or even triple the power generated from the power station.
Improvement should have the first priority over new constructions. However the potential of building new hydropower stations exists and is most likely to happen in the near future since the energy consumption is still rising. Each new power station has a big impact on the environment and it should be checked in details according to the water framework directive and other related laws. Especially at bigger facilities there is a conflict with the residents and other stakeholders of the degraded area.
Power production from water is strongly impacted by climate changes, since the hydrologic balance of rivers is changing. The precipitation is changing, the snow in the mountains is effecting the spring level of water.

Average yearly precipitation

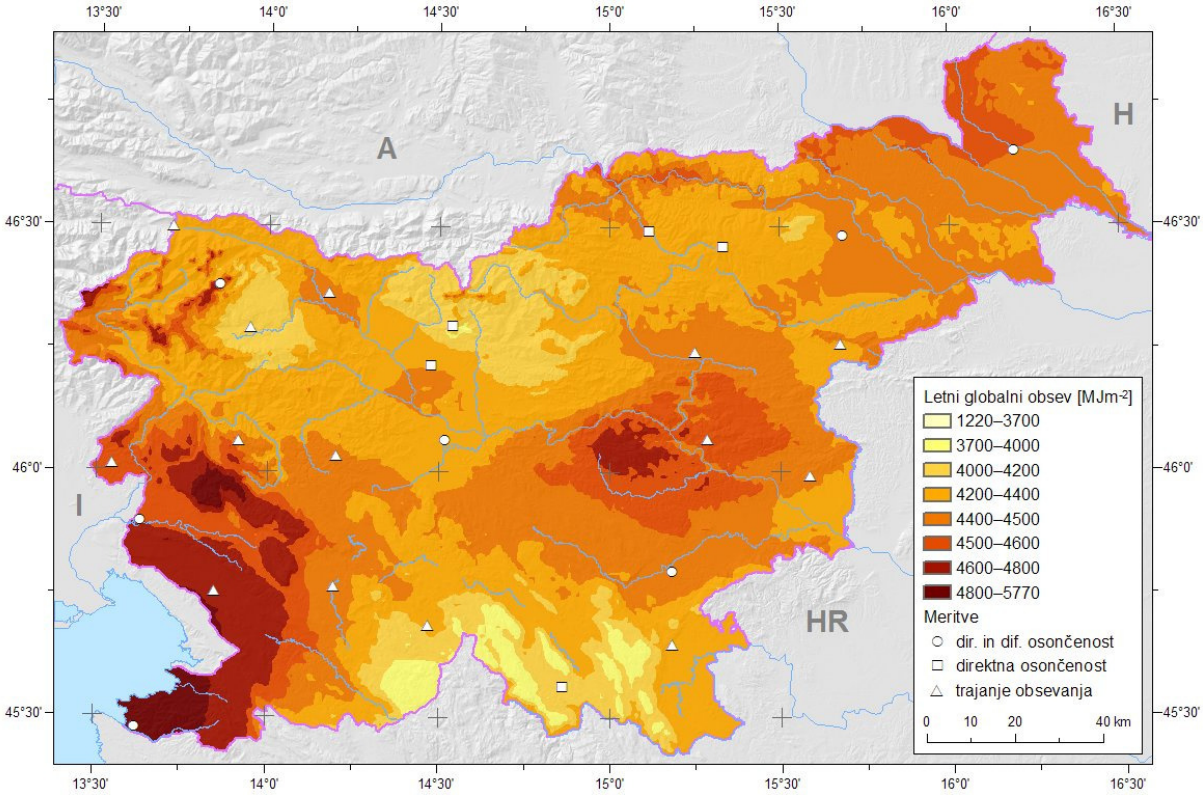


Source: ARSO

Solar power

Energy of the sun is a big potential because it can be used for private purposes or for public. In many cases the traditional use of energy of the sun for hot water is now being upgraded to photovoltaic systems and bigger systems are being implemented. The use of solar energy has also very little impact on climate and the possible climate changes also shouldn't impact the efficiency of these systems. Solar energy is also a good solution for remote areas not part of the grid (mountains villages, huts …). Especially Primorska region has a lot of sunny days and the efficiency of solar panels is therefore much higher. There have been many projects in recent years related to implementation of bigger systems in the area.

Energy from the sun within one year



Source: www.razvojkrasa.si/file/643/mjvsyarqwb.jp

One of the most popular solutions is refurbishment of the roofs of schools with solar panels. There is also a stock of roofs as a potential for possible investments in the future.

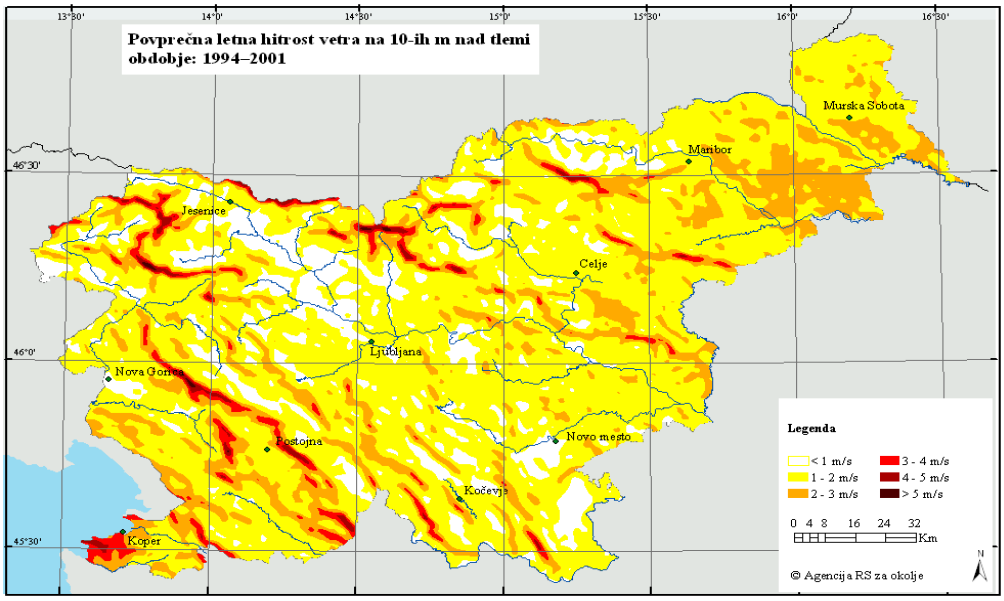
Biomass

The use of wood for heating is a traditional way of heating in the area. In some parts the gas line and the low prices of oil related products changed the consumers' behaviour in the past but many of them they are now, due to boosting prices, coming back to wood. Also the efficiency of devices is much better than it was in the past and what is important is also that the energy source is available locally to avoid unnecessary costs and emissions. Furthermore it offers a closed added value chain for local population.
Other sources of biomass could also be used in the future.

Wind

Wind is considered as a great possibility for the future. Slovenia is one of the rare countries without wind turbines. The region of Northern Primorska (Goriska statistical region) and especially the Vipava valley has a great potential but for now the technology can not manage such extreme wind conditions. The wind is not constant and the speed often exceeds 100 km/h so that the turbines can not operate in such conditions. However if technology can find a way that turbines could operate it could be an added value. There is also a question of storage of the power that would have to be answered since the production would depend on relatively unstable wind conditions. The possible solution would be pumped storage hydropower stations.

Average yearly wind speed 10m above ground (1994 – 2001)



Source: ARSO

In Slovenia there have been great discussions about the impact of wind turbines on species, especially when the turbines were within Natura 2000 area. NGOs blocked the implementation of a planned system and it is most likely to expect similar discussion in the future.

Biogas

We can not expect a large part of energy produced from biogas since farming as the biggest potential covers only the low parts of the region. There are some possibilities and initiatives that will result in smaller facilities for better energy efficiency and also to reduce the emissions from possible waste deposits (regional dump, wine marc, animal farms, …).

Geothermal energy

The possibility of using geothermal energy is usually related to hot mineral water and tourism. The main problem is that the risk of not finding hot water is very high and it is hard to find potential investors.

''Energy savings''

This is not an energy source but it can have a big influence on the future needs for energy supply and demand. Changing the consumers' behaviour is an important task in sustainable use of energy.

SWOT Analysis

	strength	weakness	opportunity	threat
Hydropower	Already tested, existing management structure	Big change in landscape, high investment costs	Great potential	Climate change – changes in precipitation, conflict with nature conservation, conflict with residents
PV	Possibilities of different size investments, good climate conditions	Scattered market	Good funding possibilities,	No guarantee for the buyout prices in the future
Biomass	Traditional use	Low efficiency of implemented devices	Prices of oil related energy will boost	
Wind	Diversifications of supply	Extreme wind conditions, no strategy and best practice	Smaller facilities	Stability of the windy conditions, conflict with nature conservation
Biogas	Using of waste	transport	Long term sustainability	Input of materials
Geothermal energy	New potential	High investment costs	Use for heating, tourism development	High risk before drilling (no guarantee)

8. Climate Change in Slovenia – possible trends

The earth's climate is changing and that is a global problem and a challenge for the society at the same time.

Many scientist agree that the temperatures will continue to rise and will bring changes in weather patterns.

In April 2009 the European Commission presented a policy paper known as a White Paper which presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change. The changes will vary by regions and mountain areas are particularly vulnerable – many of the adaptation measures will need to be carried out nationally or regionally. Adapting to climate change will be integrated into all EU policies and will feature prominently in the Union's external policies to assist those countries most affected.

Climate change trends in Slovenia according to European Commission's Joint Research Centre

Observed trends:

- The annual mean temperature has increased by around 1.5° C over the past 35 years;
- The impact on ecosystems is manifest, for example agricultural crops are flowering 1-2 weeks earlier than 30 years ago.

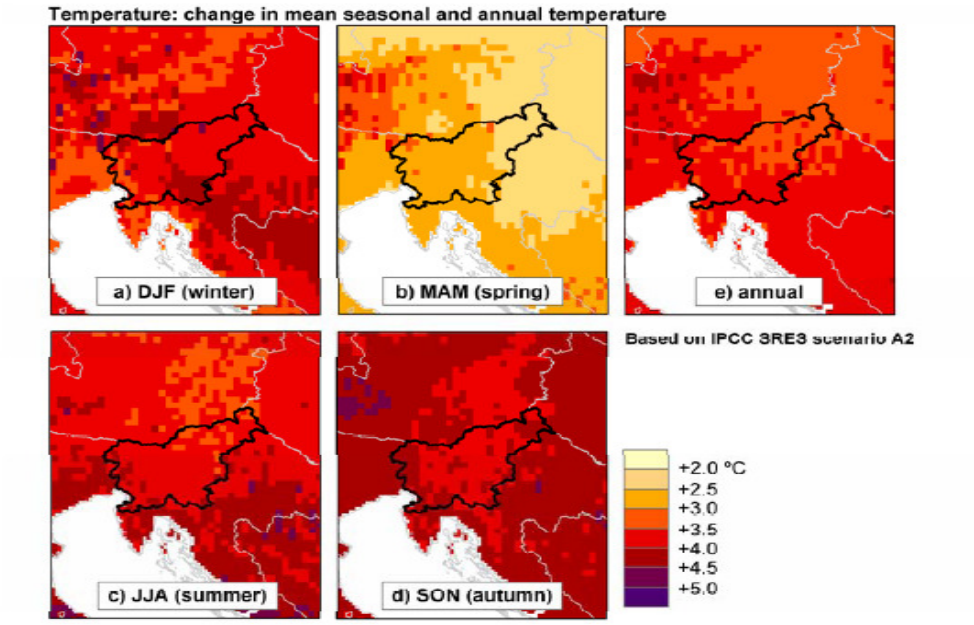
Projected trends:

- Temperatures will increase up to 3-4 degrees Celsius by the end of the century under certain scenarios2;
- Under the same scenario sustainable fresh water resources in Slovenia are projected to increase in winter and spring, whereas reductions of 40% and more are projected in summer and autumn;
- The frequency and severity of droughts will increase;
- An increase in the occurrence of extreme precipitation events and flash floods is likely;
- The projected climate-induced changes in Slovenia will aggravate the impact of other stresses, such as those of land use and demographic or socio-economic changes, on

water availability, freshwater ecosystems, agriculture, energy production, navigation, irrigation, tourism and several other sectors.

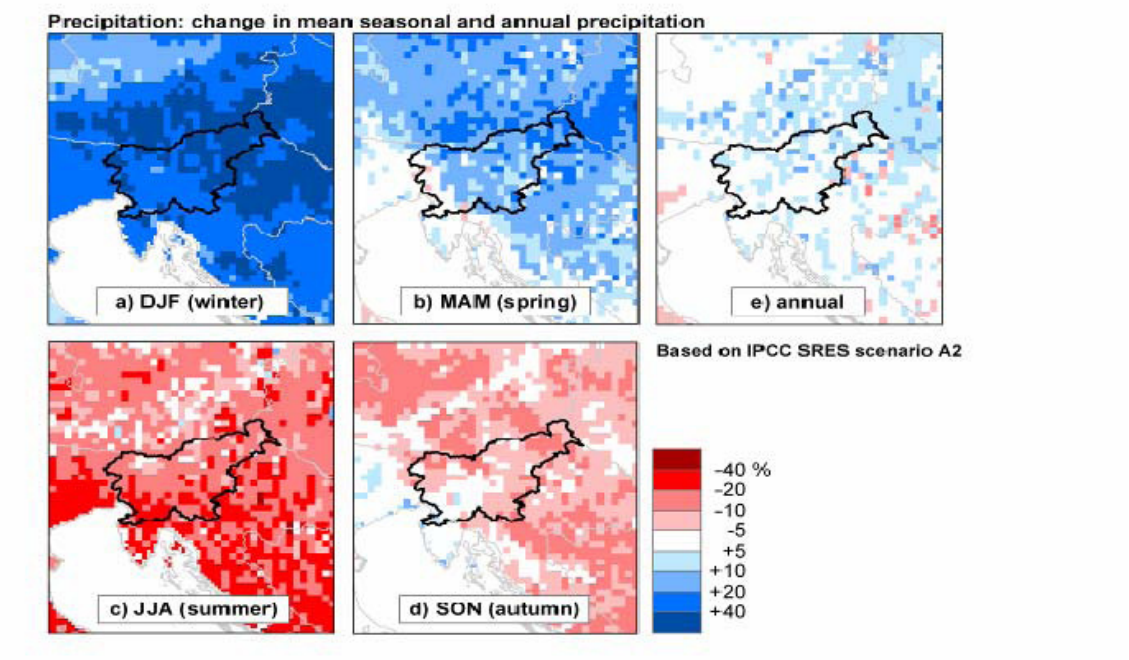
See below for information on SRES scenarios and the Intergovernmental Panel on Climate change.

Change in **mean temperature** in Slovenia (1970-2004) (between 1961-1990 and 2071-2100, based on IPCC SRES A2 scenario)



DJF = December, January, February, etc.

Change in **mean precipitation** in Slovenia (between 1961-1990 and 2071-2100, based on IPCC SRES A2 scenario)


Precipitation: change in mean seasonal and annual precipitation
a) DJF (winter)
b) MAM (spring)
e) annual
c) JJA (summer)
d) SON (autumn)
Based on IPCC SRES scenario A2
-40 %
-20
-10
-5
+5
+10
+20
+40

Overview of various energy sources and relationship with climate change

	Energy source	Use	Effect on climate	Impact of climate change	Contribution to energy consumption in the Alpine countries	Potential, conflicting goals
Fossil energy sources	Coal	Heat, electricity	Highly detrimental to climate	Medium (cooling water)	Medium	Greater use would be counterproductive in terms of climate and environmental policy
	Crude oil	Heat, electricity, fuels	Detrimental to climate	Medium (cooling water)	Very high	Greater use would be counterproductive in terms of climate policy
	Natural gas	Heat, electricity, stationary engines	Detrimental to climate	Medium (cooling water)	High	Greater use would be counterproductive in terms of climate policy
Traditional renewable energy sources	Water power	Electricity	Low impact on climate	High (changes in water flow)	Relatively high	Potential exhausted in a considerable part, conflicts with nature protection
	Traditional biomass (firewood)	Heat	Low impact on climate	Medium (changes in growth through climate change)	Relatively high	Still relatively high potential; potential conflicts with nature protection
New renewable energy sources	Modern biomass (Bio fuels, Pellets …)	Electricity, heating, fuels	Depends on production method	Medium (changes in growth through climate change)	Minimum, growing	High potential estimated, probably overvalued. Conflicts with nature protection and food production
	Wind energy	Electricity	Low impact on climate	Medium (danger through storms)	Still minimum, rapidly growing	Medium potential in the Alps

	Solar power	Heat, electricity	Low impact on climate	Minimum (changes in sunshine hours)	Still minimum, rapidly growing	High potential, in particular in heat production
	Terrestrial heat, industrial waste heat, combustion heat from waste	Heat	Low impact on climate	Minimum	Minimum	Relatively high potential for spatial heating
Nuclear power	Nuclear fission	Electricity	Risky. Final storage issue not solved	Regionally different, based on water availability (cooling water)	Relatively high	Due to ecological and social risks and long term consequences linked to high acceptance problems

Source: Prolim 2007