



## **REGIONAL INVENTORY MARIBOR – PODRAVJE REGION in SLOVENIA**

### **Geography**

Slovenia is a country in Central Europe touching the Alps and bordering the Mediterranean. Slovenia borders Italy on the west, the Adriatic Sea on the southwest, Croatia on the south and east, Hungary on the northeast, and Austria on the north. The capital and largest city of Slovenia is Ljubljana (350.000 inhabitants). Slovenia covers an area of 20,273 square kilometers and has a population of about 2 million. Around 40% of Slovenia's land mass is elevated land - mostly in the form of mountains and plateaus - which is located in the interior regions of the country. Slovenia has governmental system with only two levels: national and local. Local level presents local authorities – municipalities. There are around 210 municipalities and they are independent. Out of it comes also that all the legislative documents are prepared at national level. At local level only minor legislative documents are adopted covering only very local issues. There is no regional level in Slovenia. Geographically we are talking about regions. Podravje region is covering the area close to Drava river and covers around 11% of the area of Slovenia. There live around 322.000 people, 16% of Slovene population. The centre is Maribor, second the biggest town in Slovenia with 120.000 inhabitants. Municipality of Maribor is second the biggest municipality and city in Slovenia with 147 km<sup>2</sup>. It is a University City and financial, cultural, sport capital of north eastern part of Slovenia.

### **Economic situation in Slovenia**

#### **Economic situation in the region**

Maribor is the second largest town in Slovenia, with its population, including the suburbs, amounting to 180,000 people. Before Slovenia's independence, the town was one of the major industrial centres in former Yugoslavia and faced numerous environmental problems. There were a lot of production industry in metal, textile, car, weapon sector. After the independency many big companies had bankrupted and many people were unemployed. Now the region is becoming more and more service sector oriented area. Today there is 129.743 working people which is about 14,7 % of all workers in Slovenia. The most of them are employed in service sector, following by real estate service, education, health and social care and traffic. The sector of production is only presented with some metal production sector. Only few systems are in food and electronic equipment production. The unemployment rate in the region in 2008 was 9,4% what is more than national average. In January 2009 were unemployed 15.282 persons and it presents 20,7 % of all unemployed persons in Slovenia.

The regional GDP in 2006 was 13.052 EUR per capita which is about 84% of the national average.

## **State of the art in energy field in Slovenia**

Slovenia is a young state. We gain our independency in 1991. The first legal act about energy matters was adopted in 1999. Before an old Yugoslav law from 1981 called Energy management law was used. The main objectives were permanent energy supply, decreasing the amount of imported energy, more efficient use of our own energy sources, rational production and use of energy. It covered coal, nuclear, oil-gas, electricity and district heating activity. It stated that these activities should be economically reasonable and safe and the use of energy sources should be optimal. The law mentioned unconventional energy sources: solar, wind, geothermal, waste. The development of these systems was a part of programme for development of conventional energy sources. Till 1991 the Slovenia was socialistic state and energy prices were low and not market regulated. Incomes were low and people were modest: not every family got a car, TV, there were not so many domestic appliances and equipments. In late 80s there were also restrictions in electricity and petrol use. People used energy very rationally and efficient. After our independency 1991 the development has began: the production of energy has raised and also the use. The incomes and GDP has grown and people were able to buy more cars, equipment and appliances. Before a lot of people use wood biomass for heating but they changed their system to oil because it was more comfortable for use. The prices were not so important at that time. People just wanted to catch the "western world" and their way of life which was that was prohibited for so many years.

The new Slovene energy law was adopted in 1999 and upgraded in 2004. It has determined the energy policy, roles for energy market, energy supply and reliability and efficient use. It assured competition on energy market. The efficient use of energy and the use of renewable energy sources were a part of an energy policy. Efficient use and saving the energy were set in the first row. The state has set the obligation to educate and inform the people about rational use of energy (RUE) and use of renewable energy sources (RES), to introduce energy advices, audits, local energy concepts, to set funds for investments in RUE and RES. People have not taken much care about new law. Since 1991 each year there were more products per inhabitants that use energy. The rational use of energy seems to people like to hold back their development and living standards. The prices for energy are not so high that energy saving could be seen in much money savings. The family payments for electricity are much lower than for telephones, the petrol prices are low and one person in car is cheaper than using public transport. They do not see a lot of reasons for savings and RES. People are aware a bit about the climate changes but their point of view is that it will happen somewhere else not in Slovenia, we are so small that can not do anything. We do not have any experiences with ESCOs. The law in Slovenia does not say anything about it and there is no company in Maribor to offer such service.

## **RES in Slovenia**

The main source of RES is water for electricity production (ca 30%). The RES presents only 8% in the whole primary production in Slovenia and main source is water. The use of solar systems presents less than 1% and out of it the main share is production of electricity.

## Current solar thermal market development

### Climate data

The climate data for Maribor shows that it has a main subpannonic characteristic. Average yearly temperature is 9.4°C. There are not many oscillations in average yearly temperatures in the past. The lowest average temperature in January is -1.3°C, the highest average temperature in July is 19,7°C. Winters are quite cold, springs are coming early, summers are hot and autumns are warm and dry. The average in yearly fall is 1050 mm, the most of them are in May, June and July. In Maribor region there is also a lot of sunny days, yearly average is 266 days. There is not a lot of fog, it appears sometimes in November and December. As a weather consequence the heating season in Maribor is in average 227 days for period 1990-2007.

### Solar thermal market

The solar thermal market in Slovenia is developed only in the field of domestic use. About 3% of households have solar thermal installations with an average surface of 5,9 m<sup>2</sup>. Industrial process heat applications are virtually unknown and non-existent.

#### Important market players and stakeholders for solar process heat in the region

Slovenia has no big solar equipment production companies. There are only services that buy the systems from abroad and sell them after. They usually offer consultancy in preparation of documentation and they offer the installation services. There are only few solar thermal heat producers with very small production capacity. There is no knowledge about the use of solar heat in processes. The main market players are all listed in the solar companies listing. The cost for solar thermal installations for households in the region are in the range of 600 to 800 EUR per m<sup>2</sup> (final price). There is no large scale installation in Slovenia.

In Table 1 there are information about the prices of competing energy sources in Slovenia.

Table 1: Prices of energy sources in Slovenia in November 2009

Energy carrier	Unit	Price (z DDV)	Heating power	Energy price	Conversion method	Efficiency	Useful energy price	Ranking highest to lowest price	Energy supplier		
		€/unit	kWh/unit	€/kWh	Description		€/kWh				
Natural gas with yearly use from 501 to 1500 Sm <sup>3</sup>	Cena dobavljenega plina €/Sm <sup>3</sup>	0,3667	9,50	0,0407	Old high temperature boiler	84%	0,0485	19	Pinarna Maribor <a href="http://www.pinarna-maribor.si/">http://www.pinarna-maribor.si/</a>		
	Fiksni del-omrežnine	4,0000			Low temperature boiler	92%	0,0442	22			
	Variabilni del-omrežnine	0,1229			Condensation boiler	109%	0,0373	26			
	Skupna cena velja pri porabi 1000 Sm <sup>3</sup> letno	0,5378									
Natural gas with yearly use from 1501 do 2500 Sm <sup>3</sup>	Cena dobavljenega plina €/Sm <sup>3</sup>	0,3667	9,50	0,0407	Old high temperature boiler	84%	0,0485	19	Pinarna Maribor <a href="http://www.pinarna-maribor.si/">http://www.pinarna-maribor.si/</a>		
	Fiksni del-omrežnine	4,0000			Low temperature boiler	92%	0,0442	22			
	Variabilni del-omrežnine	0,1229			Condensation boiler	109%	0,0373	26			
	Skupna cena velja pri porabi 2000 Sm <sup>3</sup> letno	0,5336									
UNP propane (tank)	€/l	0,5500	6,53	0,0842	Old high temperature boiler	84%	0,1003	3	Petrol <a href="http://www.petrol.si/">http://www.petrol.si/</a>		
					Low temperature boiler	92%	0,0916	5			
					Condensation boiler	109%	0,0773	11			
UNP propane-butane (tank)	€/l	0,5500	7,23	0,0761	Old high temperature boiler	84%	0,0906	6	Petrol <a href="http://www.petrol.si/">http://www.petrol.si/</a>		
					Low temperature boiler	92%	0,0827	9			
					Condensation boiler	109%	0,0696	14			
Heating Oil (ELKO)	€/l	0,6250	10,00	0,0625	Old high temperature boiler	76%	0,0822	10	Petrol <a href="http://www.petrol.si/">http://www.petrol.si/</a>		
					Low temperature boiler	94%	0,0665	15			
					Condensation boiler	102%	0,0613	16			
Lignite	€/t	239,00	3100,00	0,0771	Boiler wood coal	65%	0,1186	1	Bioles Horizont <a href="http://www.bioles-horizont.si/">http://www.bioles-horizont.si/</a>		
					Boiler wood coal	75%	0,1028	2			
Brown coal	€/t	320,00	5000,00	0,0640	Boiler wood coal	65%	0,0965	4	Bioles Horizont <a href="http://www.bioles-horizont.si/">http://www.bioles-horizont.si/</a>		
					Boiler wood coal	75%	0,0853	7			
Wood	€/pm	69,90	2410,00	0,0290	Open chimney fireplace	40%	0,0725	12	Bioles Horizont <a href="http://www.bioles-horizont.si/">http://www.bioles-horizont.si/</a>		
					Boiler wood coal	70%	0,0414	25			
					Modern wood gassifier	93%	0,0312	28			
Wood chips	€/nm <sup>3</sup>	18,00	800,00	0,0225	Chip boiler	84%	0,0268	30	EKO LES Ptuj Biomasa		
					Chip boiler with lambda regulatio	91%	0,0247	32			
Pellets	€/kg	0,2200	5,00	0,0440	Pellet boiler	86%	0,0512	17	Profiles Bioles Horizont <a href="http://www.bioles-horizont.si/">http://www.bioles-horizont.si/</a> Eneries <a href="http://www.eneries.si/">http://www.eneries.si/</a>		
					Pellet boiler with lambda	92%	0,0478	21			
Remote heating	Toplotna €/kwh	0,0445					0,0508	18	Toplotna oskrba Maribor <a href="http://www.jptom.si/">http://www.jptom.si/</a>		
	Obračunska moč	1,5735									
	Skupaj pri letni porabi 12000 kwh in moči 4 kW	0,0508									
Electric energy for households	II. tarifna stopnja (do 7kW) – Enotarifno merjenje	€/kwh	0,0754			Electric heater	95%	0,0717	13	Elektro Maribor <a href="http://www.elektro-maribor.si/">http://www.elektro-maribor.si/</a>	
						Heat pump earth water (35°C)	390%	0,0193	34		
						Heat pump air water (35°C)	300%	0,0251	31		
	II. tarifna stopnja (do 7kW) – Višja tarifa vsak delavnik od 6.00 do 22.00	€/kwh	0,0806				Electric heater	95%	0,0651		8
							Heat pump earth water (35°C)	390%	0,0207		33
							Heat pump air water (35°C)	300%	0,0269		29
	II. tarifna stopnja (do 7kW) – Nižja tarifa vsak delavnik od 22.00 do 6.00 ter soboto, nedeljo in med prazniki	€/kwh	0,0418				Electric heater	95%	0,0437		24
							Heat pump earth water (35°C)	390%	0,0107		36
							Heat pump air water (35°C)	300%	0,0139		35

## Financial supports:

The different subsidies for energy related projects are only at national level. The local level does not have any fund for financing the energy systems. And also by law the municipalities are not allowed to finance the industrial sectors. There are possibilities to get money through some EU structural fund's projects. The limitations are 200.000 EUR in three years period. The industry in Slovenia they are in very bad energy efficient field. Usually they do not even have the energy audits done. So they ask firstly for subsidies to cover the cost for making the processes more energy efficient. There is no special programme for financing the solar thermal installation in processes. There are programmes to finance the photovoltaic systems. The subsidies are for private sector – households. There are government supported crediting programs that enable investors to get beneficial crediting for renewable energy investments, hence also solar process heat in industry. But the credits in such systems are also included in State aid system.

### **Industrial sectors of special interest**

There is not a lot of industrial sectors in the region. They all are in bad energy use conditions. Some of them they have done the energy audits of their processes. And the results are that they are very inefficient and have to deal firstly with energy efficiency, they usually have a lot of waste process heat. To search for RES is not their priority.

Each municipality is putting a lot of efforts to get or to have a business economic development area where different services and processes could be placed. But mainly in these areas are services: shops, logistic centres,... In the region of Podravje there is development zone Tezno. Zone Tezno is developing industrial, business and services zone in Maribor and the biggest area of its kind in Slovenia (108 ha). It includes 180 companies with more than 3000 employees. As the energy performance in all sectors is not good there is no sector with special interest. After the first check there are two companies dealing with the preparation of food for animals and wool production that are interested in cooperating in the project SO PRO.

### **Solar process heat applications already identified**

Two processes were already identified to be a potential pilot project: sheep wool washing and drying and livestock food substrate heating for further applications.

### **Regional approach to companies or screenings and for pilot projects**

The first list of potential companies was prepared according to national databases and in cooperation with the experts in the field of industrial processes energy auditing. Final list will be prepared in the beginning of the next year with the help of Regional Chamber of Commerce. The processes for screenings were selected on the basis of temperature range of their processes and only for the companies that already have a energy audit done and we know that there is not enough process heat in the process.

### **Regional approach to other relevant stakeholders** (e.g. companies which could become active as ESCOs in the field of solar process heat)

In Slovenia the system of ESCOs is not developed yet. There are only very few companies working in the field. The actively involved is company Weishaupt and they could become an ESCO but they do not have such experience yet.

### **Market development - outlook**

The market potential for solar process heat is not very big in Slovenia since the industrial processes are in bad condition regarding the energy efficiency. Also due to financial crises the companies have difficulties to make some new projects. The energy strategies at national level are also not prepared yet and companies do not have a framework programmes where to go. There is not special financial scheme for energy efficiency in industry and also not for solar heat. The national directives are focused mainly on photovoltaic systems and cogeneration units for electricity production.

### **Factors for success for the positive market development of solar process heat in the region**

In the first phase the main impact might be made with the national or local energy development strategies to give the headways for industries to work in the field of energy efficiency first and also in RES field. Also the governmental subsidies, regulations (minimum percentage of renewable energy requirements) and promotion programs would make a move. In the future only a price rise of fossil and other energy carriers will produce a breakthrough in the market. Very important are also the educational programs for companies and the experts. At the high school's level in Slovenia the solar heat in the processes is not a subject to be presented to students.