SOPRO PROJECT

WP2- SUMMARY SCREENINGS

INDEX

1	**Introduction**	**3**
2	**Summary of Screenings**	**4**
2.1	Selection of companies for screening	4
2.2	Industrial sectors	6
2.3	Basic process	7
2.4	Company size	7
2.5	Energy substituted	8
2.6	Flow temperature	9
2.7	Heat demand	9
2.8	Energy cost	10
2.9	Sopro economic ratio	11

1 Introduction

Based on the result of task 2.1. (Regional Inventory), energy screenings have been carried out in industrial companies that presented potential in solar for process heat installation.

The screenings are short analyses that include relevant information needed to develop an initial evaluation of the feasibility of a solar system. Screenings include data on the industrial sector, existing processes, heat demand, current energy supply or energy cost. A summary of the screening results is presented in this document.

ENERGY SCREENINGS

So-Pro Project Partner: **ESV**
Energy Screen No: **7**

Company Information

Name of the company	
Address of the company	
Address of the company site analysed	
Contact person	
Position of the contact person	
Phone numbers	
e-mail:	
Business sector of the company	butchery
Main products	meat
Number of employees (approx.)	30
Main energy supply systems	district heat, electricity, liquid gas
Main processes	scalding, cleaning, cooling
Date of the visit to the site	2009-11-05

Processes

Describe all processes at the site which require process heat at temperature level

Process 1

Type of process	scalding (boiling meat) - heating
Temperature range (in ° C) from - to	90°C
Energy consumption (e.g. m³/h or kWh/year)	~ 70,000 kWh/a (estimation)
Demand period (all year/only which months)	all year when animals are slaugh every second day)
Present energy supply of the process (energy source, system)	central heating system, district h
Availability of usable waste heat	waste heat utilisation difficult bec temperature level
Technical feasibility of solar process heat (first estimate)	relatively high
Economic feasibility of solar process heat (first estimate)	medium (due to the relative high level)

Process 2

Type of process	scalding (boiling meat) – hot water
Temperature range (in ° C) from - to	90°C
Energy consumption (e.g. m³/h or kWh/year)	no meters, energy consumption difficult to estimate
Demand period (all year/only which months)	all year when animals are slaughtered (about every second day)
Present energy supply of the process (energy source, system)	district heat and waste heat of chiller units
Availability of usable waste heat	waste heat of chiller units is used for pre-heating
Technical feasibility of solar process heat (first estimate)	relatively high
Economic feasibility of solar process heat (first estimate)	medium (due to the relative high temperature level)

Process 3

Type of process	hot water for cleaning
Temperature range (in ° C) from - to	60°C
Energy consumption (e.g. m³/h or kWh/year)	no meters, energy consumption difficult to estimate
Demand period (all year/only which months)	all year, except for when company is closed (holidays)
Present energy supply of the process (energy source, system)	district heat and waste heat of chiller units
Availability of usable waste heat	waste heat of chiller units is used for pre-heating
Technical feasibility of solar process heat (first estimate)	relatively high
Economic feasibility of solar process heat (first estimate)	metering would be necessary to show, how much heat – besides use of waste heat – can be provided. These results influence the economic feasibility of solar process heat

Space availability for solar thermal

Available areas/space for collectors for supplying the processes described	800 m² roof area available
Orientation and shading of available area	orientation towards South with less shading possible
If available area is a roof, statics and inclination of the roof	statics of the roof should be OK, South orientation, about 20° inclination
Available areas/space for buffer storage, other restriction for buffer storage	possible

compression chiller units, waste heat at about 50°C
hot water provision, cleaning of boxes
waste heat of chiller units is already used

Energy costs for the site

	Unit	Annual consumption	Unit costs (with/without taxes)	Total costs
Electricity	kWh_{el}	~ 450,000 kWh_{el}	~ 0.11 €/ kWh_{el} excl. VAT	~ € 50,000
Gas	used as fuel for the production process and not for heat supply			
Oil				
District heating	MWh	270 MWh	kilowatt-hour-rate: 50.07 €/MWh resp. average total price: 73.94 €/MWh excl. VAT	€ 19,962.92
Coal				
Others				

Additional information/remarks on the energy system & energy costs:

- high standard of heating system
- enlargement of the production and changes in the energy supply planned

Conclusions

Comments on the overall technical feasibility of a solar process heat system on this site:

- possible and in combination with the planned enlargement likely

Comments on the overall economic feasibility of a solar process heat on this site:

- short pay-back period of investments
- technical requirements are good (installation, combination with heating system)
- offers and metering necessary to calculate economic feasibility

Factors pro / con solar process heat in this company (including planned changes at the site which may also affect the energy supply):

- solar cooling is presently under consideration because of relatively high electricity consumption for provision of cold
- temperature level of about 90°C is for the use of solar process heat relatively high

2 Summary of Screenings

2.1 Selection of companies for screening

Partners selected preliminary industrial sectors for screenings. These sectors were based basically on few previous existing experiences in Europe, plus the stakeholders and partners experiences. The specific selection of industrial companies and processes for screening by partners has been:

- In Upper Austria:

O.Ö. Energiesparverband is in charge of an energy advice programme for companies - in the course of the last years, more than 2000 companies (from very small SMEs to the largest industrial companies) were advised by the specialised team of energy advisers. Also, these are in general companies more interested in energy issues and energy innovation and therefore potentially more interested in solar process heat. An analysis of the advice reports was done and from them, companies were filtered which seemed to be interesting for solar process heat applications. These were contacted to verify the current conditions (as some of the reports date back several years) and their interest in the subject.

Additionally, the project and the possibility of screenings was made known through networks of companies and respective events to make this possibility known to other companies as well.

- In Central Spain:

Based on best practices in the region, the experiences from diagnosis and studies previously developed at regional level, the inputs from the industrial associations, the solar industries information and the previous experiences on energy audits from ESCAN, there have been selected the most promising companies or sectors for screenings.

During the selection of companies there have been bi-lateral meetings with the regional administration to exchange information on experiences from previous energy campaigns that could lead to better selection of companies.

- In South Bohemia (Checz Republic):

First of all industrial companies that made use of energy consultancy of ECCB in the past have been addressed. The first step was addressing a person who is responsible for the energetics of the company per telephone. In case of smaller companies we spoke directly to the owner of the company. The European project So-Pro was shortly introduced per telephone. There is a positive experience from the previous personal contacts with the persons involved and from the previous cooperation.

As the next step, over 500 industrial companies were addressed with a letter where we offered them a free energy screening. Approx. 10 companies reacted to this letter and were interested in the energy screening. Nevertheless the interest was not so big, as we assumed, that is why we had to contact some companies also by telephone.

- In North-Rhine Westphalia (NRW, Germany):

The solar companies have been asked for their actual contacts to industrial companies interested in solar thermal heat and for inform them about SO-PRO via mailing. Therefore, a press report has been authored which informs shortly about the contents and all objects of the project SO-PRO. A profound online search helped to detect industrial sectors with a high heat demand in their processes. With regard to the results of this search, the Chamber of Commerce and Industry in Essen has been asked to compile a list of companies in the detected sectors and to give their opinion on fitting branches. The Energy Efficiency Agency NRW (EFA) has been used as an uncommitted platform to spread information about the SO-PRO project. Additionally, a press report has been published in the EEA-newsletter which informs briefly about the contents and objects of SO-PRO. Existing contacts of Gertec to industrial companies have been informed about the SO-PRO project, ESCOs and solar companies have been involved in the search for candidates which are suitable and interested in SO-PRO. The local Environmental Department in the Ruhr area has been asked to cooperate in the search for interested companies. The Environmental Departments established a contact to the Communal Business Development, asking them also for publishing the SO-PRO press report. An important multiplier in the NRW-region is the “Ökoprofit” campagne which is supported by the Communal Business Development. It is mainly focused in energy efficiency questions in the industry.

- In Saxony (Germany):

For the acquisition of screening candidates the first contact to industrial companies is mainly done by phone/phone interviews. For more information on the project a 10 page abstract of the wok programme in the regional language is handed out and main project information are published on the regional project area website: http://www.saena.de/Saena/Unternehmen/Solare_Prozesswaerme.html. Screening candidates receive a 2 page pre-checklist for the preparations of the energy screening.

To motivate industrial companies with process heat demand to participate in energy screenings and pilot project several aspects are communicated, as the promotion "innovative company" > demonstration as best practise on regional and European level (internet platform, brochures, campaign etc.), the energy screening free of charge, the possibility of a following detailed energy consulting with existing instruments (SäGEP, KfW "Sonderfonds Energieeffizienz"), the experience from existing

model projects or out of the project results, the know how transfer and the financial support for pilot projects via promotion directives.

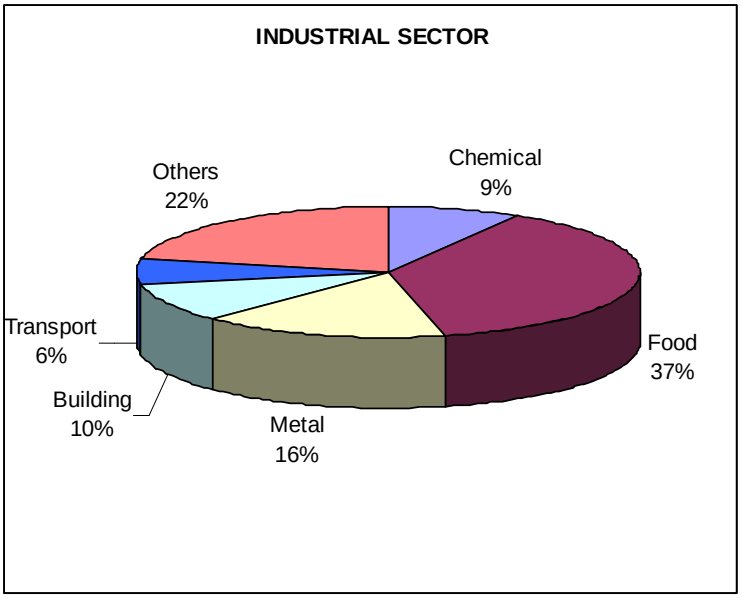
Screening candidates are selected by criteria as the process heat demand with temperatures around 100°C or cooling demand, their interest in the project / in the use of solar thermal, the diversity of sectors enforcement, the availability of waste heat from other process steps, the processes with direct heat input (not only per electricity) and the availability of roofs without shading.

- In Podravje (Slovenia):

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 for the region will be finished in April 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 an energy audit done and we know that there is not enough process heat in the process.

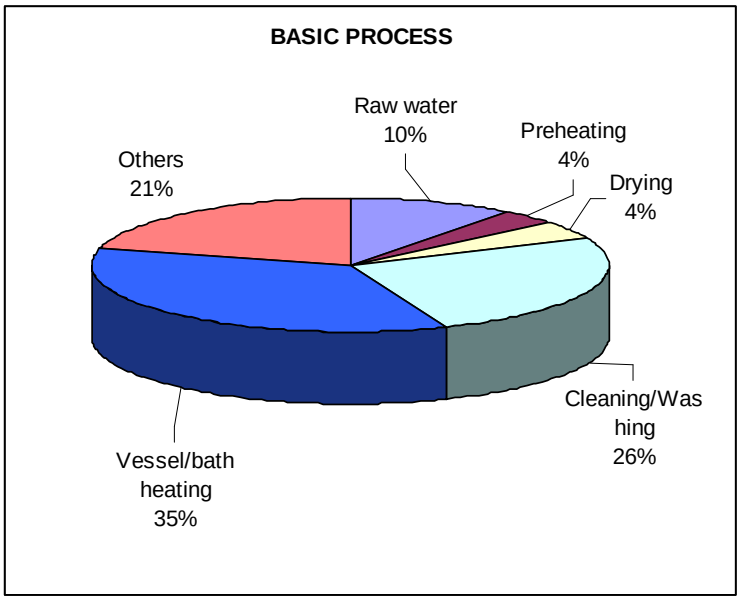
2.2 Industrial sectors

The industrial sectors that present preliminary higher potential in partners countries are Food and Brewery (37%), Metal(16 %), Building (10%) and Chemical (9%). Transport (car industry, trucks, etc.) present less cases (6%) while other sectors involve 22% of the total.



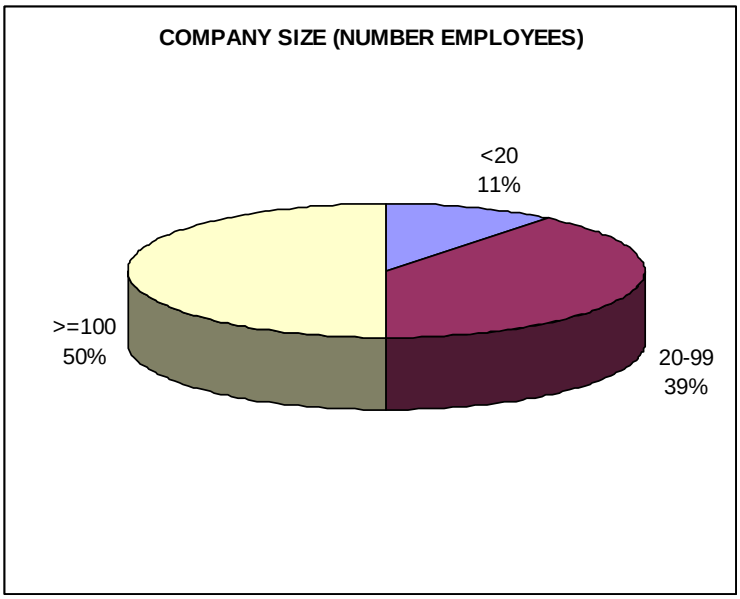
2.3 Basic process

Within the industrial sectors, some basic processes were detected for process heat. Vessels and bath heating lead the list (35%), followed by cleaning and washing (26%). Furthermore drying (4%), preheating (4%), raw water production (10%) and others (21%) complete the list. Drying is considered of particular interest due to the favourable technical and economic conditions found in the specific cases screened.



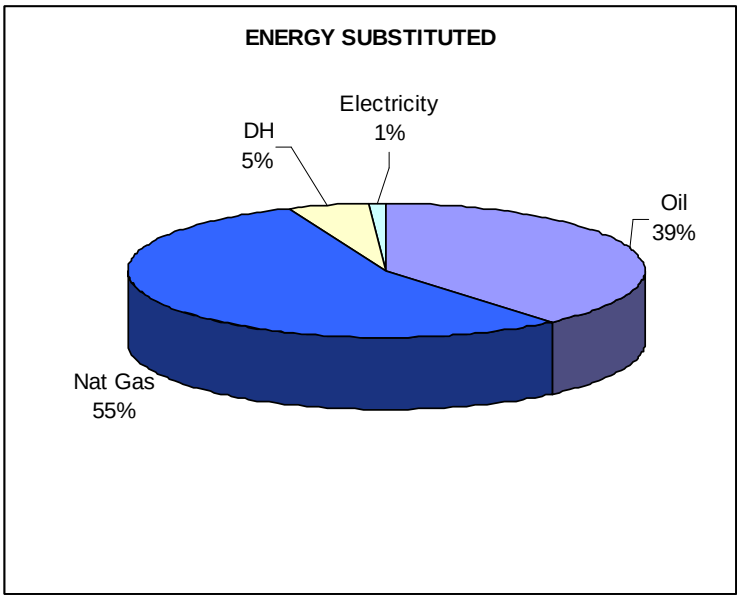
2.4 Company size

Company size could provide information on which industries are more suitable for a solar thermal system. Bigger industries are likely to have better investment potential, while smaller industries could take decisions easier and faster for new systems. The result indicates that big industries represent 50% of the total, while medium size 39% and small ones 11%, which means that company size selected has been mainly big or medium size (>= 20 employees).



2.5 Energy substituted

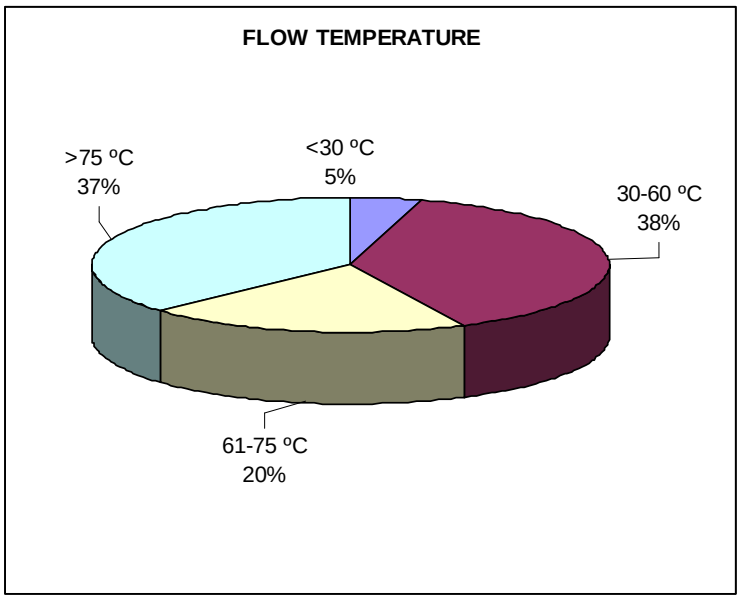
The primary and final energy consumption for industrial process heat can vary significantly from one process and company to other. Natural gas is presented as the energy with preferably selected by users (55%) followed by oil (39%). Lower use is given to district heating (5%) and electricity (1%).



2.6 Flow temperature

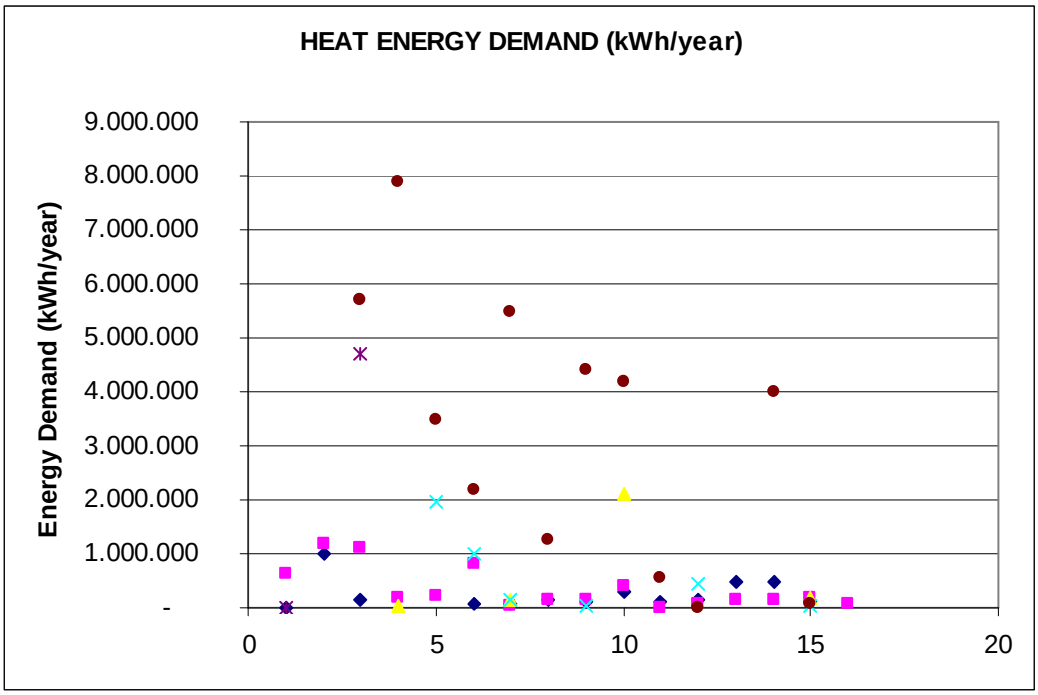
The flow temperature at process is one of the key factors for a reliable solar process heat system. Solar system can be limited due to temperature needs and this variable must be analyzed for each basic process. Flat collectors might be better used for process with temperatures below 60ºC, while vacuum collectors might rise the value up to 80 or 90 ºC.

Very low temperatures (<30ºC) are found in few industrial process (5%), while temperatures in a good range for flat collectors (30-60ºC) add another 38%. Higher temperatures (61-75ºC) are available in 20% of the processes and very high temperatures (>75ºC) in 37%.



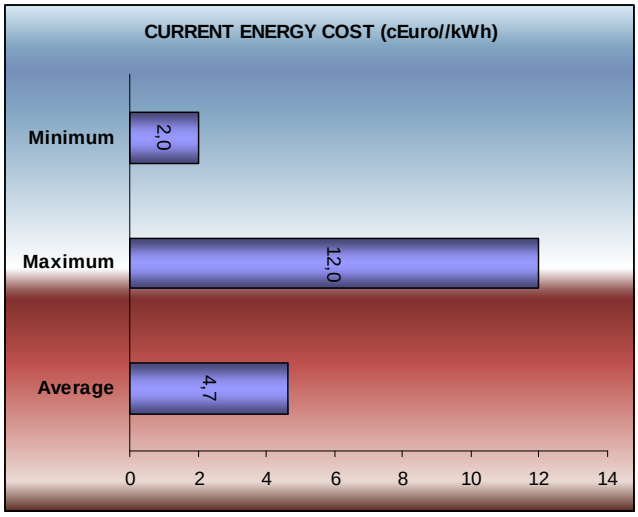
2.7 Heat demand

The heat demand affects significantly to the size of the solar system and the investment needed. The heat demands vary much in the screenings, due to the different processes and industry sizes, with an average value of 1.480.000 kWh/year, a maximum of 21.000.000 kWh/year and a minimum of 6.000 kWh/year.



2.8 Energy cost

Unitary energy cost (cEuro/kWh) is one of the key factors for the economic viability of a solar system, together with the amount of energy consumed. For a solar system, big amounts of energy consumed and higher energy costs are positive economic factors.



2.9 Sopro economic ratio

Considering normal energy production by solar systems, energy current cost, normal investment cost and current heat demand, an economic ratio has been developed for SOPRO solar systems. This ratio represents a theoretical pay-back period (not a real one) that provides a first figure on the systems economy. Those systems with a lower ratio (<15) present better options for solar process heat. Systems with ratio 16-20 need of further analysis while those with >20 are probably of lower interest.