

*Project 2*

**BRESCIA - RECOVERY WASTE-HEAT FROM INDUSTRIAL PLANTS**

Brescia district heating system is fed by several heat source, as waste to energy plants that satisfy more than 40% of the heat requirement of the city, a multi fuel cogeneration plants and some natural gas heat only boiler mainly to cover peak demands; district heating in Brescia now supply heat about 70% of the city buildings.

The opportunity to recovery into this district heating network the waste heat from several industrial sources could improve the energetic and environmental efficiency of the whole system.

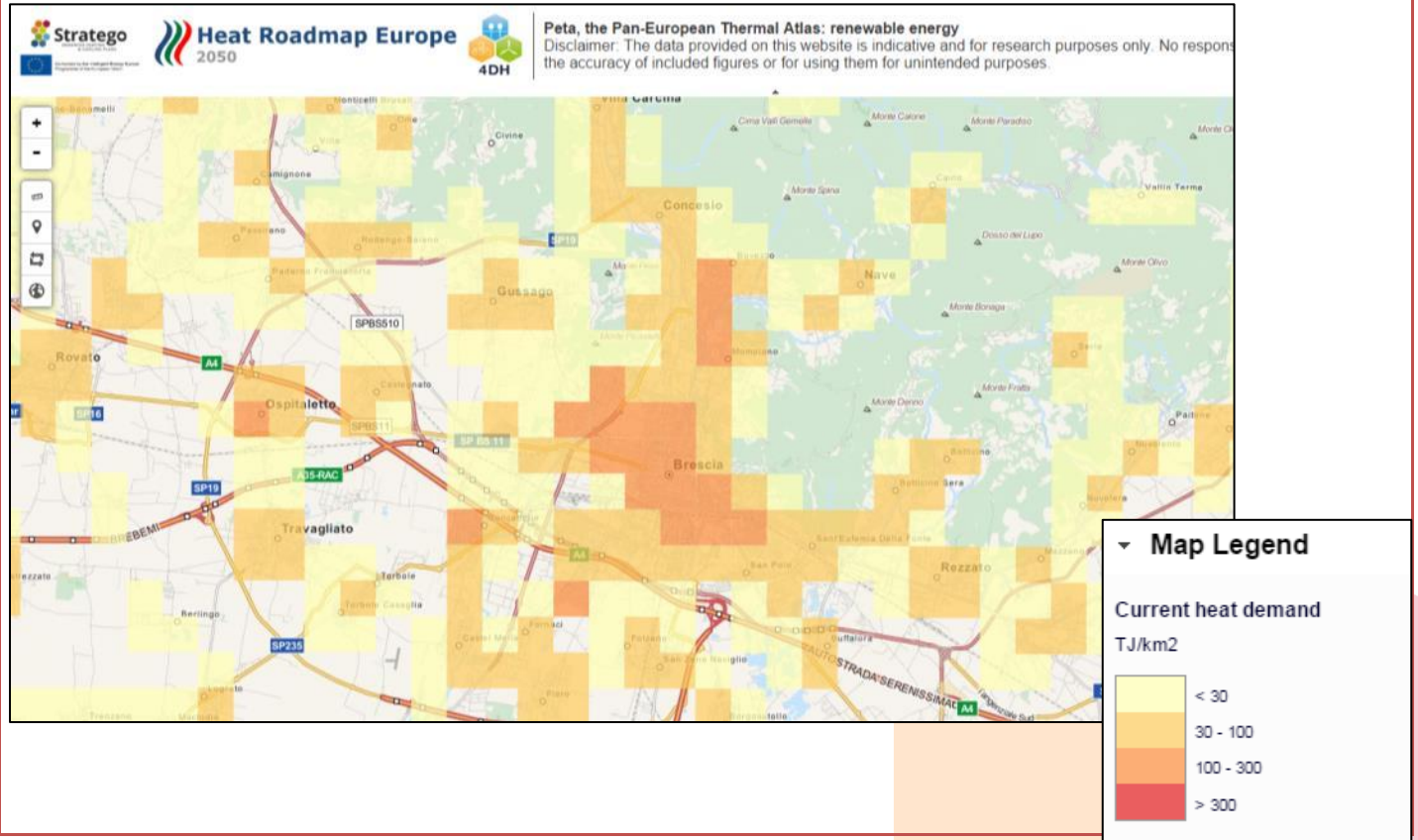
Several industrial sites already exist near the city, and some of that has been study to evaluate the amount of heat recoverable:

- Industrial site “a”: heat recoverable 10 MWh and 30 GWhth yearly. This project could allow to save 2500 toe and to avoid emissions of 6000 tons of CO<sub>2</sub>.
- Industrial site “b”: heat available 38,5 MWth, 3 MWth in a first recoverable, 15 GWhth on a yearly basis. Totally, this project could allow to save 1300 toe and to avoid emissions of 3000 tons of CO<sub>2</sub>.
- Industrial site “c”: heat available, in a peak transient, would be 6.5 MWth, recovering 32 GWhth yearly. Saving could be 2500 toe and emissions avoided 6000 tons of CO<sub>2</sub>.

**BRESCIA AREA, STREET MAP - from Pan-European Thermal Atlas**



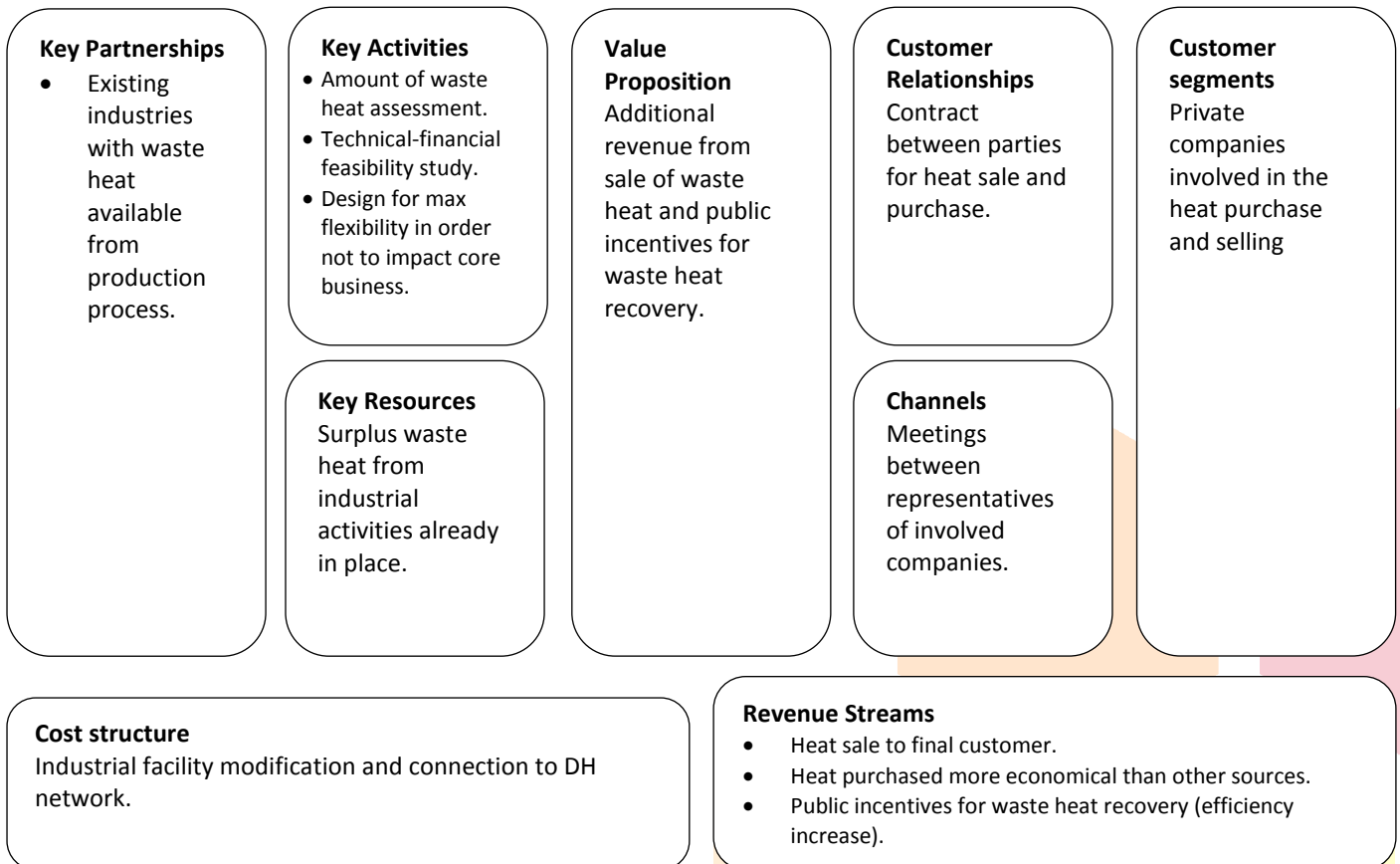
**BRESCIA AREA, ANNUAL HEAT DEMAND - from Pan-European Thermal Atlas**



## Business model of project 2

The project developments involve the district heating operator side and the industrial site side.

The following Business Model is referred to a potential business between private operators: the industry which might have waste heat surplus and the district heating operator (which in Brescia is a private company).



Description of the business model of project2

## Customer Segments

Private companies involved in the heat purchase and selling.

The district heating in the City of Brescia cover already about 70% of the buildings. Therefore finding new customers is not the core-activity for the development of the system.

This project aims to create new interconnection with industrial sites, in order to deploy and recover the waste-heat coming from such existing industrial site.

At the same time (but it is not the main purpose of this project) industrial sites could be heat customers of the district heating network.

Therefore the customer segments for this project in Brescia is made of industrial sites with waste heat availability.

For the Bergamo case new heat sources for feeding the district heating network are needed in order to expand the net and connect new customers. Industrial facilities with waste heat available could be useful heat sources with an easier authorisation process than new power facilities. For these reasons industries are the customer segment also for the Bergamo case.

## Value Proposition

Additional revenue from sale of waste heat and public incentives for waste heat recovery.

In the neighbourhoods of the cities, industrial sites with waste heat availability already exists; now a day, they lose heat due to their production processes. District heating systems is a way to recover this waste heat. This opportunity represents an added value for the whole city.

## Channels

Meetings between representatives of involved companies.

Meetings between industry representatives and DH company representatives could bring to a better understanding of the Value Proposition, both for economical items and in a social related perspective (example through an evaluation of the benefits for the whole community, like a reduction in CO<sub>2</sub> and pollutant emissions).

## Customer relationship

Contract between parties for heat sale and purchase.

Customer relationship should be, once the project has been defined and agreed between parties, a contract undersigned by industry and DH network operator representatives for the selling and purchasing of the waste heat.

## Revenue streams

*First point* - Heat sale to final customer.

*Second point* - Heat purchased more economical than other sources.

*Third point* - Public incentives for waste heat recovery (efficiency increase).

*First point.*

Heat recovered from industrial sites can increase also the total amount of heat available to the DH network operator. This would allow to connect new customers and to increase the rate of heat-selling.

*Second point.*

Heat recovered from industrial site could be less expensive than heat coming from traditional sources (ex. fossil boilers). This represents a decreasing of total variable costs of district heating network.

*Third point.*

The increasing of efficiency of the whole energy system could lead to an incentive-scheme. This issue needs to be deeply investigated, in order to identify whether an incentive-tool is available and, in case more than one exists, in order to identify the best one.

## Key resources

Surplus waste heat from industrial activities already in place.

The main purpose of this project is the recovery of waste heat in order to make a useful use of it. The main resource of the project is, therefore, such waste heat from industrial facilities.

To meet this target, the project need several further resources, like:

- process-scheme analyst;
- technical people from industrial site;
- technical people from district heating operator;
- installation team.

### Key activities

Amount of waste heat assessment.  
Technical-financial feasibility study.  
Design for max flexibility in order not to impact core business.

For developing the project several activities needs to be carried out:

- assessment of waste heat availability in terms of “quantity” and “quality”;
- technical feasibility study;
- financial feasibility study;
- identification of necessary new infrastructures to be built;
- optimization of the recovery process, to recovery the maximum amount of heat and to make a useful use of it;
- assessment of the heat demand which could be served;
- design of the system for the max flexibility.

### Key partners

Existing industries with waste heat available from production process.

The first partners which need to be engaged are industry representatives. Other key partners could be the suppliers of particular technologies needed in order to recover the waste heat or to optimize the system.

### Cost structure

Industrial facility modification and connection to DH network.

The structure of costs could be summarized in this way:

- new network branch to connect the industrial site;
- new pumping station;
- new control system for the regulation of the heat exchange process;
- all the components needed for modification of the industrial process in order to make the waste heat available to the DH network;
- design costs;
- authorization costs.