SESSION 9

SMART ENERGY

THERMAL ENERGY SMART GRID

Siram

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Introduction

ENERGY & ENVIRONMENT

Global Warming:
Reduce emissions of CO_2

Optimize **energy** uses

Acceleration of **urbanization**

Energy cost:
Very unstable and with increasing trend

Environmental **protection**

Industrial **development**

Our AIM is develops, builds and manages more economical and environmentally friendly energy systems.

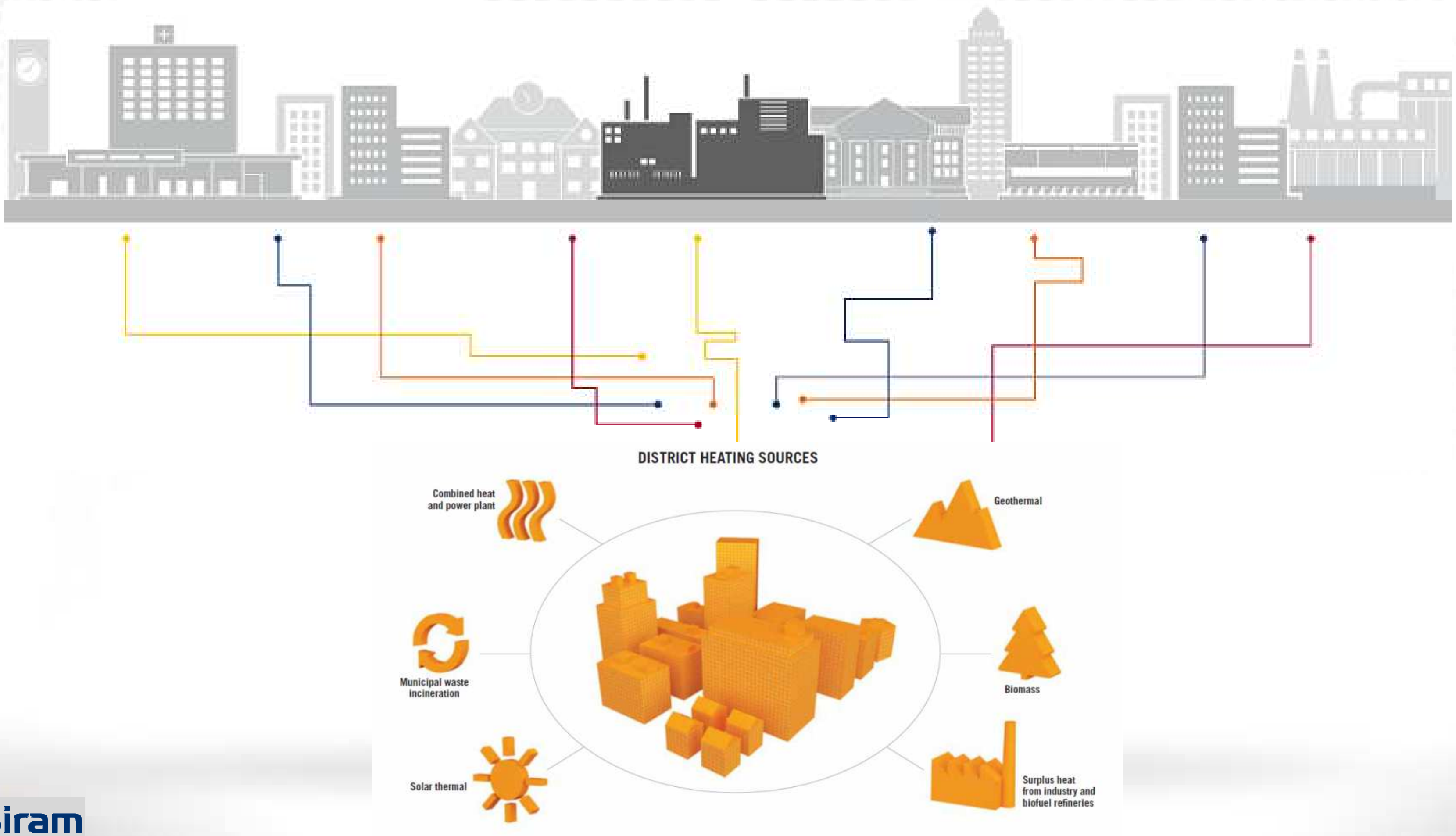
What is a solution proposed for improved energy efficiency in cities ?

THERMAL ENERGY **SMART GRID**

DISTRICT Heating & Cooling

DISTRICT Heating

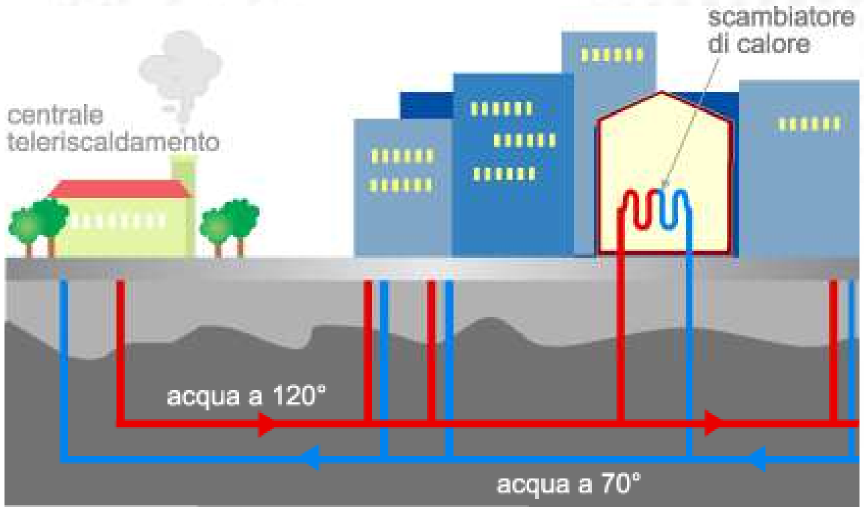
District heating indicates **the supply of heating and / or sanitary hot water** to users at a distance, through a system of pipes that transport heat **from power plant** (hot water, superheated water or steam)**, that is generated by different types of energy sources** (traditional fossil fuels, renewables, energy mix) going to replace traditional systems heat of individual buildings.

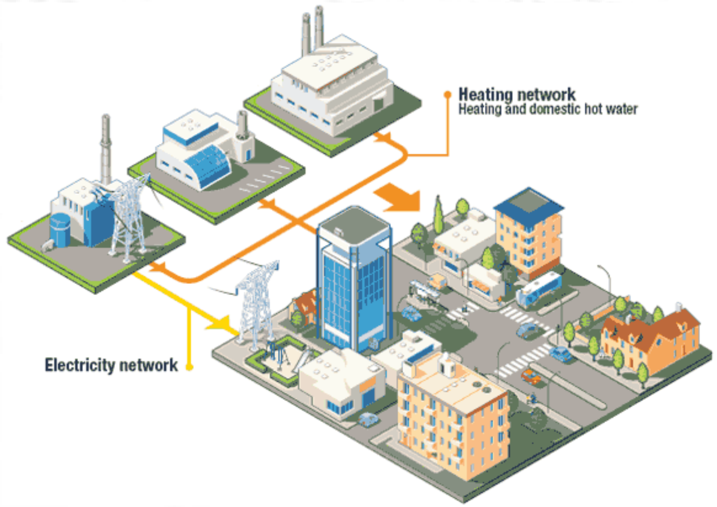


DISTRICT Heating

Main components of a District Heating

- The power plant of heat;
- The network of distribution of hot water (the pipes forming a closed circuit);
- The sub-stations of use: replace the traditional boiler of each building, school building etc. and allow the transfer of heat from the distribution network to the system by the customer.





The centralized production of heat enables to have a greater efficiency than distributed boilers in every home, with obvious energy savings and environmental benefits.

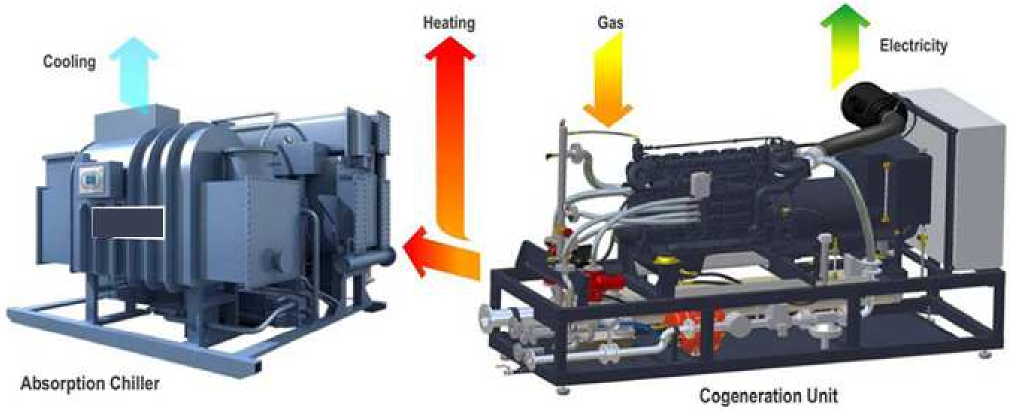
The District Heating in the city makes breathe better,
because it contributes to decrease the chimneys and it contributes to have a better control of toxic micro-pollutants. Power plants are energy efficient, and have an upscale control systems

DISTRICT Cooling

\>> District cooling is a sustainable alternative to conventional electricity or gas-driven air conditioning systems. As with district heating, the main idea is to use local resources that otherwise would be wasted or difficult to use. The strategic resources are:

- natural cooling from deep sea, lakes and rivers
- conversion of surplus heat from industry, waste incineration and combined heat & power to produce chilled water (thanks to absorption refrigerators).

TRIGENERATION SYSTEM



The customer is connected to the cooling production via a pipe network. Chilled water is distributed to the buildings where it loses its cold content, thus cooling down the building temperature.

DISTRICT Heating & Cooling

What's Benefit

Cost Reduction

- No maintenance/replacement costs for boilers/chillers
- Tax benefits (VAT 10 %)
- Overall energy costs: - 5 % - 10 %

High energy efficiency guarantee

- Advanced technologies such as cogeneration
- Renewable energy sources, such as biomass

More security than a traditional system

- No risk for gas leaks, fires and poisoning smoke by bad combustion
- Less space, low noise due to lack of gas and chimney

Environmental benefits

- Fossil fuel saving
- Reduction of CO_2 emissions in atmosphere

European Community TARGETS (20-20-20)

- CO_2 reduction > 20%
- Primary energy demand reduction > 20%
- Using Renewable Energy > 20%

Siram Dalkia Group

Dalkia is present in 35 with 49.800 employees, provides close-to-the-customer service and tailored solutions that take local practices and business conditions into account to create worldclass energy services.

Challenges

Managing energy consumption

Ensuring technical facilities' reliability and safety

Developing sustainable strategies

Dalkia International currently manages about 800 worldwide District Heating .

Siram in numbers

We have been providing energy management services throughout Italy **since 1912, both to the public sector and to industry.**

Over the years we have gained vital experience in the fields of global services. The specialist skills we have acquired enhance the package we offer to our customers.

More than 3.000 customers, with 3.000 employees

Siram
Registered office **Milano**
50 operational offices
4 Business Units:
North West, North East,
North Central, South Central

Simav
Registered office **Roma**
20 operational offices

Semitec
Registered office **Massa Martana (PG)**
20 operational offices

DHC Siram: successful examples

Siram District Heating in numbers:

>> Siram manages several District Heating networks including:

- in Milan for the Forlanini district: 1 network of 20 km with an output power of 19 MW thermal;
- in Tuscany - Monte Amiata area. “Amiata Energy Company” : a network of 20 km with an output thermal power of 15 MW (energy from geothermal sources).
- in Florence at the University Hospital of Careggi, Siram designed, realized and manages a trigeneration plant, that annually produced 65,000 MWhe, and development of a District Heating network
- for the “Snos of Turin” complex from 2010 Siram took over the management of cogeneration plants and to provide, through the district heating network dedicated winter and summer air conditioning services for offices and shops in the mall

- In addition to the site of the hospital in Udine ....

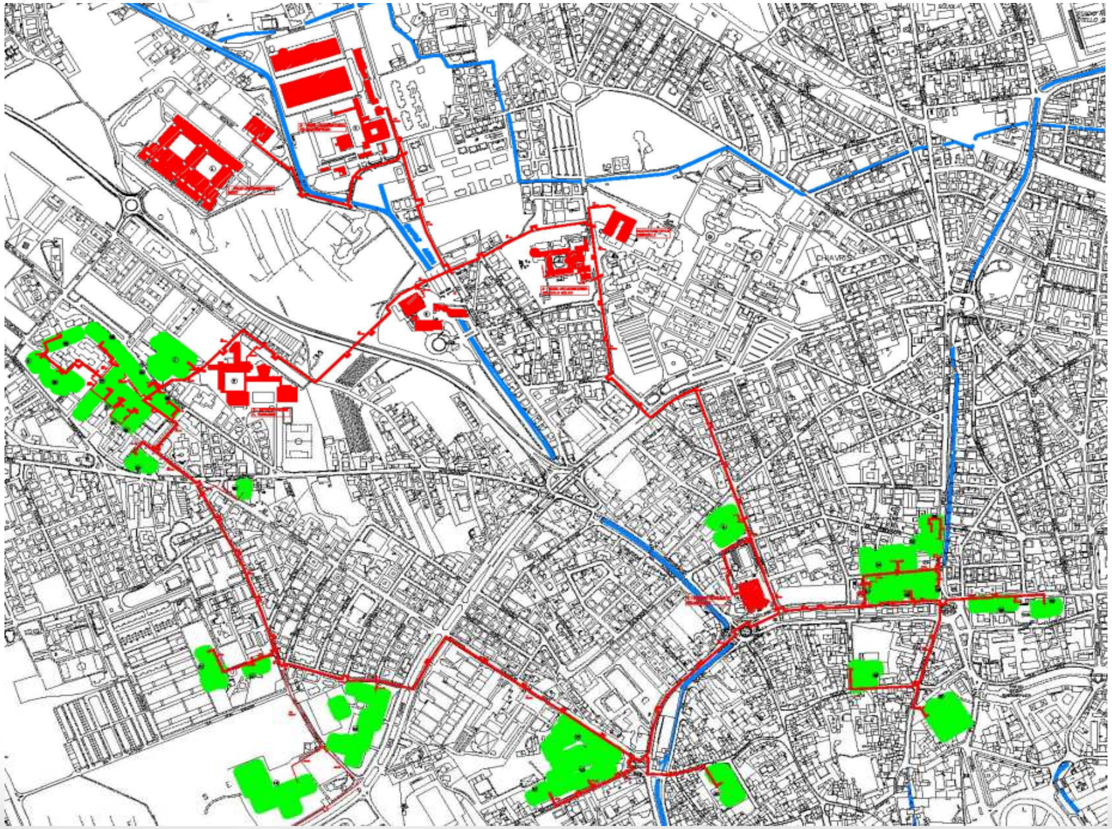
DHC Siram: successful examples

The Hospital “Santa Maria della Misericordia” UDINE

Volume: 721.650 m^3

Thermal power: Peak demand 20.986 kW

Cooling capacity: Peak demand 26.482 kW



External users of the District Heating System

Number: 39

Thermal power: Peak demand 38.135 kW

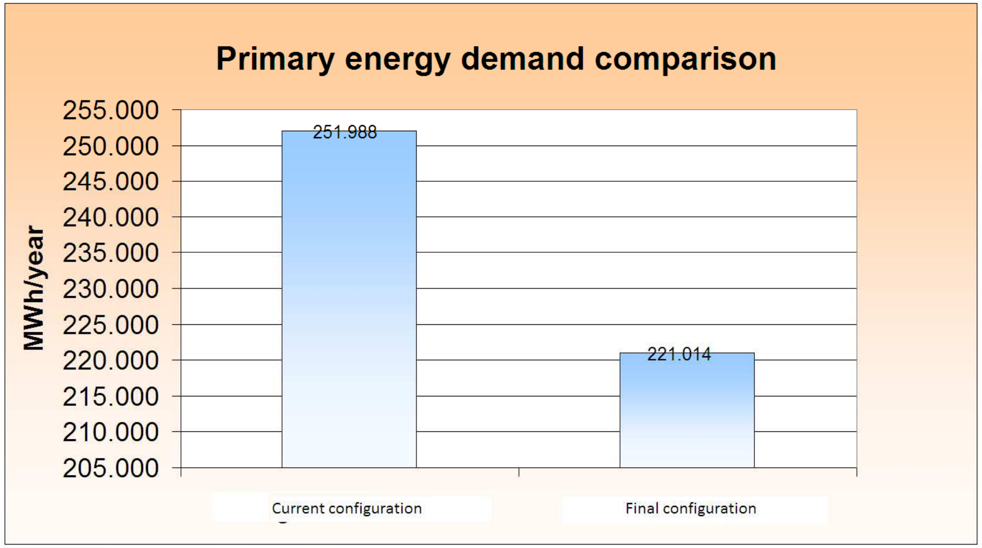
DHC Siram: successful examples

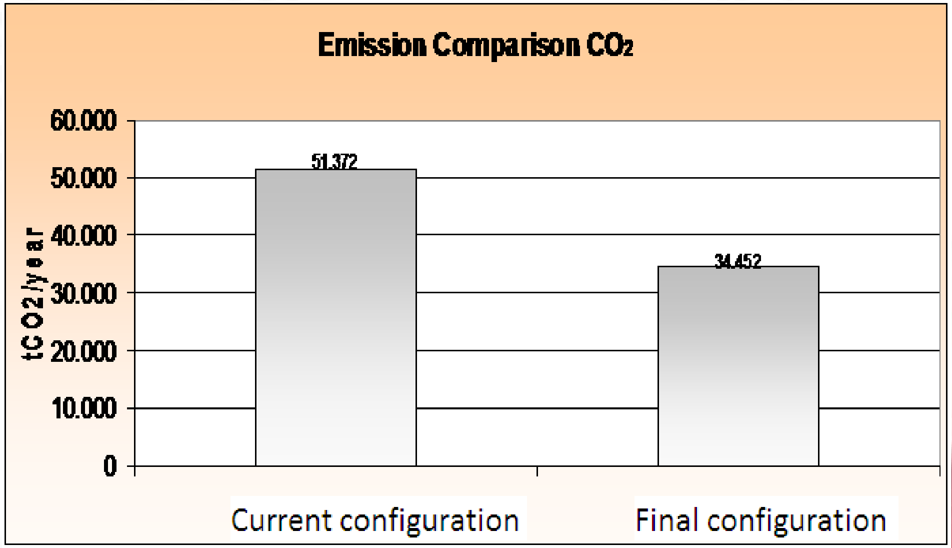
Environmental benefits

This technology allows a significant primary energy savings and, as a direct consequence, a reduction of greenhouse gases with particular reference to CO_2

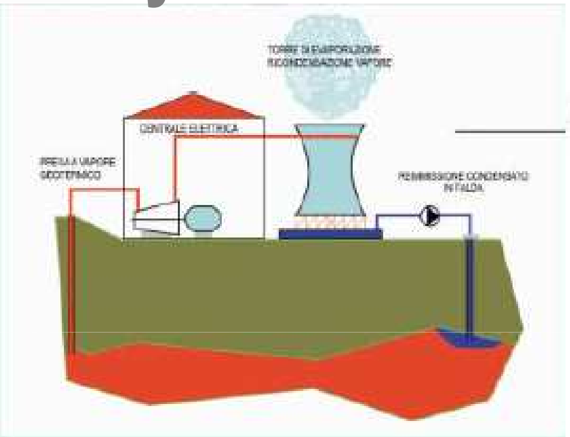
Comparison between primary energy and emissions

Power Plant configuration	Primary Energy Demand MWh/year	Emissions tCO2/year
Current configuration	251.988	51.372
Final configuration	221.014	34.452
Decrease	30.974	16.920
Decrease %	12,29%	32,94%

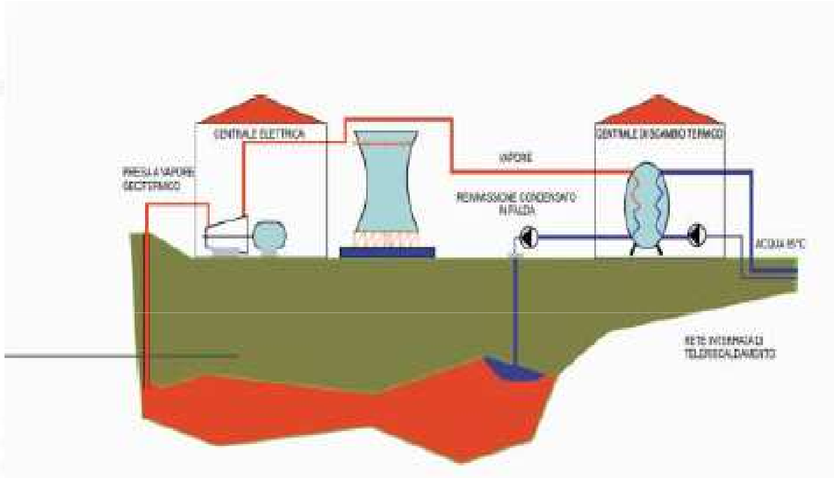




Amiata Energia DH network
Key technical data of the existing Electrical Power plant



Original plant configuration (by third parties)



Current plant configuration (by third parties) and heat exchange interface with Amiata Energia DH project

>> Location: Bagnore (S. Fiora)

Rankine cycle Power output: 20 Mwe

Maxim steam temperature: 280 °C

Depth of well: 2000 m

Electricity production: 2.02 GWh

Steam production: 120 t/h

Annual energy production of 390.9 GWh

Heat Exchanging section

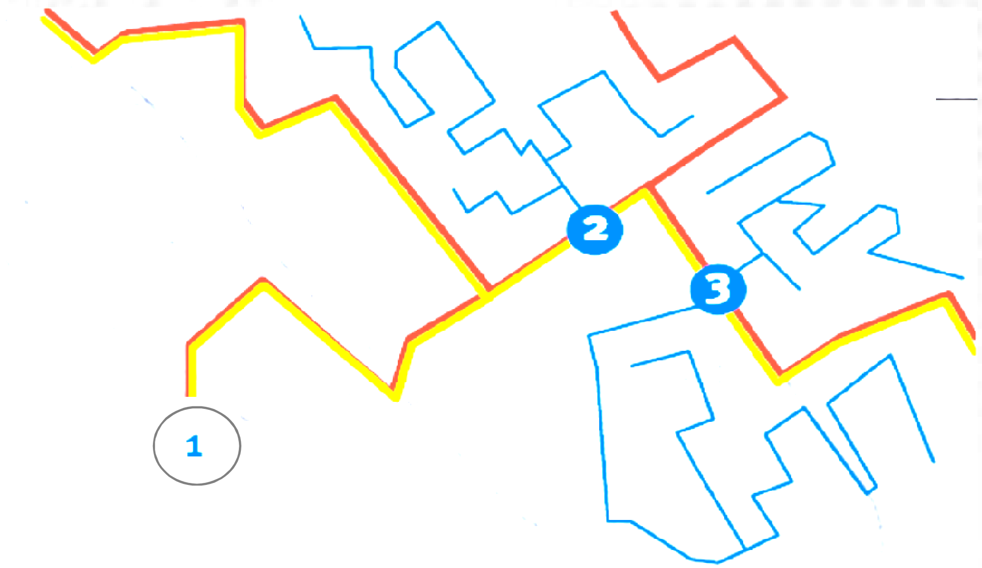
Amiata Energia District Heating basic data

>> Two electrical power plants are situated in Santa Fiora and seven in Piancastagnaio: for a total electrical power output of 75 MW.

Industrial volume to be fed: 40 000 m3

Public real estate: 37 000 m3

Total housing: 250 000 m3 - 2 000 residential users



1 - Main pumping station

2, 3 - Secondary Heat Exchange stations

Main pipework line executed

Main pipework in progress

Total Length of double pipework: 15 600 m

Water Temperature: 90°C Supply - 65 °C Return

Variable flow rate concept

thanks for your attention

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