District Heating and Cooling in Barcelona

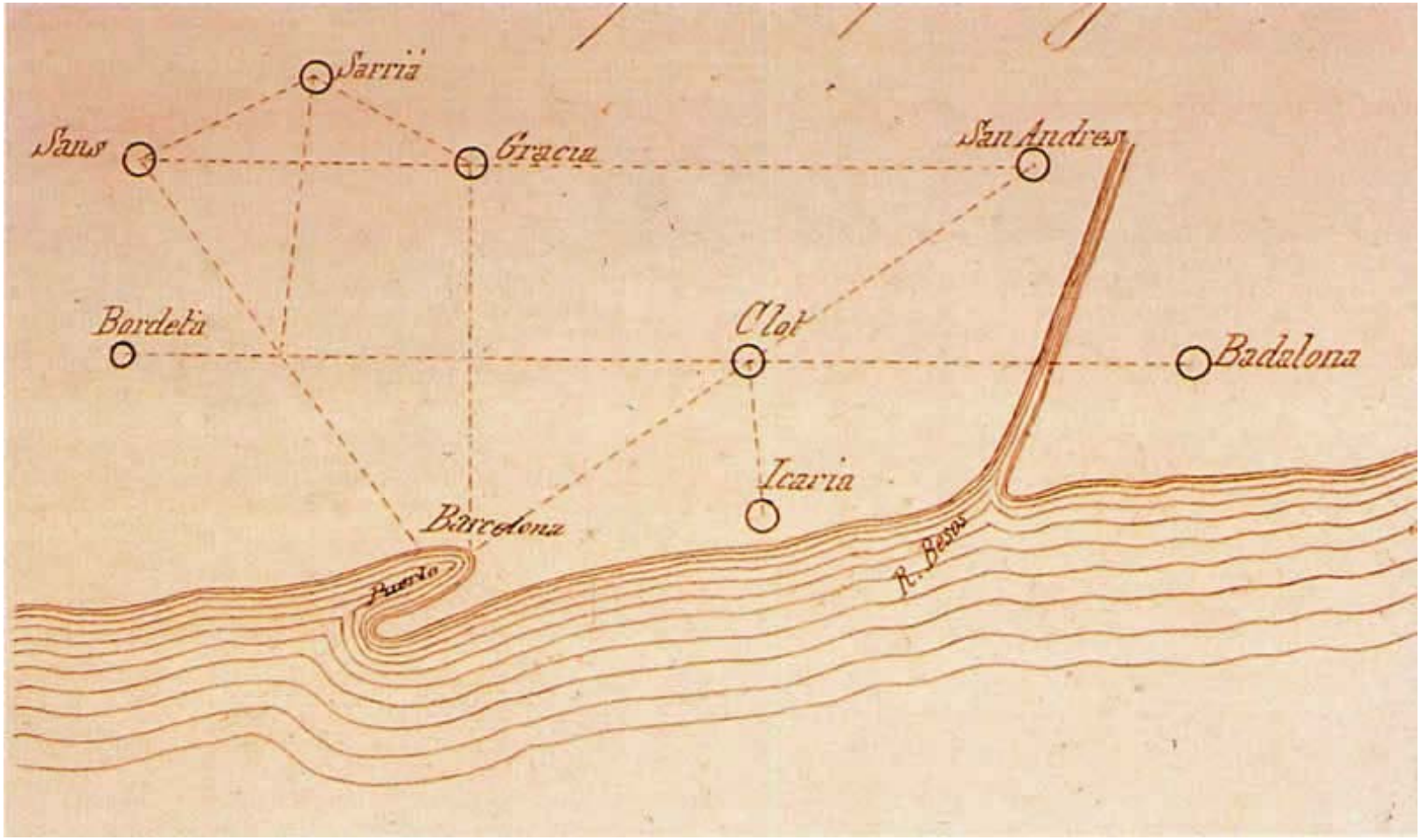
Waste to Energy

1st July 2010

Index of the presentation:

District Heating and Cooling in Barcelona

Context

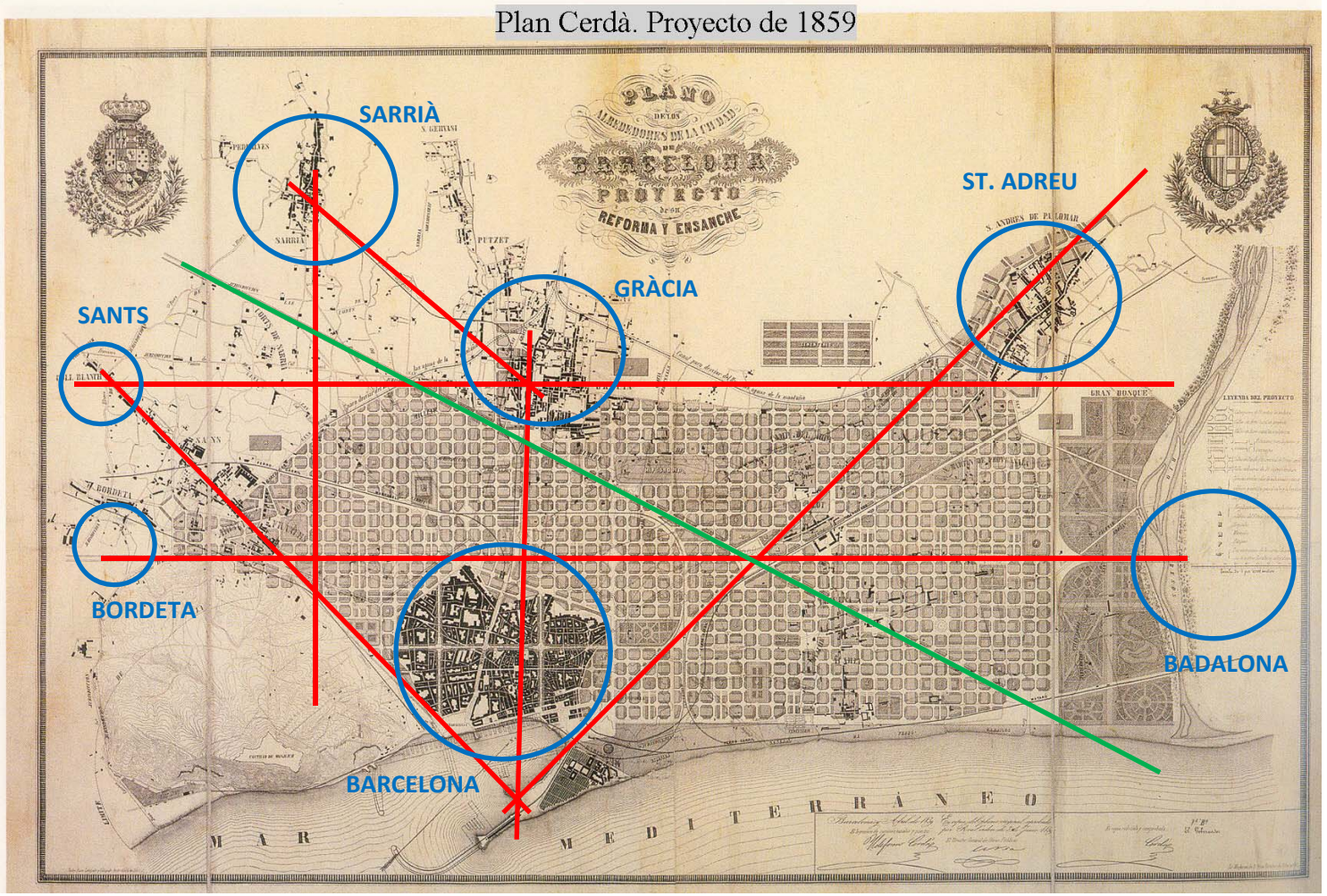


AGÈNCIA D'ENERGIA DE BARCELONA

Ajuntament de Barcelona

District Heating and Cooling in Barcelona

Context



AGÈNCIA D'ENERGIA DE BARCELONA

District Heating and Cooling in Barcelona

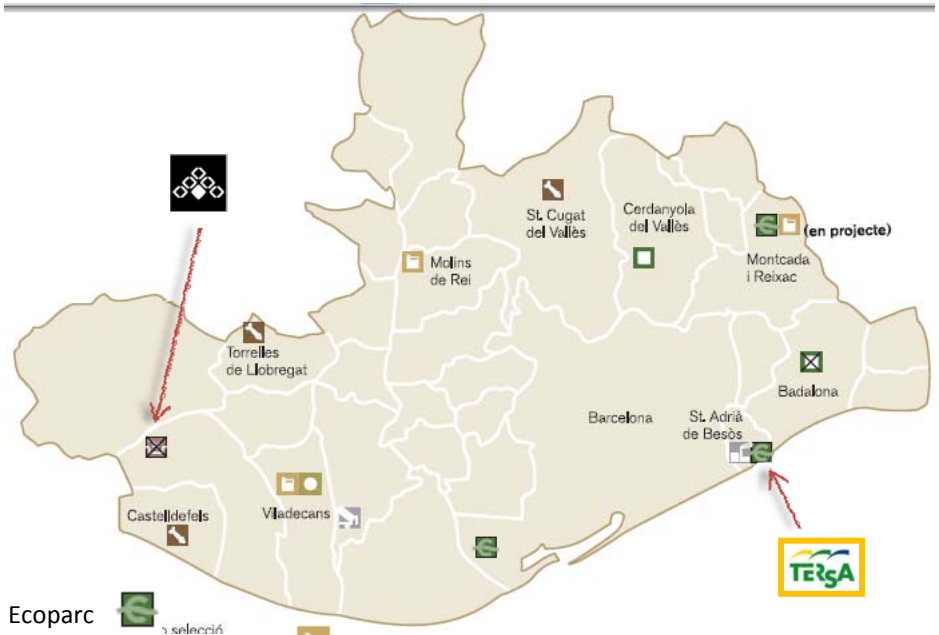
Context

AGÈNCIA D'ENERGIA DE BARCELONA

Metropolitan facilities of waste treatment and percentage of residues according to his treatment . Electricity production.

Withdrawal segregated in Barcelona	Tons/year 2008	
Crystal	31.420	10%
Paper and carton	66.625	22%
Packings and residues of packings	18.503	6%
Inorganic Fracíón of municipal residues	84.014	28%
Vegetable fraction	3.483	1%
Voluminous	45.697	15%
Dump	13.106	4%
Textile	472	0%
Others	36.703	12%
Selective withdrawal	300.023	
kg per capita and day of Selective withdrawal	0,51	

Index of selective withdrawal and index of residues to valuation of Barcelona	Tons/year 2008	
Selective withdrawal	300.023	34%
Mechanical biological treatment	185.262	21%
TOTAL Valued residues	485.285	55%
Residues to controlled warehouse	247.269	28%
Residues to energetic valuation	154.962	17%
Municipal residues	887.516	



Ecoparc
Facilities of selection
Facilities of energetic valuation

	2007	2008
ECO2	6.911	20.180
PVE	134.792	167.504
DC Vall d'en Joan	59.840	55.206
TOTAL	201.543	242.890 MWh/year

Advantages of DH&C in Barcelona (1/2)

ENVIRONMENTAL

Residual energy sources are generally used (urban solid waste or others) in high performance energy equipment, thus **minimising fossil origin primary energy consumption.**
Reduction of greenhouse effect gas emission as it is a more efficient energy solution.
Significant **reduction of refrigerant losses into the atmosphere** compared to conventional systems.
Noise and vibration reduction in buildings connected to the system.
Null visual impact as the system ensures that roofs and façades remain completely unobstructed.

ECONOMIC

Notable **reduction** of **contracted electrical power**.
Savings in user energy bills.
Reduction in maintenance costs and fewer technical specialisation requirements.
No need to purchase or replace own production **equipment**.
Aids energy expenditure forecasting.
More space available for business or other uses.
Cutting-edge buildings with a **high added value**.

Advantages of DH&C in Barcelona (2/2)

SAFETY

Guarantee of safety and continuity of supply.
Elimination of risk of legionella in buildings as there are no refrigeration towers.
Permanent supervision of facilities by specialists, including substations.
No inflammable gases inside the building.

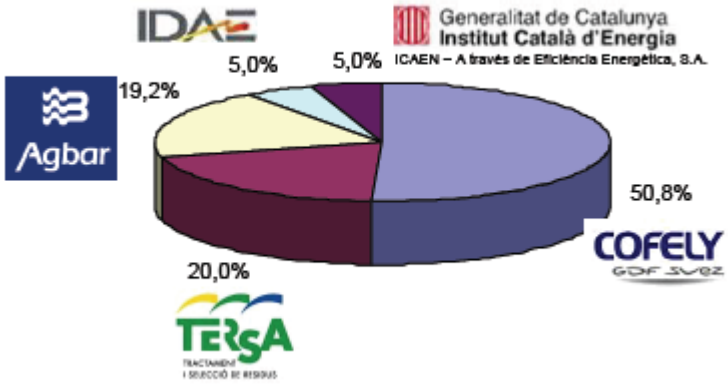
USE

Flexibility: service is guaranteed at all times, avoiding the need to plan and adapt to different user requirments. Power can therefore be increased easily with minimum investment.
Reliability: our equipment is redundant, high quality, automated and constantly supervised by highly qualified technicians to ensure unfailing service.
Simplicity: less complex facilities with low cost maintenance. Greater operative simplicity of facilities as energy production does not belong to the building.
Space saving unobstructed roofs and small technical rooms.
No vibrations, noise or negative visual impact: due to the elimination of air conditioning equipment and chimneys.

DISTRICLIMA: 1st DH&C in Barcelona (year 2002) taking advantage of the residual heat of the process of valuation SUR

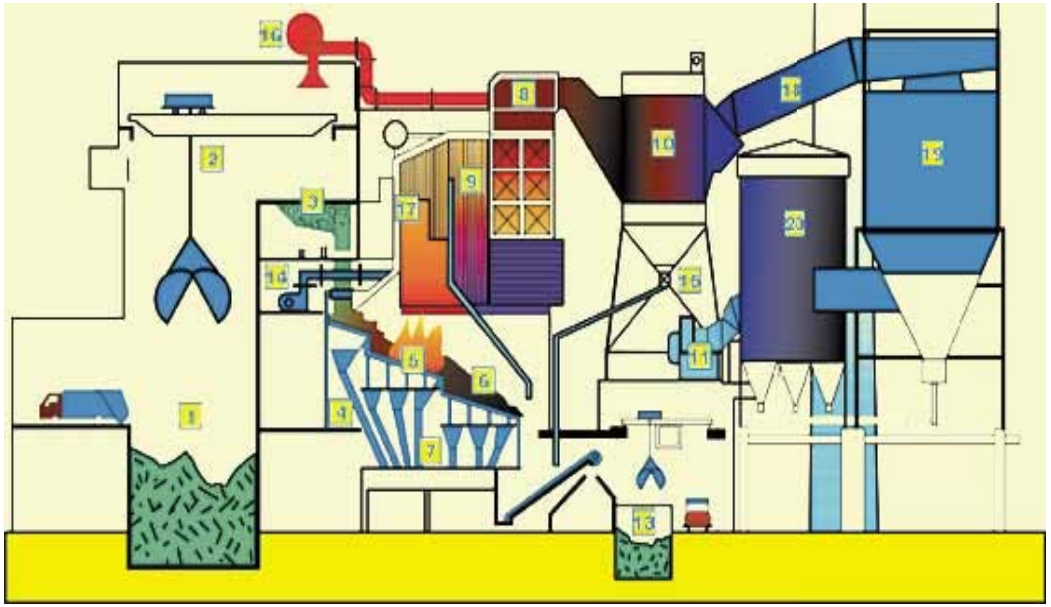
Districlima was set up in 2002 to implement, for the first time in Spain, an urban heat and cold distribution network for use in heating, air conditioning and sanitary hot water.

The project is initially located in an urbanistic remodelled area of Barcelona that includes the Cultures Forum 2004 (Besòs seafront). The project encompasses the design, construction and later use, over a 25- year concession, of the Forum's production station and energy distribution network.



Process scheme and Information 2009:

Doors of unload: 15
Capacity of the pit: 2500 T RSU
Bridge crane 4 m^3/spoon (2,5 T)
Capacity : 3 furnace de 15 T/h
Tons RSU: 359.107 T/year
Produced electric power: 180.468 MWh
Electric power : 23.76 MW



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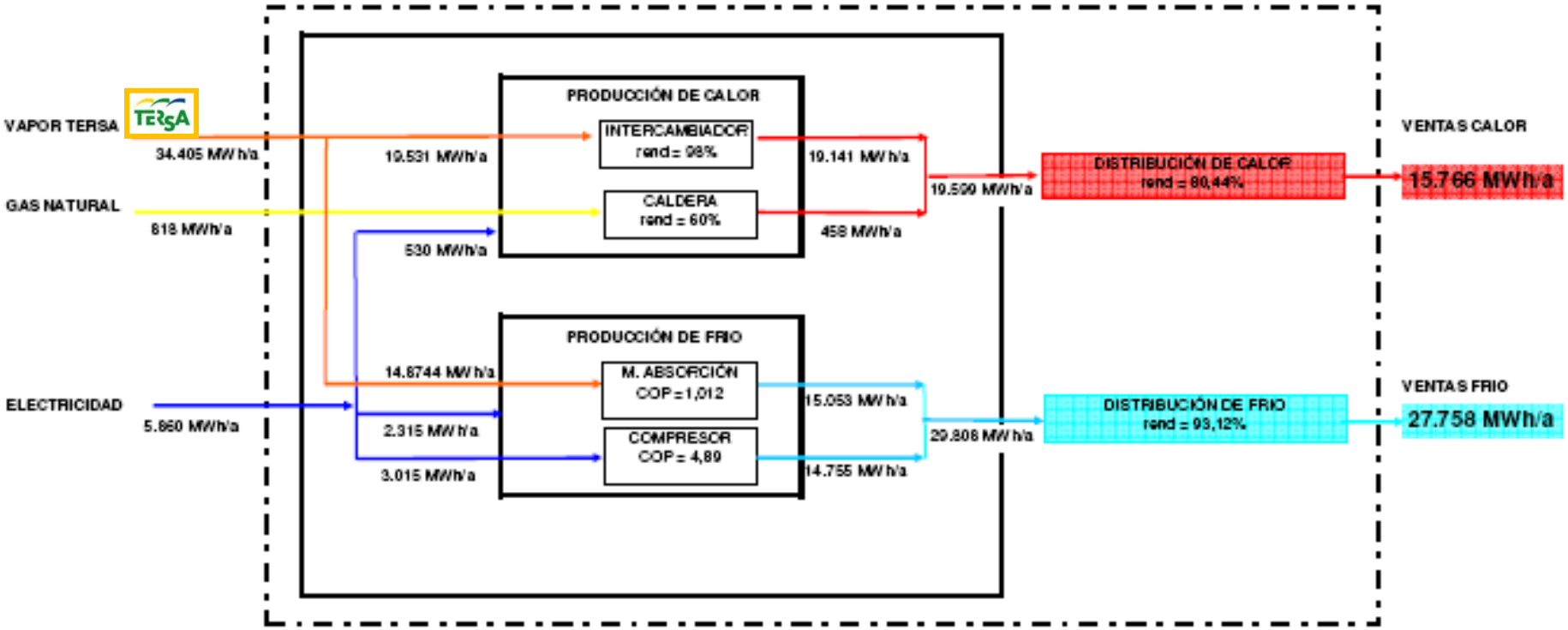
Barcelona pel Medi Ambient

District Heating and Cooling in Barcelona

DISTRICLIMA Technical Data:

Buildings connected to the network: 50
Demand of heat: 37 MW
Demand of cold: 6 MW
Air conditioned ceiling surface: 360,000m^2
Grid Extension: 12km

Heat power: 20,4MW + 20MW boiler
Cold power: 29,2MW + Tank of 5.000m^3 (=10,4MW)
Total Invest: 32,8M€



District Heating and Cooling in Barcelona

districlima

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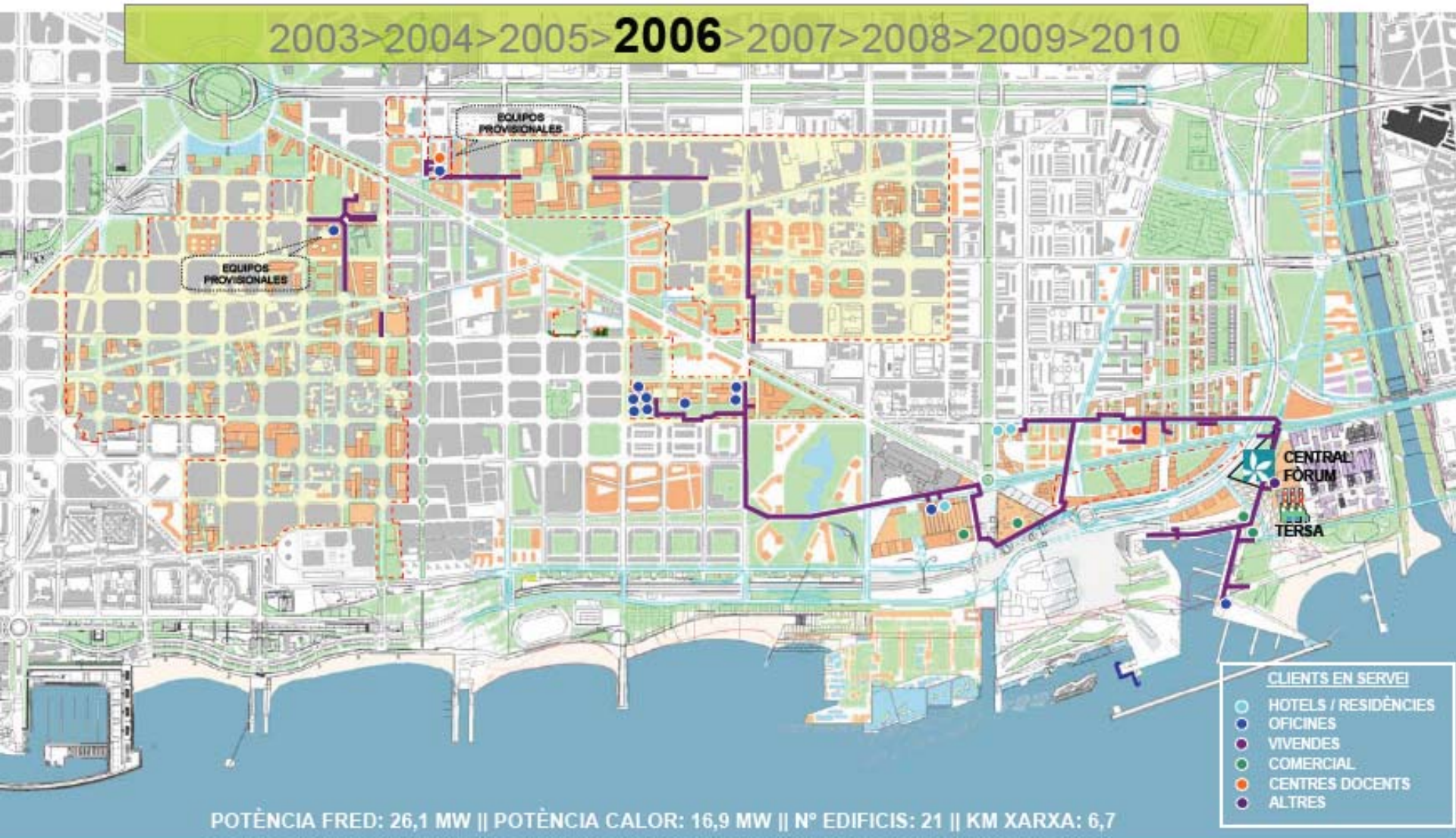

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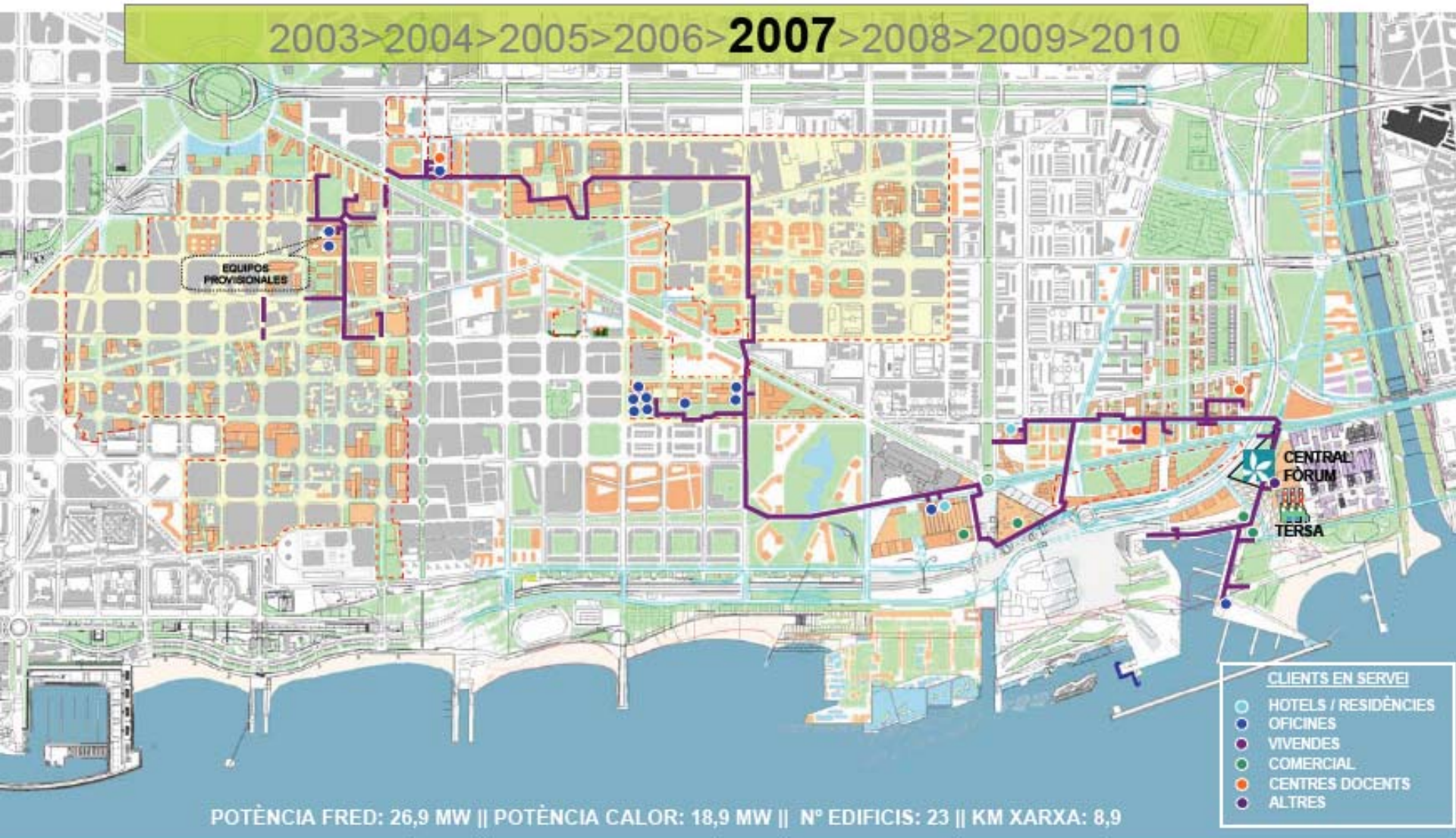
districlima



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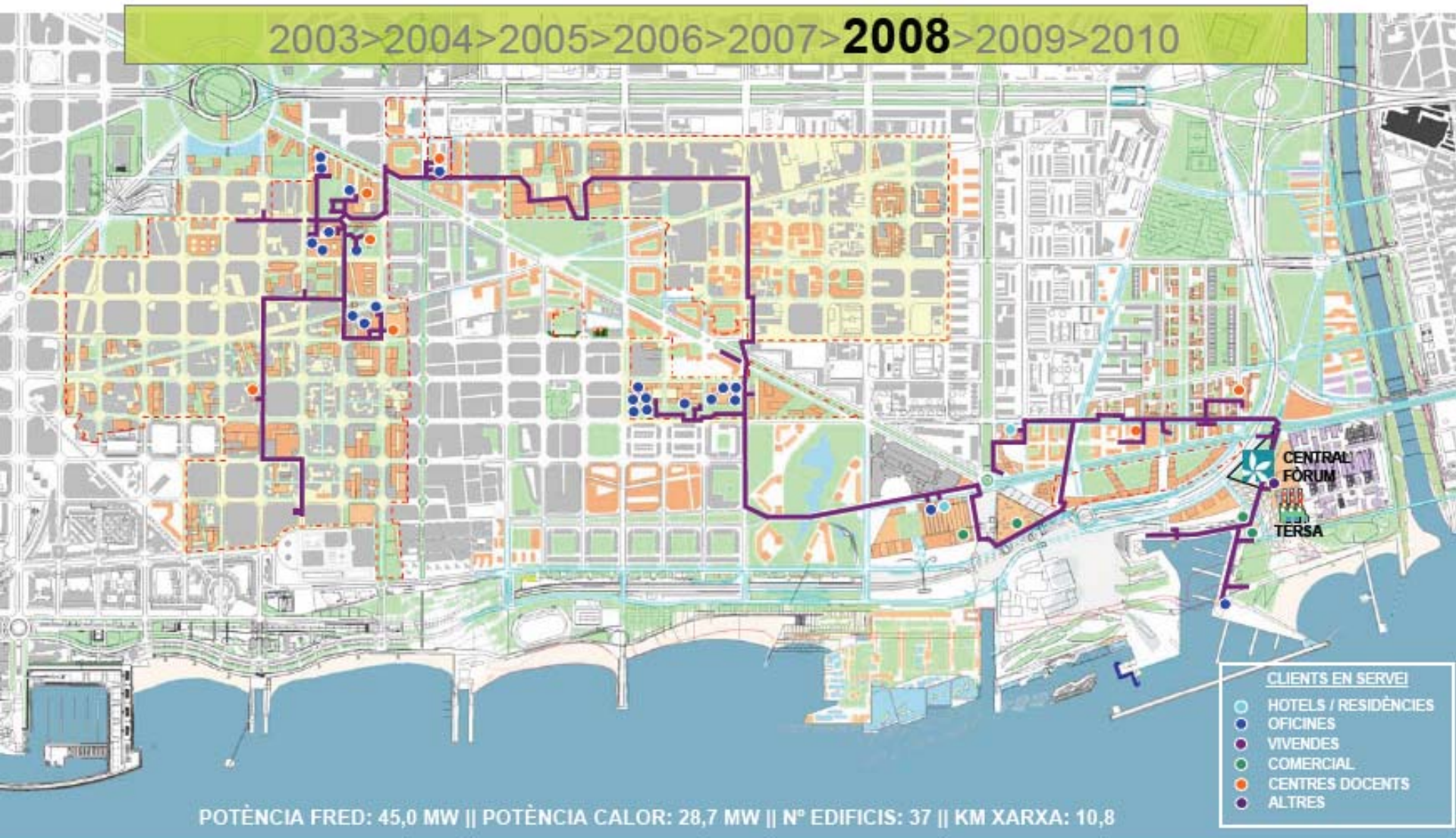
districlima



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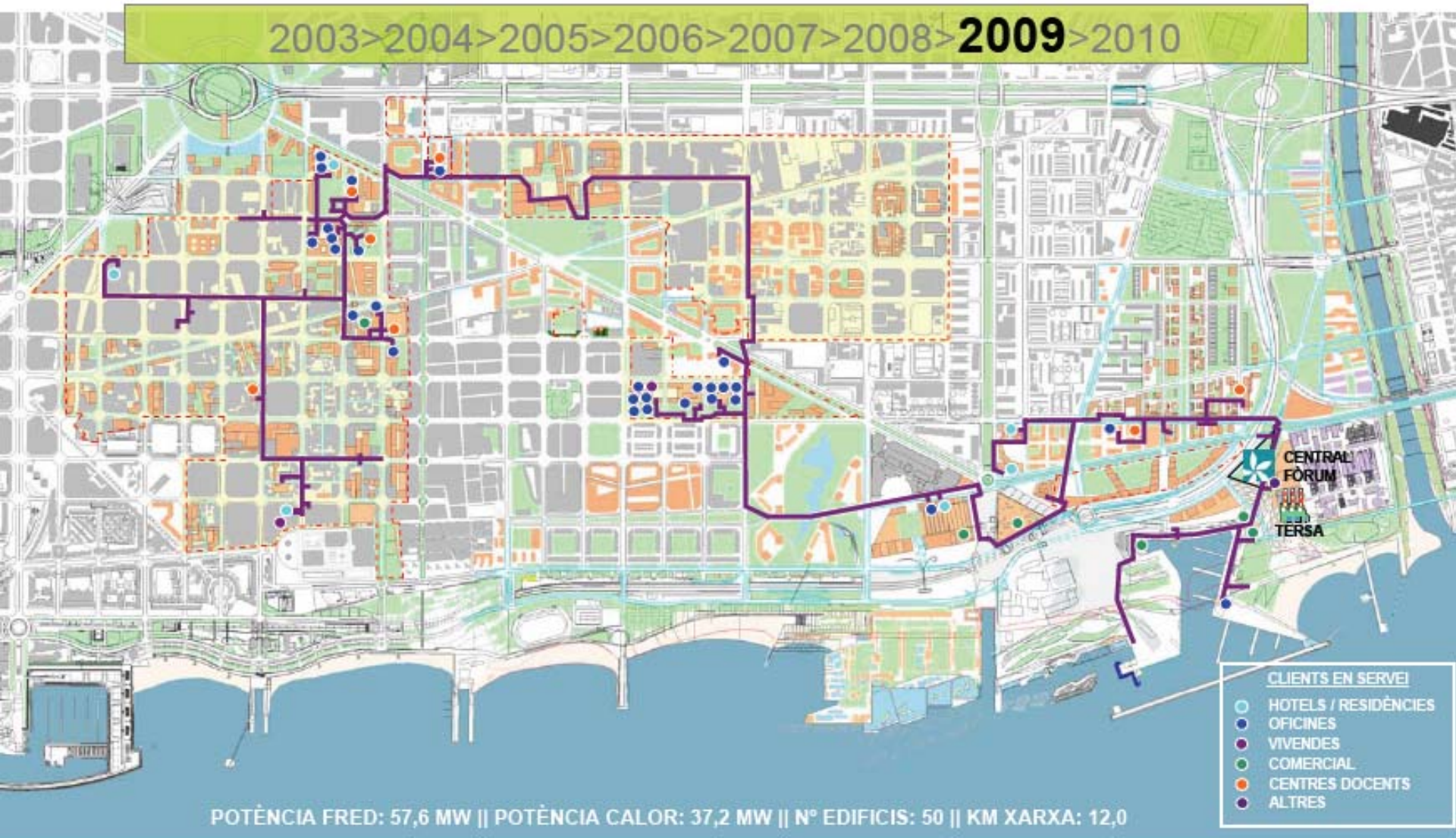
districlima



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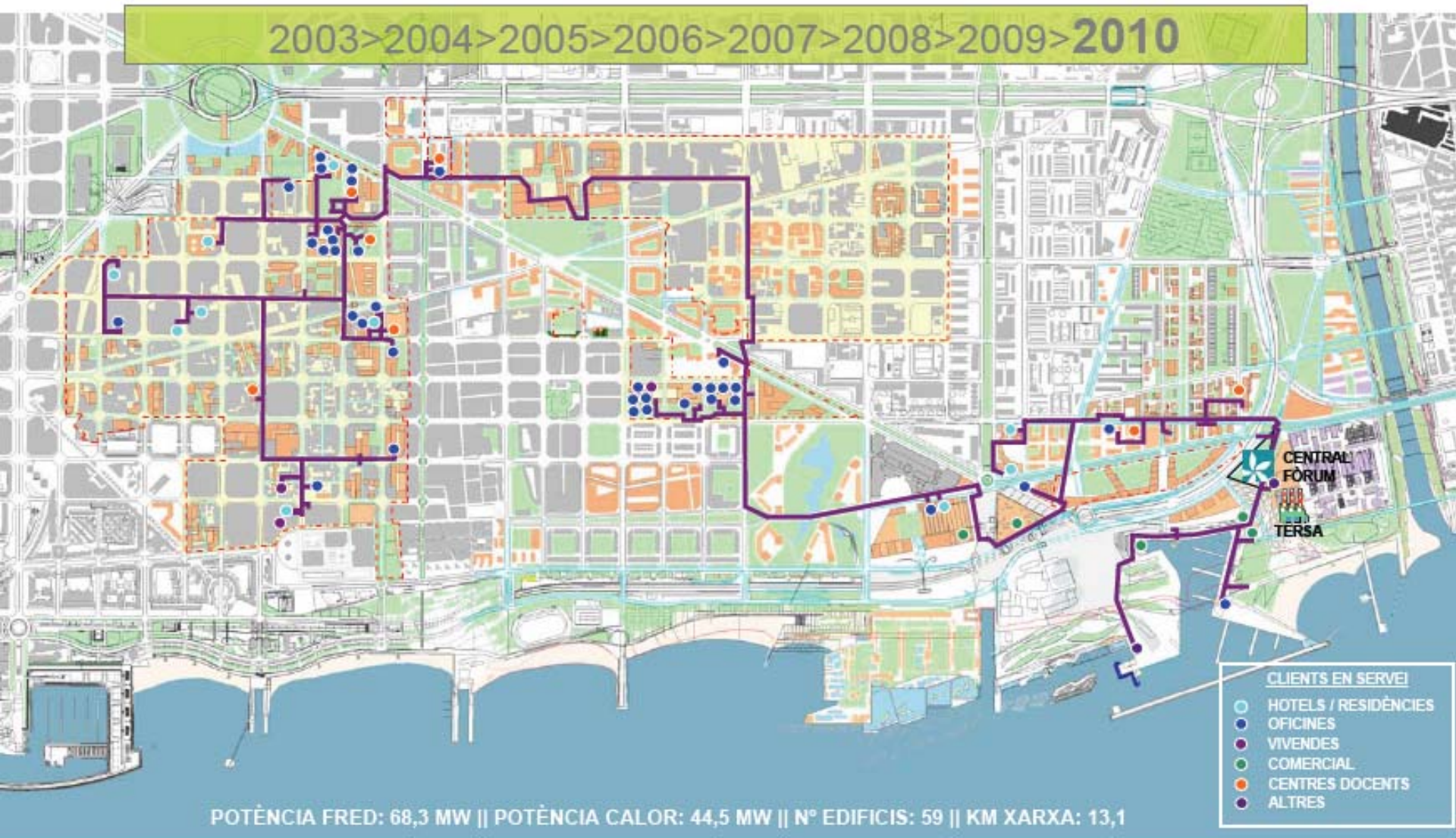
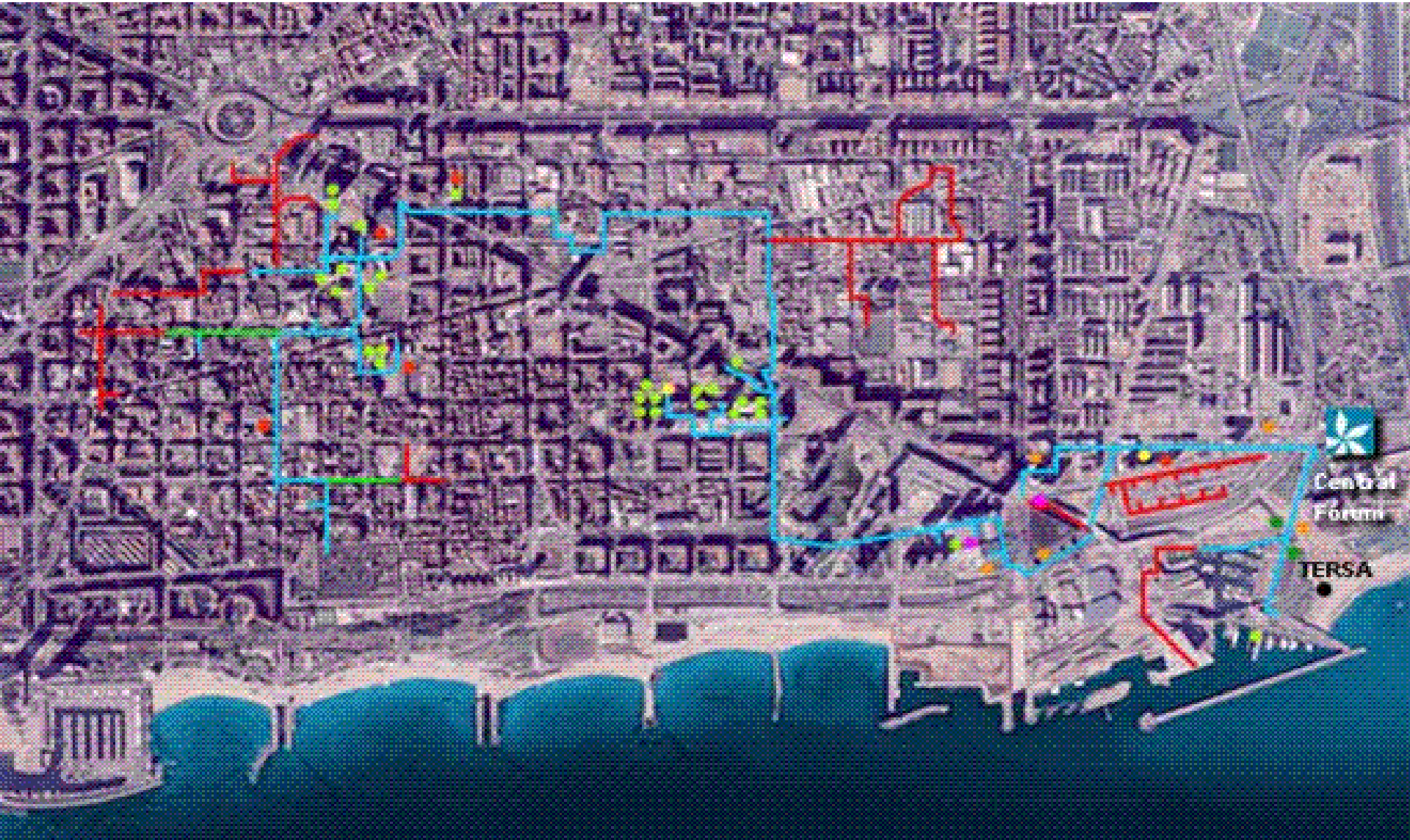


District Heating and Cooling in Barcelona

districlima



ECOENERGIES: Recovering cold energy from the regasification process of the liquefied natural gas in ENAGAS's plant.

The aim of this project is to profit wasted energy sources to provide heat and cold to a district heating and cooling network.

One of the biggest regasification plants in southern Europe is located in Barcelona's harbor, with a 625.000 m3(N)/hour capacity. Gasification process consists in heating the GNL with seawater which generates a huge amount of cold.

In addition, Barcelona produces up to **15.000 tones of biomass** coming from public parks that could be energetically profited.

This project will recover a part of the wasted cold, and recovering energetically the whole amount of biomass to serve the population.

ECOENERGIES: A project to give energy to domestic clients

The main end users of this project will be the 85% of the neighbors of the new *Marina del Prat Vermell* neighborhood (up to 1.100 new apartment buildings), the first domestic customers for this kind of installations in Barcelona.

The project pretends to cover as well Barcelona's central market Mercabarna, the Fair facilities, hotels, and even a hospital. This final users will have a 24/7 intervention service, and SMS news update service.

Cold recovery Central
Installed power: 30 MW

Biomass Central
Supply: 15000 tons/year
Electric installed power: 1.3 MWe
Thermal installed power: 4.8 MWt

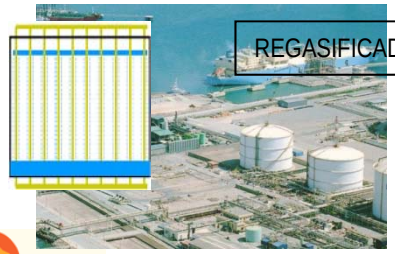
Energy production (year 2023)
Cold production: 62.48 GWh/year
Heat production: 57.53 GWh/year

Environmental facts
Avoided CO_{2eq} :13400 tons/year

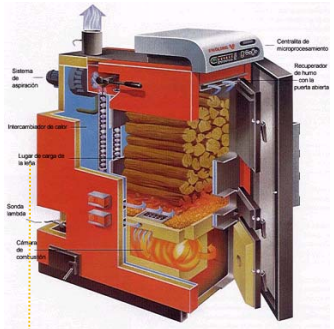
District Heating and Cooling in Barcelona

NATURAL GAS

PARC AND GARDENS BIOMASS

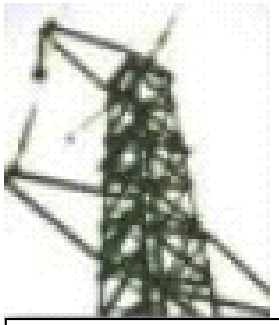


REGASIFICADORA's RESIDUAL COLD

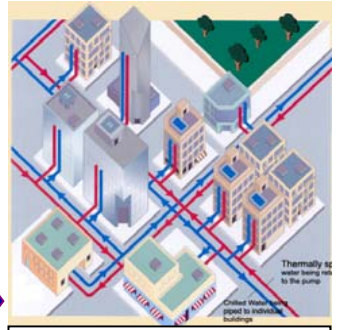


Valuation of BIOMASS

CHP



PRODUCTION OF ELECTRICITY



NETWORK OF DH&C

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Barcelona pel Medi Ambient

ECOENERGIES: Network

District Heating and Cooling in Barcelona

AGÈNCIA D'ENERGIA DE BARCELONA

A new project of network of climate

Thank-you for your attention!