

## **District Heating and Cooling Schemes a key asset for Sustainable Urban Development**

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# GDF SUEZ Energy Services within the GDF SUEZ Group

GDF SUEZ Energy Services offers its customers in industry, services and infrastructures, multi-technical solutions whether in the fields of engineering, installation or energy services.

- GDF SUEZ Energy France
- GDF SUEZ Energy Europe & International
- GDF SUEZ Global Gas & LNG
- **GDF SUEZ Energy Services**
- GDF SUEZ Infrastructures
- .....
- SUEZ Environment

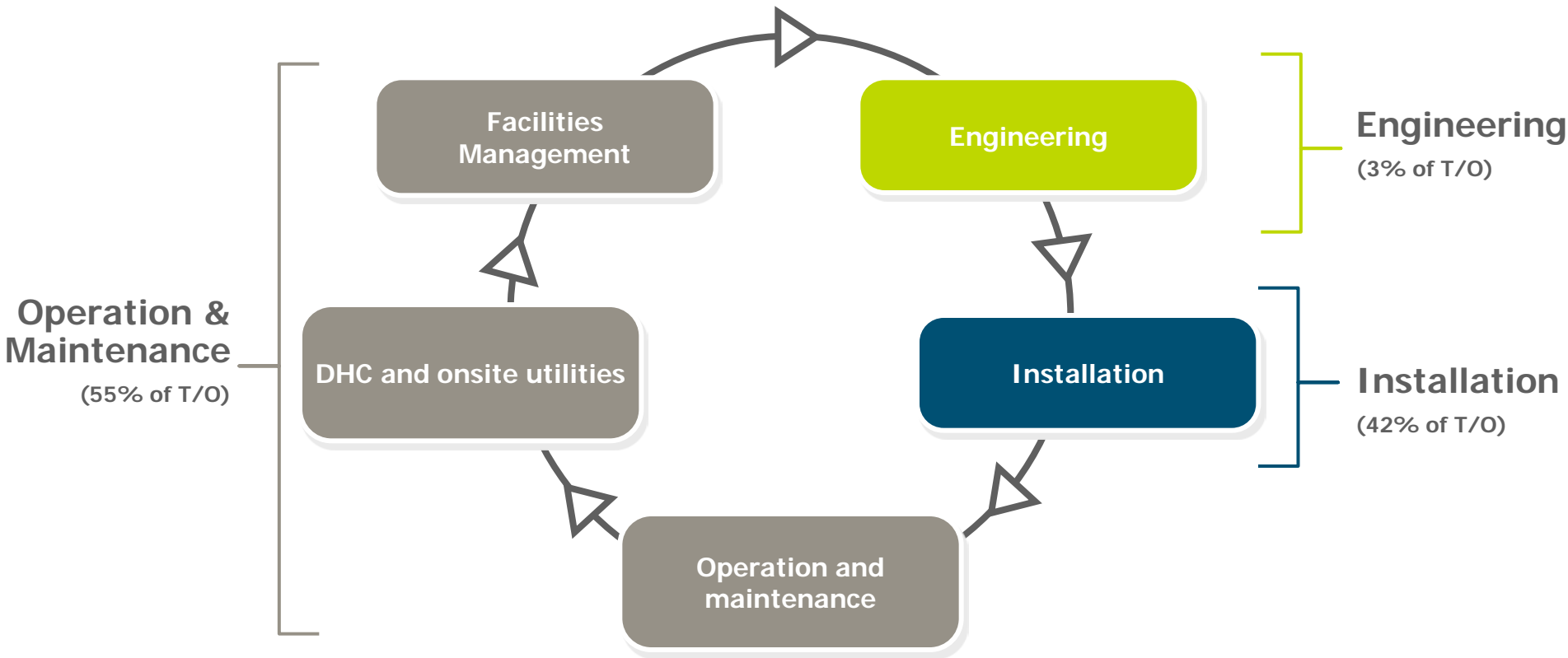
**14 billion€ revenues**  
20 % of the Group's revenues

**77 000 employees**  
40 % of the Group's employees

**1 300 locations**  
in Europe

**30 countries**

# Comprehensive solutions for a better use of energy



Alongside our clients for the whole life-cycle of their installations



# 1 in energy and environmental efficiency in Europe

# COFELY, a new organization within the Energy Services Business Line

- **8 billion € revenues**  
(14 billion € for Energy Services Business Line)
- **35 000 employees**  
(80 000 for Energy Services Business Line)
- A presence in more than **15 countries**  
(30 countries for Energy Services Business Line)
- **European 1st supplier** of energy and environmental efficiency solutions



## COFELY. Customised solutions for :

- Energy & environmental performance of buildings (Operation and maintenance, energy performance contract, etc.)
- Local and renewable energies (DHC, cogenerations, onsite utilities, etc.)
- Comprehensive services with guaranteed results (FM, PPP, etc.)

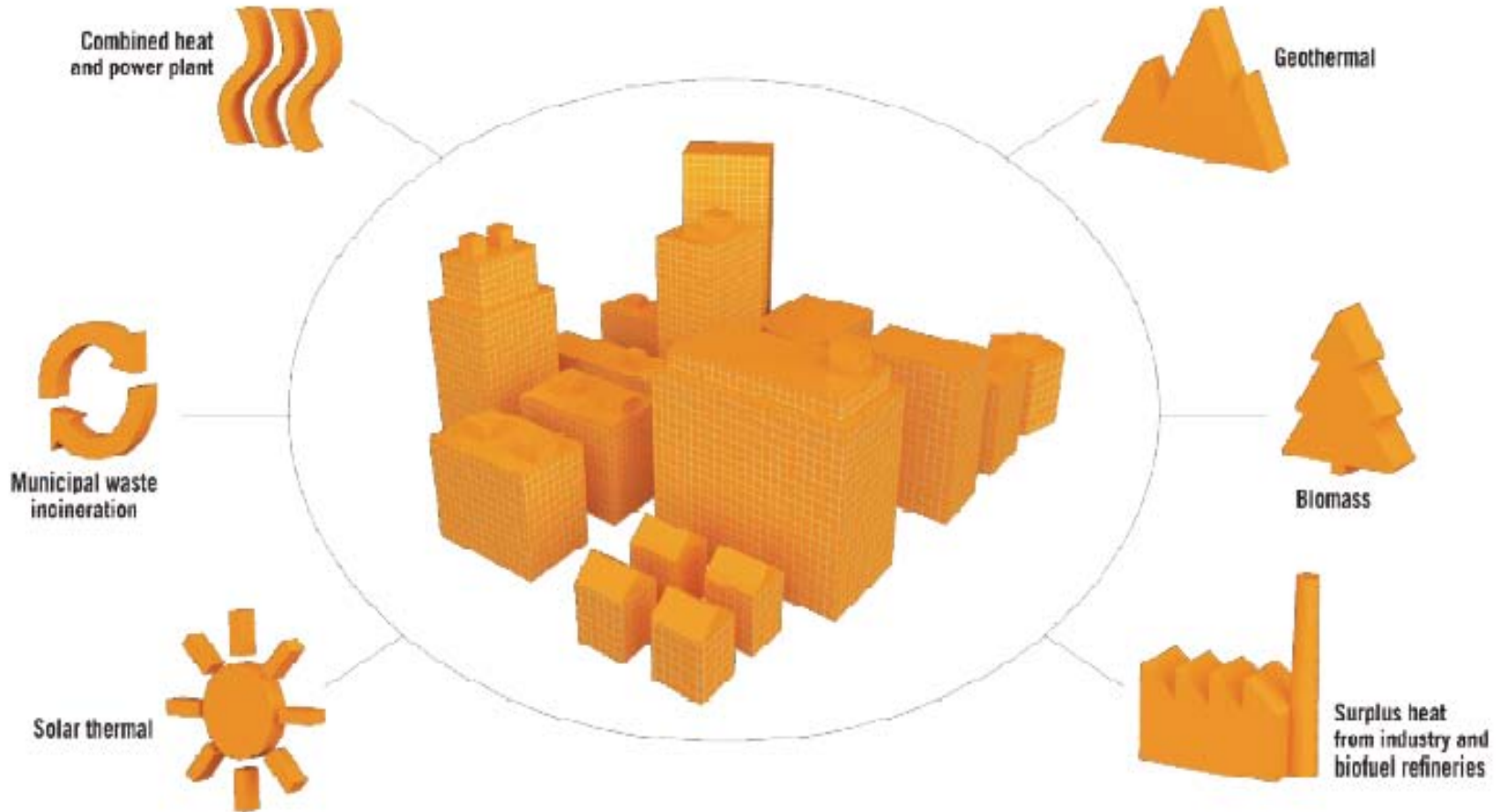
# Urban heating & the energy challenge

- Heating & cooling are responsible for half of the energy consumption in the EU
- The 3x20 for 2020 are a challenging step towards a decarbonised society; there's no way they can be reached w/o a much stronger focus on heat
  - Improve energy efficiency by 20% (translating into ~ 40% in buildings)
  - Reduce CO<sub>2</sub> emissions by 20% or 30% by 2020
  - Increase renewables to 20% of the energy mix (heat & cool: half of the increase)
- The majority of energy use for heating & cooling takes place in urban areas
- Municipal planning / involvement of local authorities is key for success
- District heating and cooling (DHC) holds a significant potential for decarbonisation of the heating and cooling market

# District heating (DH) in Europe today

- 550 TWh heat sales / turnover of ~ €20 B
- More than 5000 DH schemes, supplying ~ 9% of total heat demand, with an uneven distribution across Europe (from ~ 0% to ~ 70%)
- A flexible infrastructure enabling to integrate a wide range of renewable / recovered energy sources (local heat / fuel sources that would have been lost or remained unused)
  - on a large scale
  - where most needed
  - where most difficult to make use of RES
- More than 80% of heat in DH schemes come from recovered heat, renewable energy and waste resources
- Avoided CO<sub>2</sub> emissions amount to ~ 110 Mt/yr

# Heating & cooling w/o conventional fuels



# A technological edge vs conventional solutions

- Surplus heat from industry
- Waste-to-energy
- Combined Heat & Power
- Geothermal energy
- Environmentally friendly use of conventional biomass
- Difficult biofuels (straw, ...)
- Geothermal energy combined with heat pumps and heat / cold storage
- Energy efficiency improvements: e.g. condensation
- Large scale solar thermal plants
- Surplus wind energy combined with heat pumps and large heat accumulators
- Etc.

- 130 DHC schemes operated
- Variety of schemes from small rural biomass schemes to landmarks such as CPCU and Climespace (Paris DHS and DHC schemes)
- An early involvement in sustainable DHC for new eco-districts:  
Lisbon trigeneration → Barcelona → >Sarragosa, London Olympic Park,  
Limeil-Brévannes, Overhoeks, Oosterdokseiland ...



- 3 waste treatment plants (incineration)
- 7 combustion plants
- 2 cogeneration plants

## Distribution network

- 1 660 sub-stations
- 5 700 connexion valves
- 5 565 invoiced customers

# Refurbishment of Bourges DHS

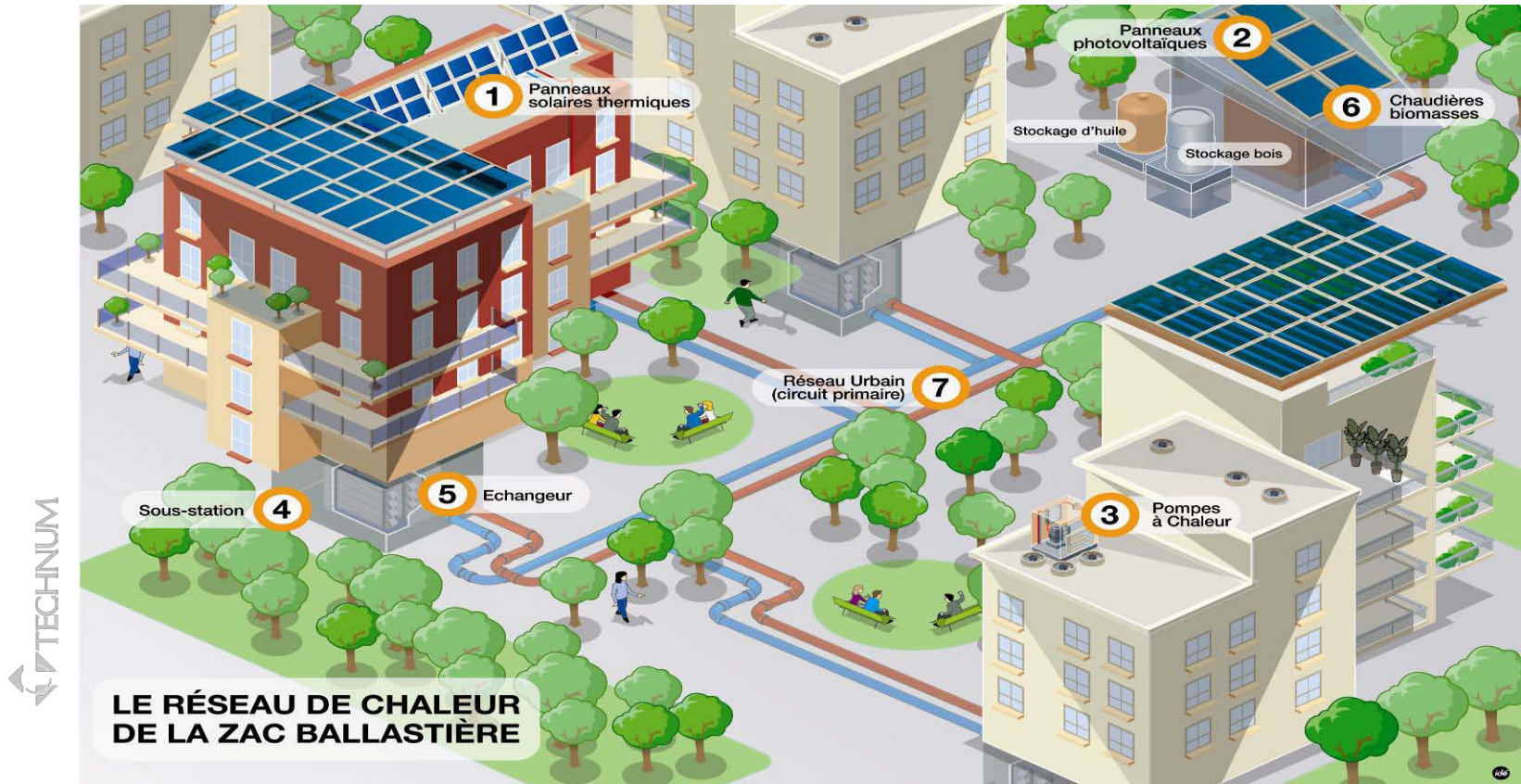
- 4,000 dwellings
- **Wood-fueled boiler house**
- **PV panels**
- **Modernisation of 8 km network**
- **Creation of a wood preparation platform**



- **Sustainable development strategy of the city**
- **GHG abatement: 90 %**
- **Job creation/Thrust for local biomass business**



# Limeil Brévannes Eco District



## Highlights

- Strong involvement of local authorities
- Landmark renovation of @22 district
- First district heating and cooling scheme in Spain
- Waste-to-energy, energy storage, heat exchangers with sea-water, ...



### Benefits

- Delivery cost: - 20% vs conventional solutions
- Energy consumption: - 48%
- CO2 abatement : - 50%
- No cooling tower (no noise, no legionella risk, ...)
- Architectural benefit



### Success of concept

- Similar DHC scheme inaugurated in Saragossa in 2008

# OOSTERDOKSEILAND – AMSTERDAM CENTRE



- 200 apartments, 90.000 m<sup>2</sup> including public library, conservatory, hotel, bars, restaurants, congress centre and 80.000m<sup>2</sup> offices
  - Totals 200.000 m<sup>2</sup>
- Cofely is responsible for the design, realisation, financing, exploitation and maintenance (24/7 supervision) of Heat and Cold generation
- Seasonal heat / cold storage
- Energy savings: 65%
- Annual CO<sub>2</sub> reduction: 65%
- Annual 3400 tons CO<sub>2</sub> reduction
- Success of concept : several similar schemes under construction

- The main energy savings occur upstream of energy delivery to buildings. Local solutions allow to utilise vast resources of waste heat to substitute fossil fuels
- Such solutions are needed as of today and should be robust for the future
- Primary energy consumption and cost-effectiveness should be key for comparing solutions, e.g. between :
  - waiting for a generalisation of “zero energy” buildings (what about grey energy ?) ?
  - or Supplying zero emissions energy to moderately refurbished buildings ?
- Integrated solutions must be privileged
  - insulation + heating + cooling
  - building envelope + technical installations + infrastructures
  - energy efficiency + renewables
  - mutualisation of needs and resources
- Recent Danish Heat Plan shows that on this basis 2030 can be close to carbon-neutrality

# Investing in DHC

- DHC schemes should be natural parts of the urban infrastructure in modern districts / cities
- Capability to provide carbon-neutral comfort energy on a large scale within a reasonable time frame and at an affordable price
- Impact on local economy and development
- Long run savings
- Good case for green recovery plans

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**Thank you for attention**