



INTERNATIONAL DISTRICT ENERGY NEW APPROACHES WITH APPLICATION TO THE US

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OVERVIEW

1. CONTEXT

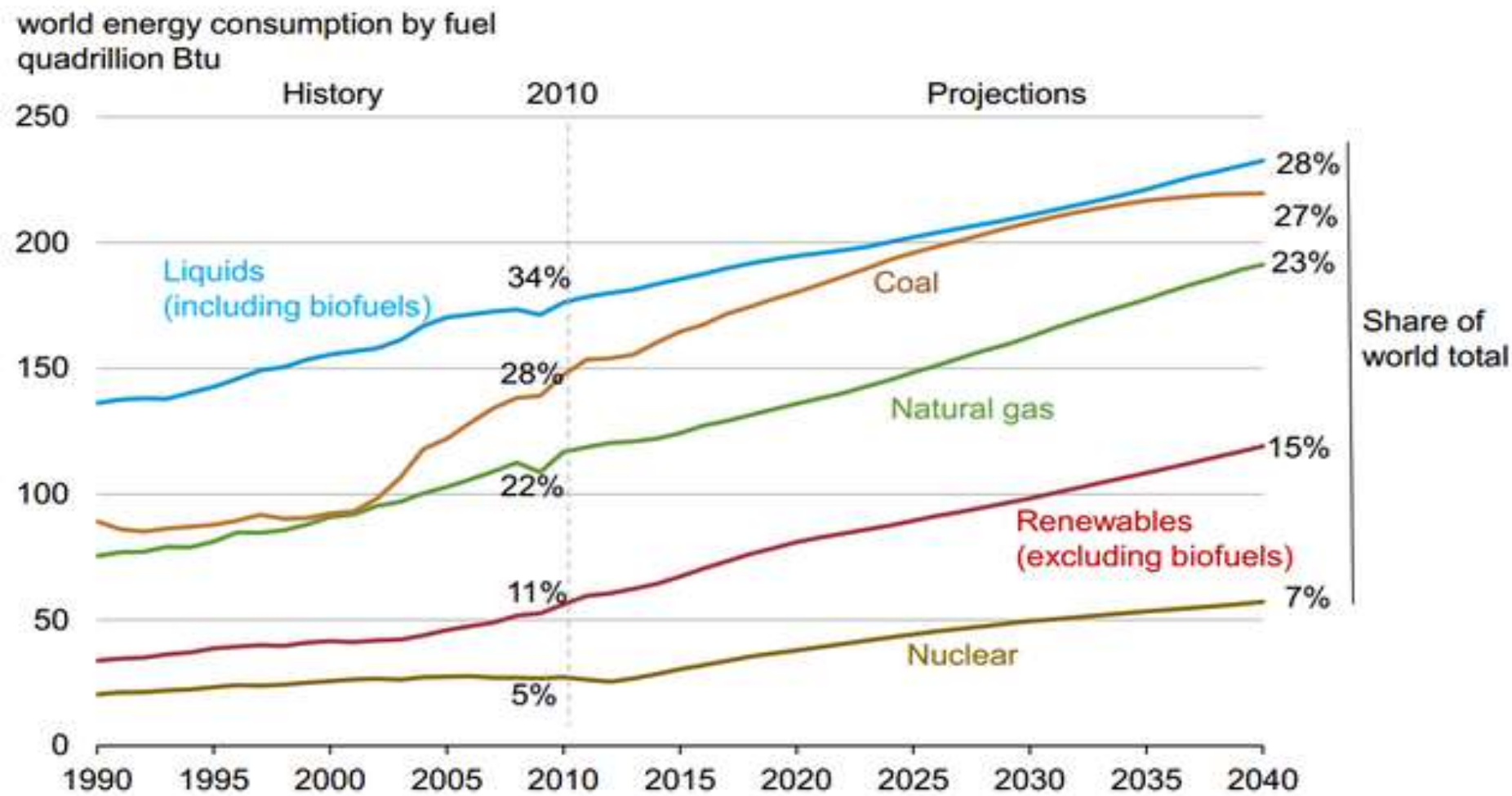
2. HEATING NETWORKS

3. CONCLUSIONS



1. CONTEXT

ENERGY USES: UPWARD TREND



Source: EIA, International Energy Outlook 2013

CARBON: A STRONG INTERNATIONAL ENVIRONMENTAL PRESSURE

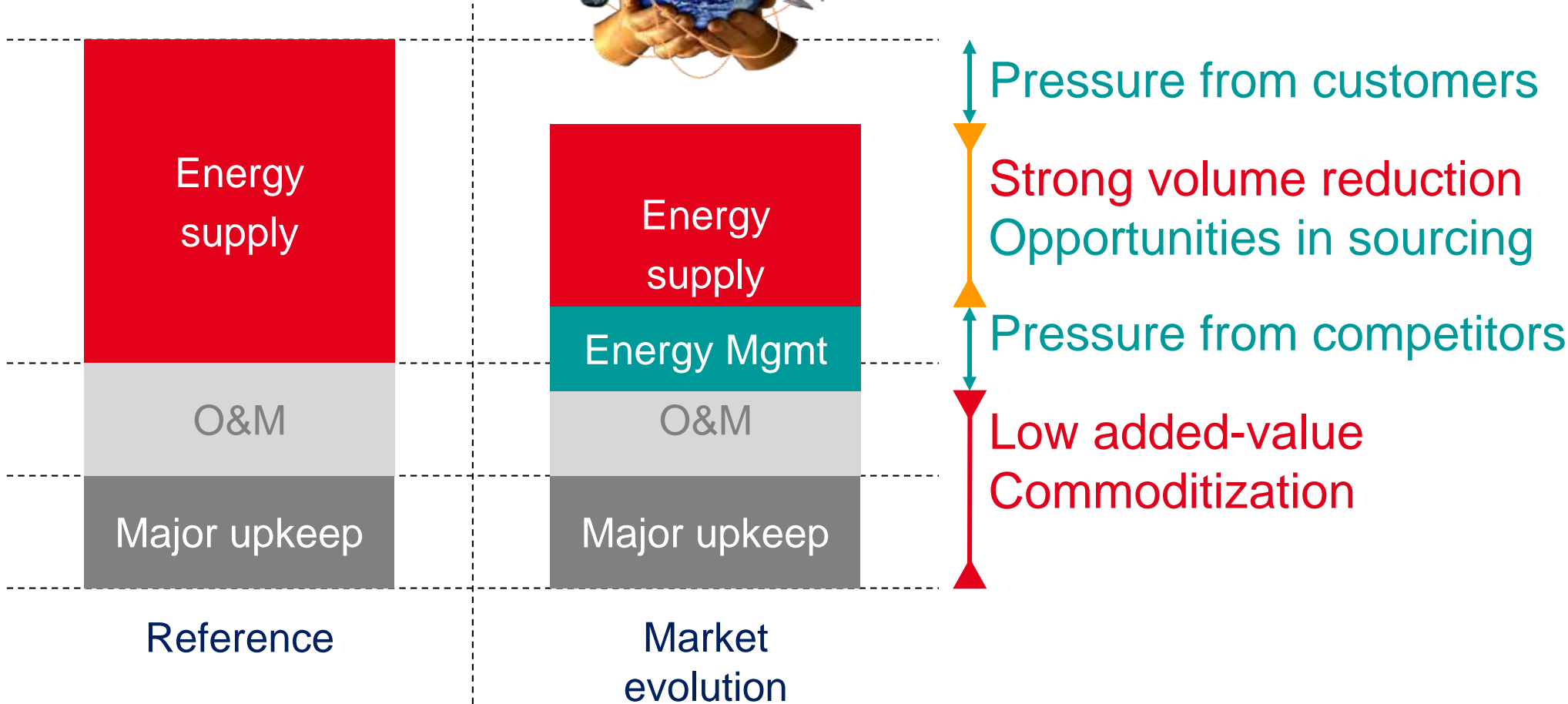


- ▶ **EXTENT OF THE PROBLEM**
Unknown, but large
- ▶ **URGENCY OF THE SITUATION**
Forcing function

CARBON & ENVIRONMENT: REVOLUTION !

- ➔ Societal models and their major changes have been based, in part, on **energy**.
- ➔ The 2 **industrial revolutions** (coal - oil) were based on **abundance**, thanks to energy.
- ➔ We squandered in **less than 200 years** most of the heritage built for millions of years.
- ➔ The **3rd industrial revolution** will be another energy revolution : carbon and economic management of resources.

CHALLENGES: PRESSURE FROM COMPETITORS & CUSTOMERS




 New offers creating value through energy efficiency, capitalizing on customer intimacy and smart management

LESSONS LEARNED ABOUT ENERGY AND USES

1. Economic necessity
2. Resource constraints
3. Environmental imperative
4. Customer expectations
5. Competitive pressures

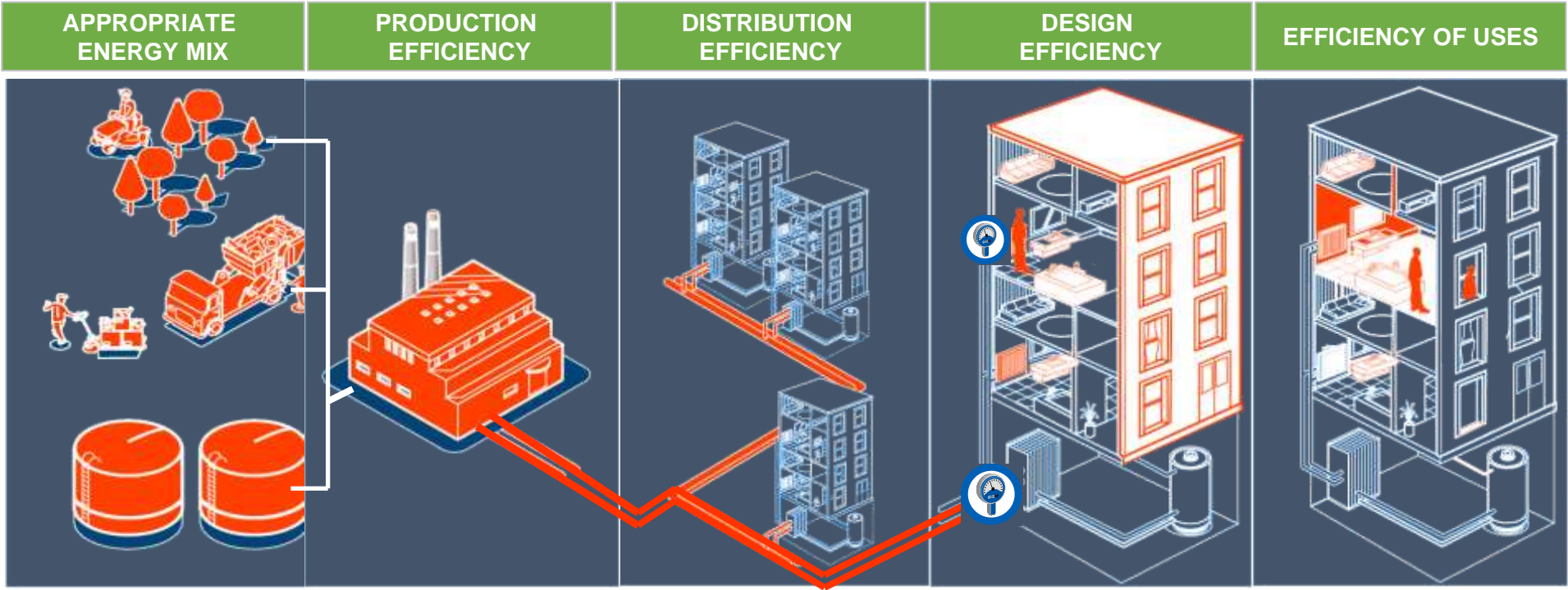


2. HEATING NETWORKS



Is it possible to change your
perception of a heating network?

TARGET PRIORITIES TO ACHIEVE ENERGY EFFICIENCY



PRODUCE BETTER
« ACTION ON SUPPLY »

Investment on industrial transformation

CONSUME LESS
« ACTION ON DEMAND »

Investment on de-consumerism

***Is the Heating
Network dead?***



***...Long live the Heating Network!
Let's see an example***

LET'S IMAGINE ...

1

*Power & Heating
Networks*

2

*Recycling
Waste Heat*

3

Renewables

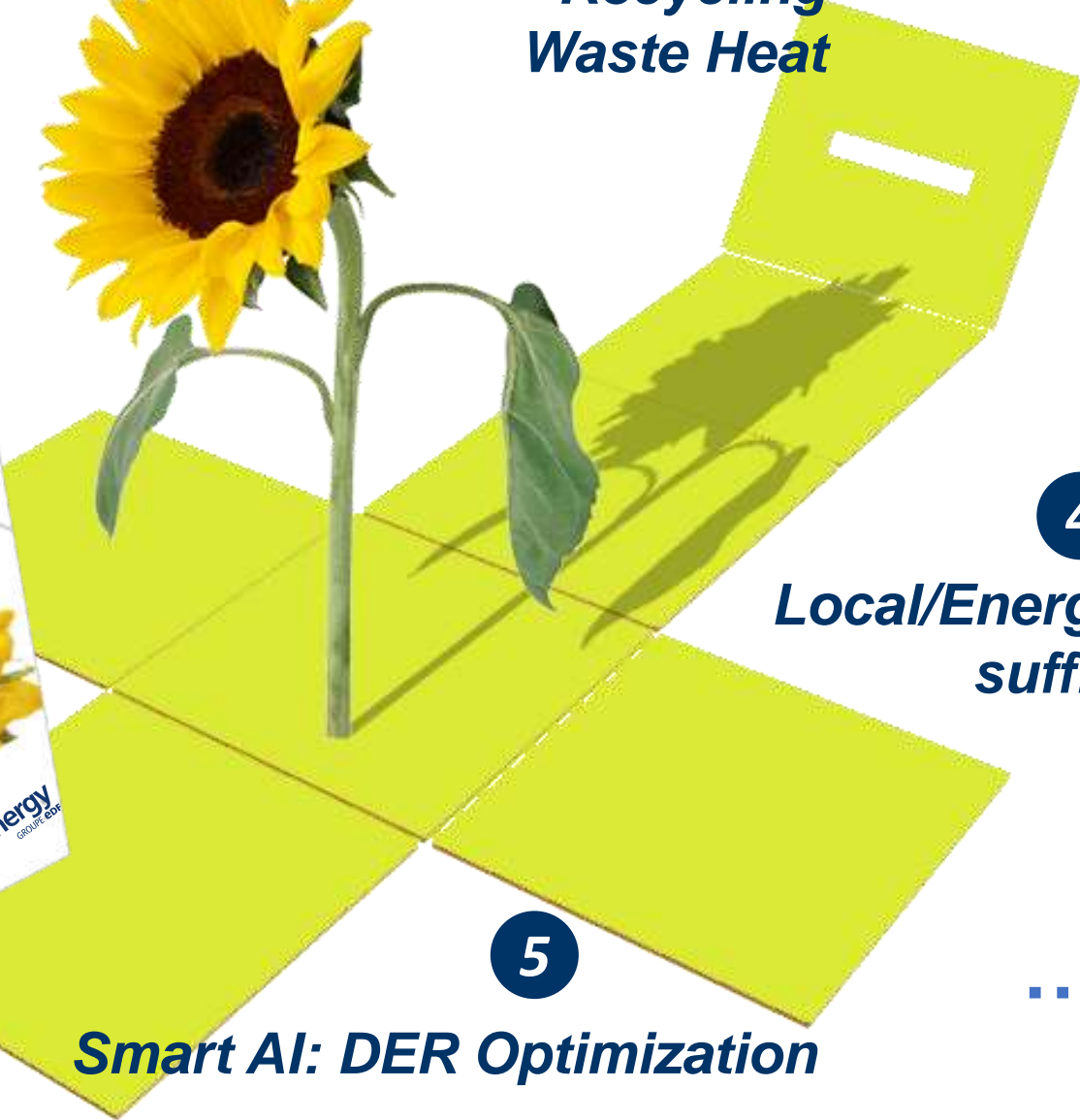
4

*Local/Energy Self-
sufficiency*

5

Smart AI: DER Optimization

... SOMETHING
POSSIBLE



DOUBLE SMART GRID (THERMAL & ELECTRICAL GRID)

What?

HIGHLIGHTS

- 60% renewable energy
- 5 local energy sources
- 100% of self-produced energy is consumed by the scheme
- Results guaranteed for 27 years
- 120,000 m² of floor area
- Revenue (27-year contract) = 27 M€
- Works = 7 M€
- Financial contribution of the property = 5 M€
- Subsidies = 1,2 M€
- Return on Investment = 11 %

DOUBLE SMART GRID (THERMAL & ELECTRICAL GRID)

Where?

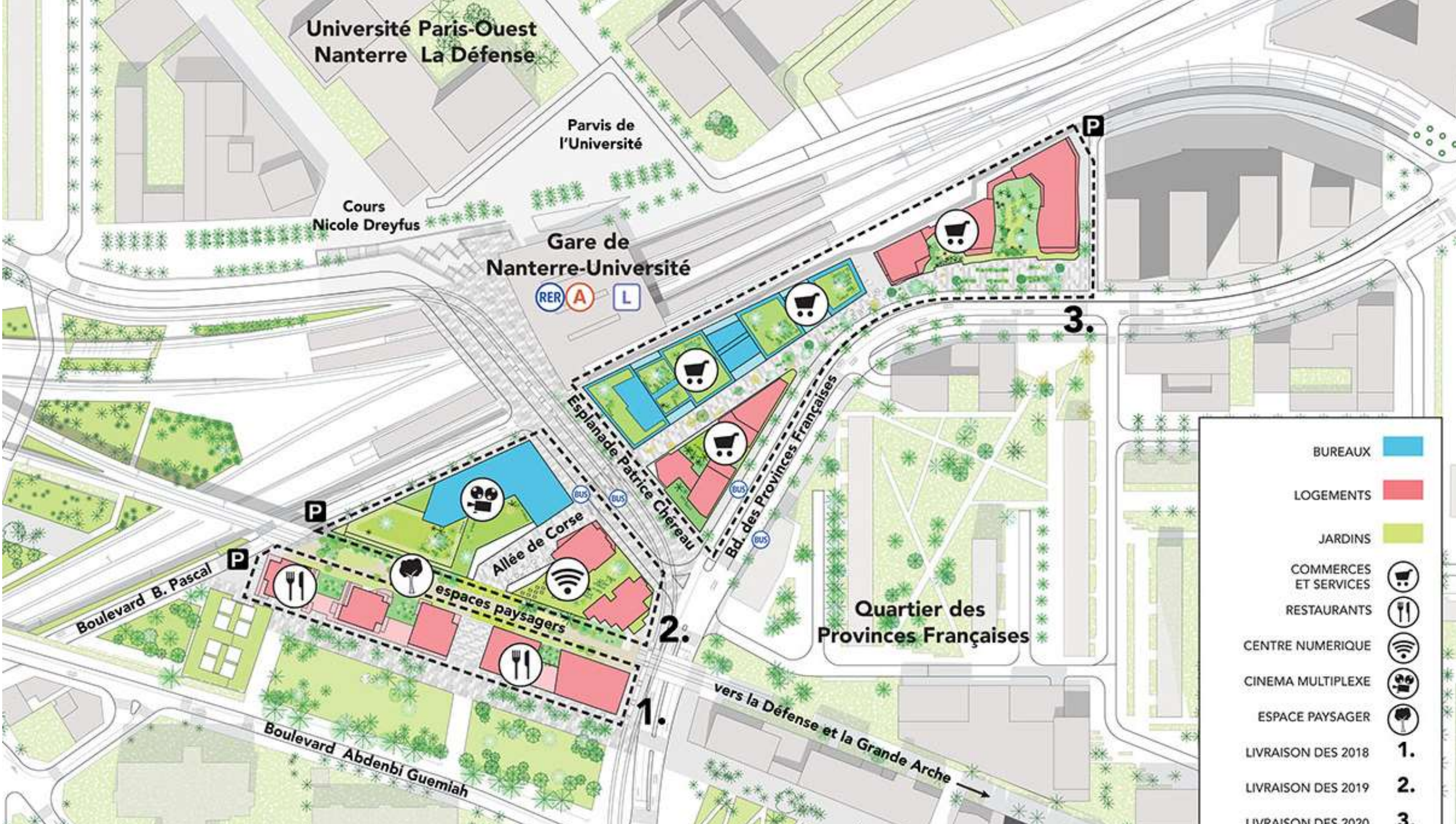


CITY OF NANTERRE



THE NANTERRE ECO DISTRICT









DOUBLE SMART GRID: THERMAL GRID

For whom?



DOUBLE SMART GRID: URBAN REVITALIZATION



City Operator

Optimal Solutions

Design-Build Energy
Solutions Firm



Energy Firm, O&M



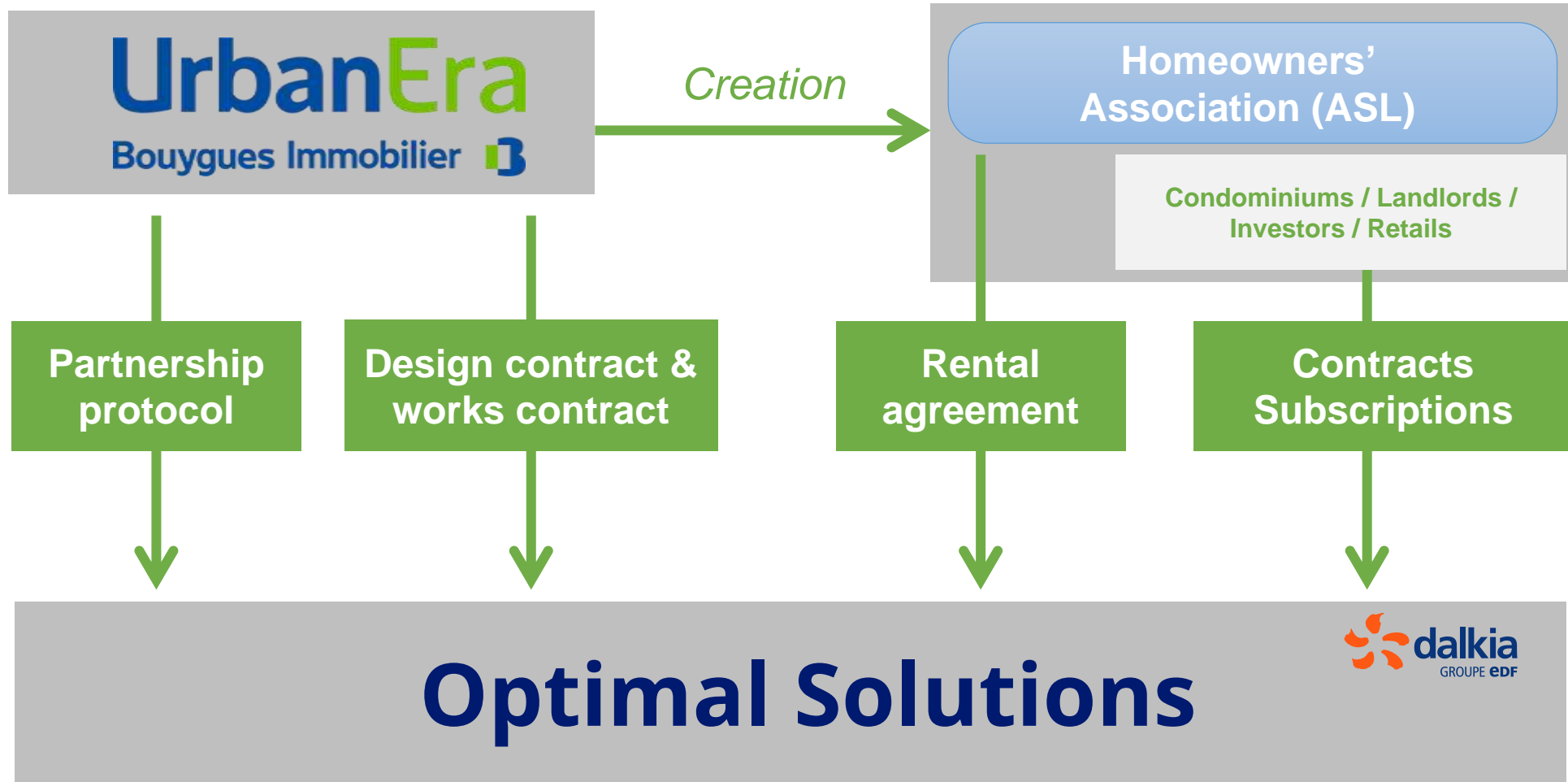
Source of Funding



Environmental Agency

DOUBLE SMART GRID: CONTRACTUAL SCHEME

A 100% PRIVATE PROJECT



DOUBLE SMART GRID: ELECTRICAL GRID

How to Cost-effectively Innovate?



DOUBLE SMART GRID: HOW DOES IT WORK?

SMART THERMAL GRID

Heat is produced on the roofs and in the basements of the buildings. 60% of heating is generated using local renewable energy sources:

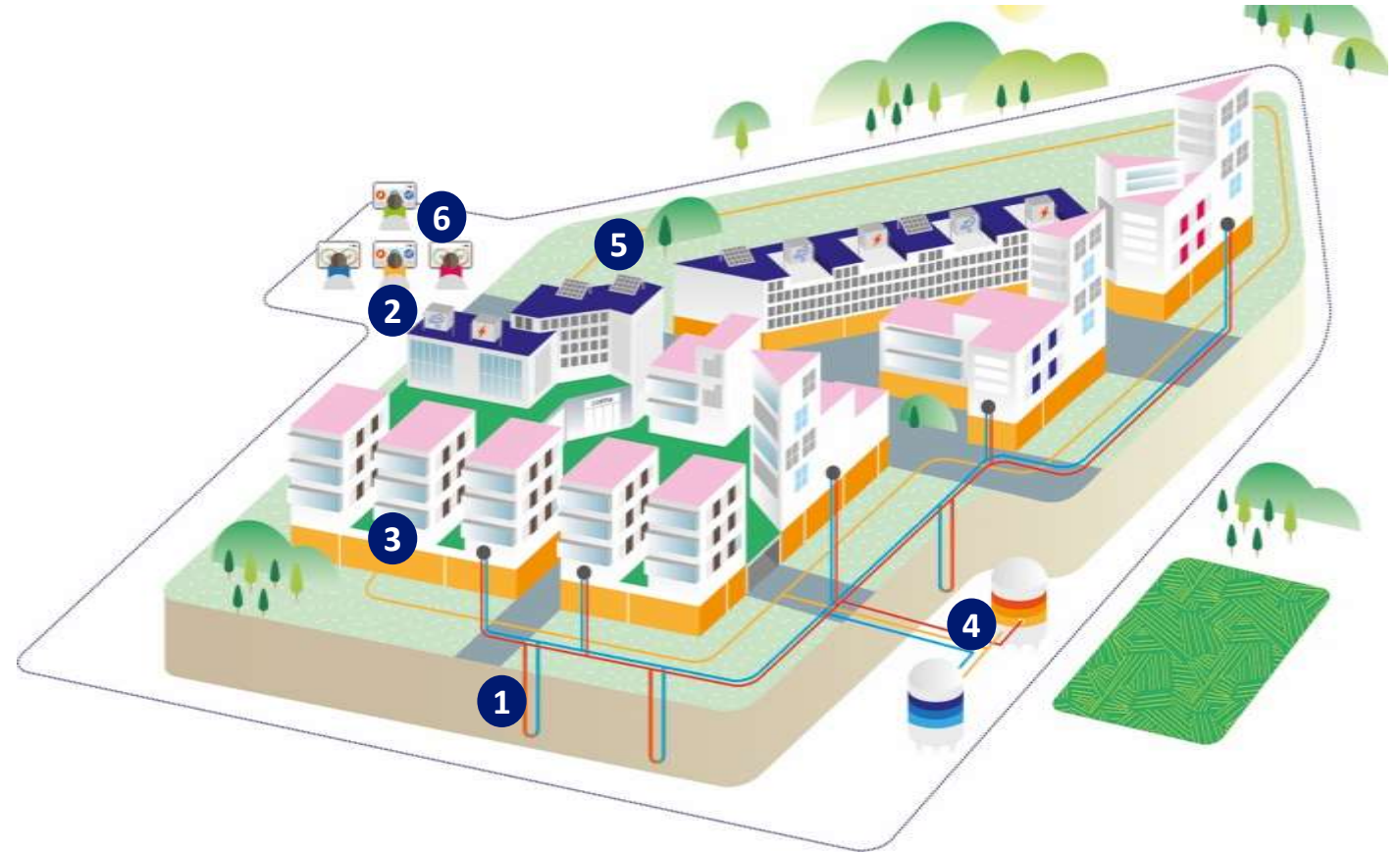
1. surface geothermal energy
2. aerothermal energy and cogeneration using rapeseed oil
3. heat recovery from wastewater and heat exchange between the buildings
4. two 80 m³ tanks store hot and cold water to supply the buildings with heating, air conditioning and domestic hot water.

Two back-up gas boilers can be used to supplement heating if demand is too high in winter.

SMART ELECTRICAL GRID

5. electricity is generated by photovoltaic panels and cogeneration using rapeseed oil.

The electricity produced is all consumed by the electrical equipment within the network, such as the heat pumps.



DIGITAL MANAGEMENT

6. the double smart grid, which is both thermal and electrical, is managed in real time to optimize energy performance and costs to users.



3. CONCLUSIONS



SOLUTIONS



3 BRANDS, ONE GROUP



EDF
The Parent
Company



Dalkia
The leading
Provider of Energy
Services in France



DK Energy
The Brand for
International
Activities of Dalkia





Thank you!

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