



**CSTB**  
le futur en construction

**efficacity**  
Innovating for sustainable cities

**PowerDIS**

Reference software for urban  
dynamic energy simulation

Ju ne 2023



Baptiste François  
Product owner, Efficacity

## Efficacity : a rich ecosystem devoted to urban transition

Public higher education and research organizations

**Efficacity is a public-private R&D institute bringing together 100 researchers and experts in multidisciplinary project-teams ...**



**... focused on sustainable city expertise, within the Cité Descartes, and connected to a pool of solutions, sourcing and expertise of the highest calibre.**

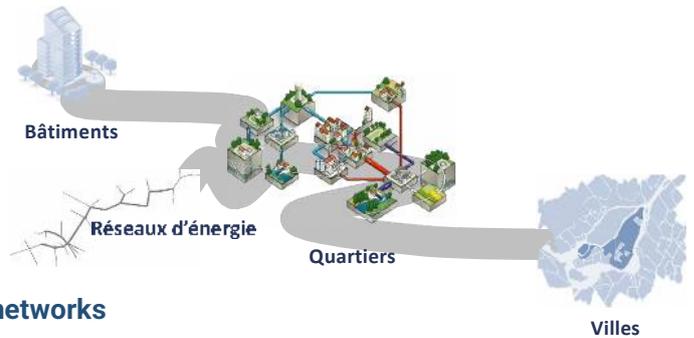
Development of decision-support methods and software for the urban energy and ecological transition

Industrial and Engineering

# PowerDIS : dynamic urban energy simulation software

## Who, what, how ?

- Target audience: developers, local authorities, design offices and R&D teams
- Spatio-temporal scale: from a dozen buildings to several hundred, reduced calculation times
- User autonomy: intuitive interface, data enrichment, one-day training course



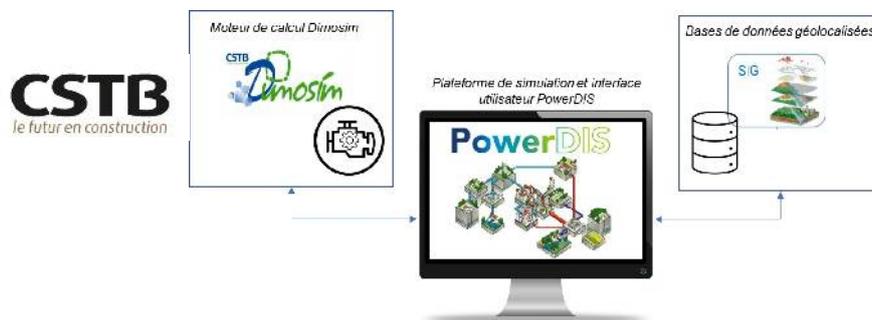
## Study types:

- Creation and extension of heating and cooling networks
- Electricity self-consumption
- Building renovation
- Energy optimization

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## PowerDIS : What is it ?

➤ Decision making software for urban energy strategies



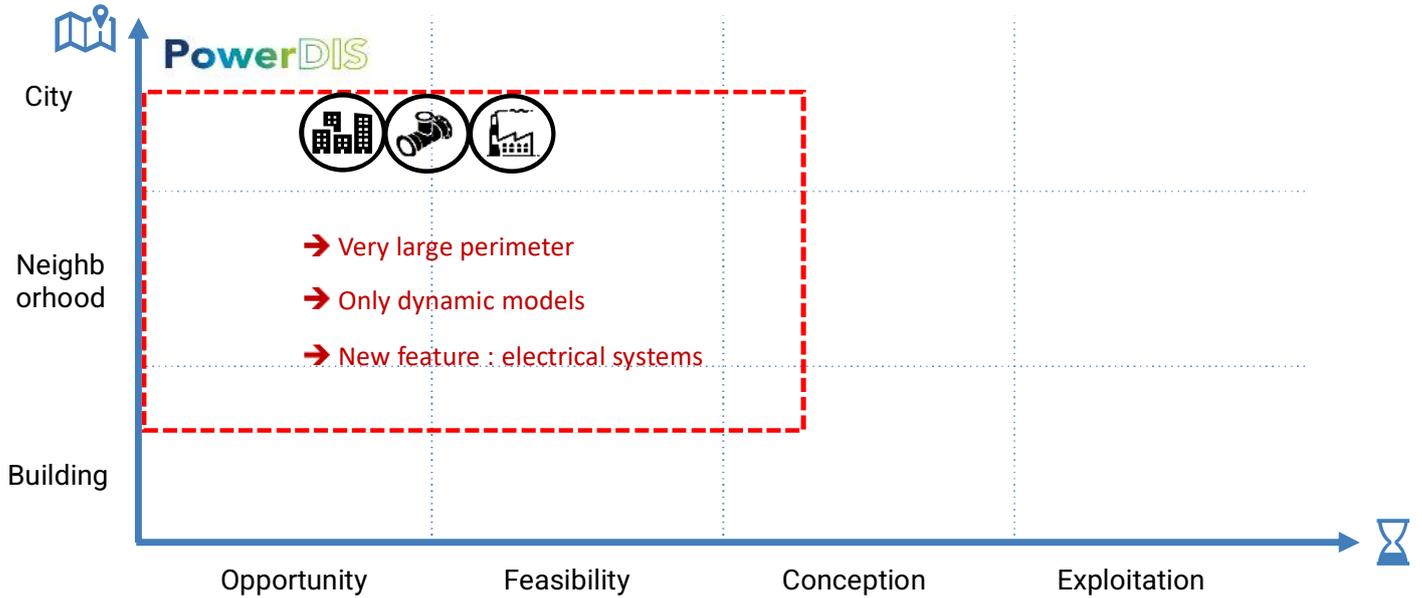
## Software's features :

- Modelization and simulation of building energy needs and system's energy consumption, for feasibility studies and energy strategic choices
- Construction and comparison of centralized and decentralized energy scenarios (district heating, individual heat pumps...), with major emphasisement on renewable energies
- Cartographic visualization for energy need and energy consumption results, as well as hourly data extraction over the year dynamically simulated for equipment sizing

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# PowerDIS Perimeter

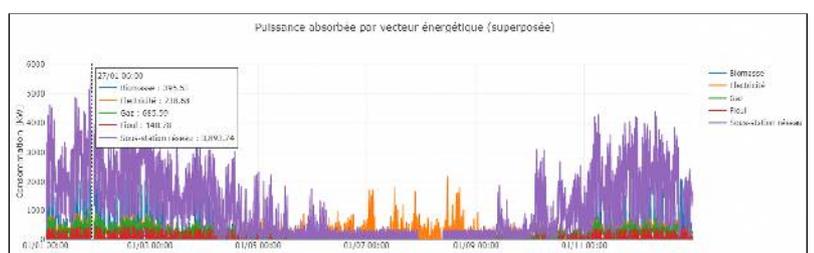
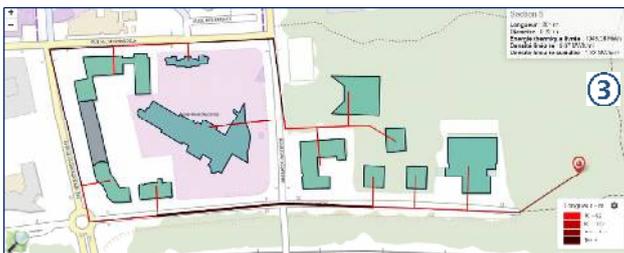
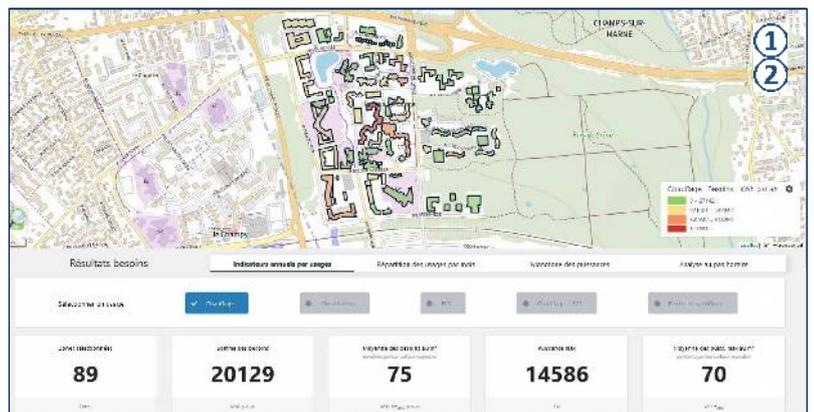
 Building needs  
  Distribution  
  Productions  
  Dynamic model



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## Examples of simulation results with PowerDIS

- **Building energy requirements:**
  1. Mapping of buildings and their annual heating, cooling and domestic hot water requirements;
  2. Annual, monthly and hourly representation of building requirements by thermal zone.
- **Energy systems consumption:**
  3. Mapping of district heating and cooling networks (boiler room and network sizing, power and energy delivered);
  4. Visualization at hourly, monthly and annual intervals of energy consumption by the means of thermal production.

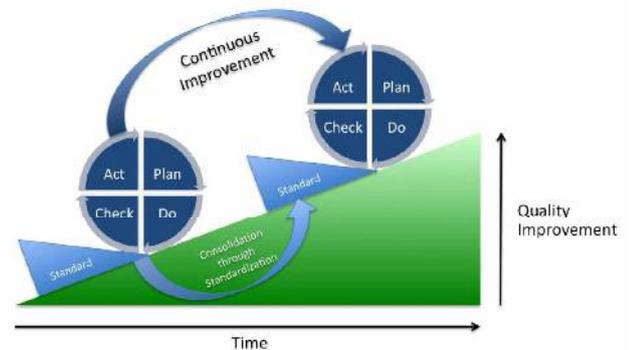


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## Operational software in continuous improvement process

### ■ Features directly from the clients' needs :

- Features are defined, specified and prioritized with partn
- Developements are made with energy experts
- Features are tested on real case scenarios



### ■ Opportunities and prospects :

- New features for energy production, distribution and consumption (both thermal and electric energies)
- Many new projects with R&D convention, and/or with partners
- Internationalization : PowerDIS use in other countries and language developements

## Building international partnerships

- Available languages for now : French and English
- Efficacity's members are using PowerDIS all across Europe throughout many city project (Germany, United Kingdoms, Spain...)
- Close partnership with overseas departments for adaptations to island and tropical climates
- R&D partnerships with Morocco, India and China: PowerDIS is adapted in partnership with local authorities, research laboratories and companies.
- Development of new functions in partnership with foreign laboratories



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**Thank you for your attention**

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