

## THE DIGITAL TWIN THAT SUPPORTS THE DECARBONIZATION OF THERMAL NETWORKS



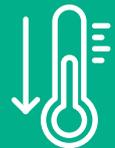
Energy and financial gains up to:

**20 %**  
in design phase

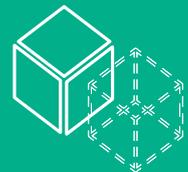
**5 %**  
in operation



**Track 100%**  
of energy losses



**Lower network temperatures**  
And control of operating parameters



**Representativeness, performance and ergonomics**  
for the design and operation of network



Suitable for  
**all types**  
of network



**DistrictLab.H**

### THE RAISON D'ÊTRE

DistrictLab.H™ sets new standards in performance and ergonomics for the design and operation of district heating networks

- Quick to learn and easy to use.
- Optimise installation sizing.
- Identify high-risk operational situations.
- Consolidate control strategies.
- Control operating parameters.

#### DistrictLab.H™ a solution for network designers and operators

- Design offices.
- Engineering and operating departments.

#### DistrictLab.H™: an unrivalled functional scope

- From MegaWatt to GigaWatt.
- Existing networks, networks to be created, networks to be extended.
- Complex architectures with multiple producers.
- District heating and cooling networks.
- 2G, 3G, 4G, 5G Technologies.

### THE DISTRICTLAB.H™ DIFFERENCES

Design and operate a perfectly optimised network and control your engineering and operating results.

#### The power of an ultra-representative digital twin

Benefit from a digital twin that is 100% representative of your existing or future heating network. You work on a virtual network, represented in all its dimensions: production, distribution, consumption.

#### A unique approach to critical network temperatures

DistrictLab.H™ is the only solution on the market that represents critical temperatures at each substation, while tracking 100% of energy losses. You're as close as possible to meeting your customers' needs.

#### A very broad spectrum of simulation

From static analysis, through daily operating sequences, to annual operation.

#### A user-friendly solution

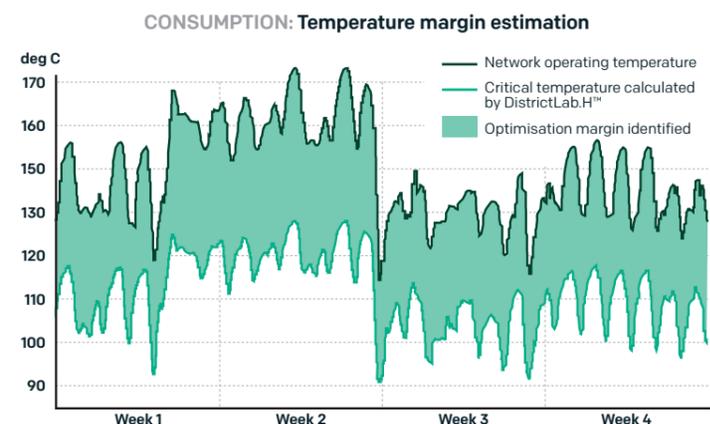
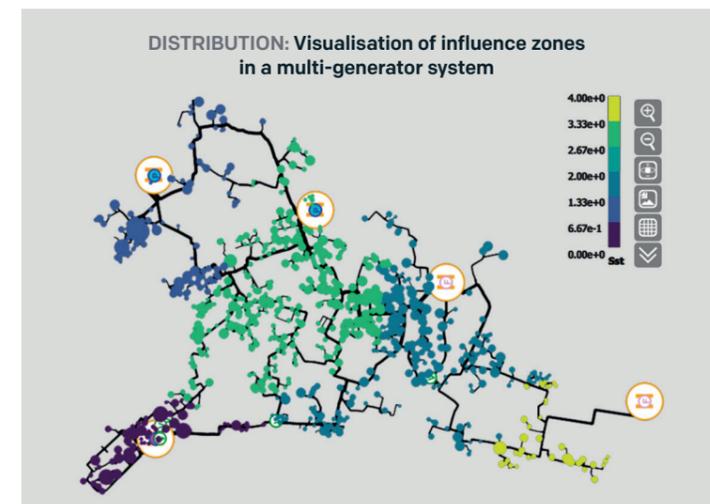
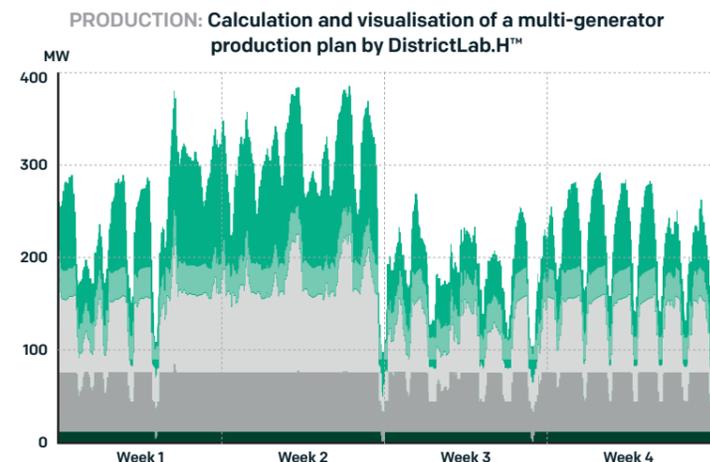
Thanks to its ergonomic graphic interface, the software solution is easy to use. Existing network models are automatically imported from a Geographic Information System (GIS). Extensions and new networks are easily traced using the editor.

#### An operational approach and effective results

Minimize your input data, run your simulations and benefit from unique relevance for your operating parameters (e.g. critical temperatures), and operational strategies. Results are fast, regardless the size or complexity of your network is.

#### Real expertise in heating networks

Designed around a fast thermo-hydraulics simulation kernel, the technology is dedicated to heating and cooling networks. The DistrictLab team: experts in thermal grids integrated into the CEA - LITEN ecosystem.



## DISTRICTLAB.H™ REPRESENTATIVITY, PERFORMANCE AND ERGONOMICS

• In an era of decarbonization, expectations in terms of controlling the performance of heating networks are ever higher. This control requires the most accurate visualization of the network and a simple, agile design system.

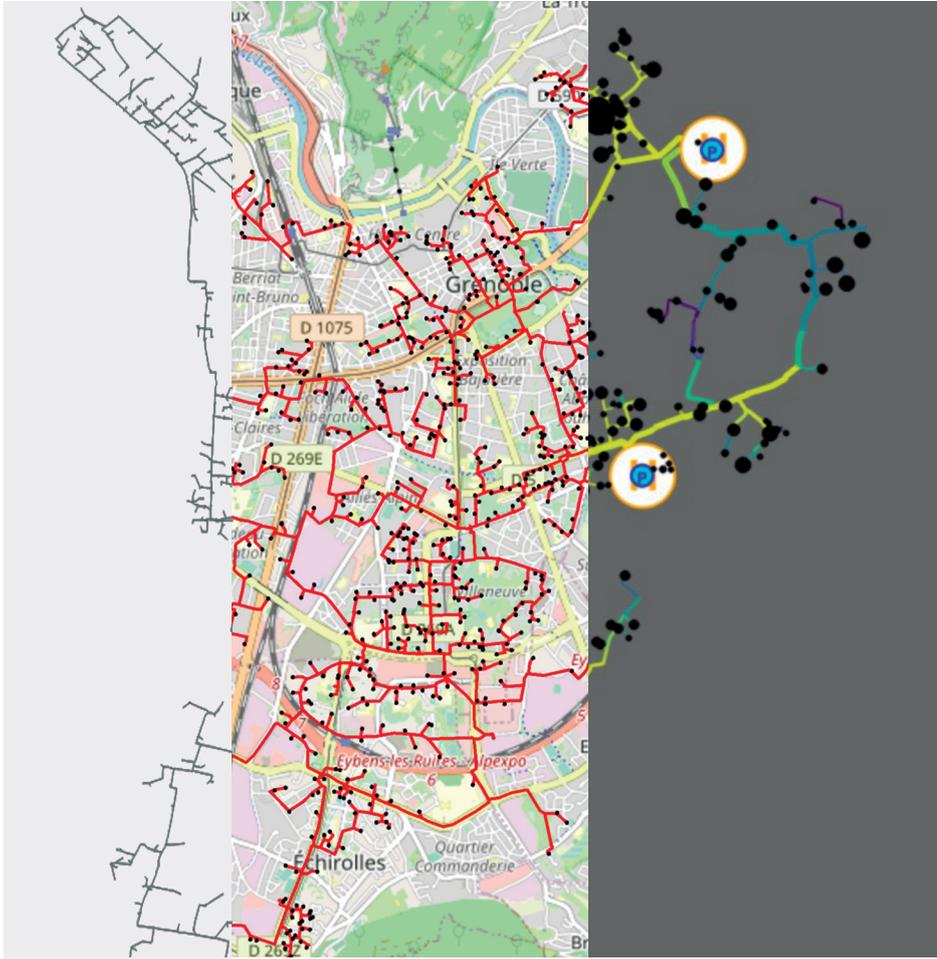
• To meet these challenges, DistrictLab.H™ is an innovative solution for the design and operation of district heating networks, however complex.

• Based on the concept of a 100% representative digital twin DistrictLab.H™ provides a unique view of its network, its reaction to events, its parameters (e.g. critical temperature) and its operating strategies.

• Designed by DistrictLab, as part of the CEA LITEN ecosystem, DistrictLab.H™ is a dedicated solution that is easy to use, highly ergonomic and operational.

## YOUR FIRST STEPS

# With DistrictLab.H™'s ergonomic graphical interface



QGIS

Édition

Analyse

### — In Edit mode

In DistrictLab.H™, import your network from a Geographic Information System (G.I.S) or draw it using the editor. Run the automatic modeling tools: simplification, plot verification, etc.

### — In Analyze mode

Create a simulation scenario (choice of time step, weather conditions). Quickly obtain verification of on your operating parameters. Visualize the reality of your network's operation in all its dimensions: production, distribution, consumption.

## Ten years of development by CEA and its partners



DistrictLab.H™ is a digital solution resulting from research undertaken since 2013 by CEA-LITEN to optimize the management of urban heating networks.

- From the outset, a partnership with the Compagnie de Chauffage Urbain de Grenoble to address the challenge of lowering the operating temperature of their network.
- The project was selected by the CEA-Magellan incubator and DistrictLab was created in 2023.
- Cumulative R&D efforts representing 30 FTEs.

### IN PRACTICE

- DistrictLab.H™ licences available for various periods (1 month to 3 years).
- 1<sup>st</sup> level support included: hotline, bug tracker, etc.
- Installation on a Windows PC.
- Coaching to get you up and running in 3 days.
- Two versions per year.

## Contact



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## Compagnie de Chauffage Intercommunale de l'Agglomération Grenobloise

We were looking for a solution to help optimize our thermal network operation. In particular, to calculate optimal control trajectories for temperature and differential pressure. With DistrictLab.H™, we can reduce the energy injected into the network. The economic and environmental benefits are tangible, with DistrictLab.H™ helping us to limit the use of fossil fuel plants. We have a precise view of the operation and behavior of our network.

**Loic Giraud-CCIAG engineer**



## Usine d'Électricité de Metz

DistrictLab.H™ enables us to operate the network optimally, day in, day out, all year round. In concrete terms, it enables us to lower the forward temperature (currently potentially 160°C). The software also enables technical savings in terms of heat production, both in terms of temperature and pressure. We'll be able to limit thermal and hydraulic losses. A significant gain.

**Nicolas Schoenacker-UEM engineer**



## CEA Cadarache

We used DistrictLab.H™ to optimize the operation of a heating network with 60 kilometers of piping, distributing 45 gigawatt-hours of energy per year. The network was historically fuelled by gas. The results convinced the stakeholders to switch part of the system to hot water, thereby reducing operating risks, heat loss and maintenance costs. In addition, DistrictLab.H™ enabled us to identify the cause of malfunctions at numerous consumers, and to propose corrective actions. DistrictLab.H™ offers significant advantages in terms of calculating optimum operating temperatures to reduce losses, and analyzing multi-producer systems. They have enabled us to make significant savings in analysis time. We are currently pursuing our mission by studying with DistrictLab.H™ the implementation of high-temperature heat pumps to decarbonize our heat production.

**Ivan Hernandez Alayeto, Energy Efficiency Engineer**



## Services Industriels de la Ville de Lausanne

Our company operates several district heating and cooling networks in the city of Lausanne. Under the impetus of the Climate Plan, these networks are about to undergo major changes. The objectives of energy efficiency and decarbonization of networks are forcing us to push back the limits, whether in the design, sizing or operation phases. In this context, DistrictLab.H™ is an invaluable aid in guiding our investment choices and mitigating project risks in the existing networks for which we are responsible. The completeness of the DistrictLab.H™ solution enables us to study all aspects of the network, from generation to distribution to the substation. For example, thanks to the solution's high degree of modularity, we have studied an innovative three-pipe network concept that reconciles an existing infrastructure with low-temperature waste heat recovery.

**Clément Dromart, Strategic Asset Management Engineer, Services Industriels City of Lausanne**



## USE CASES

# DistrictLab.H™ benefits for your design and operating needs

DistrictLab.H

### Design a new network

When modeling a new district heating network with DistrictLab.H™, you'll need to dimension its structural elements: pipes, production substations, energy delivery points, energy delivery points. Then run simulations to assess its performance and operating parameters.

### Planning a network extension

Using DistrictLab.H™, you can easily simulate the consequences of extending an existing network. Section by section, you can visualize the power reserves available. Then you can assess the feasibility of connecting new consumers and the need to install new generation points.

### Consolidate and improve operating strategies and rules

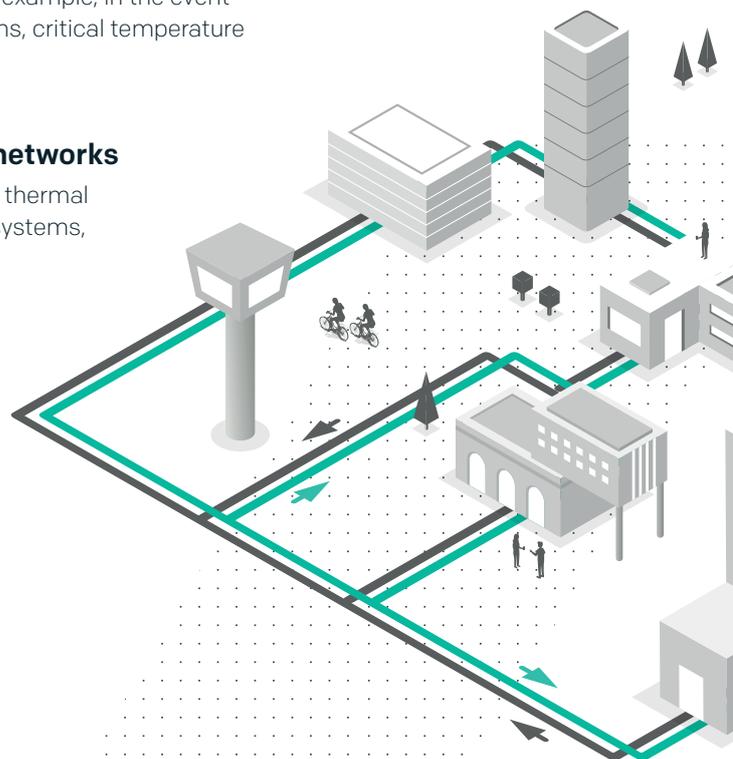
With DistrictLab.H™, you can determine and optimize the assumptions, rules and management of network parameters. You can determine the answers to problems encountered, particularly in multi-producer networks.

### Simulate a specific event and configuration

Use DistrictLab.H™ to simulate an event and test the robustness of a heating network. Analyze network behavior over a given period, for example, in the event of a fault at a production point. Visualize pressure deviations, critical temperature variations, power delivery deficits to consumers...

### Take up the challenge of innovative thermal networks

Model the design and simulate the operation of innovative thermal networks: 3-tube, open, energy loop, geothermal storage systems, heat pumps, etc.



**A NEED, A QUESTION?**

Contact us

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