

# STORM

DISTRICT ENERGY CONTROLLER

Digital smart control for district heating

## DEMAND SIDE MANAGEMENT

District heating operators who want to actively control network heat demand in real-time, STORM demand side management is a data-driven system that provides intelligent control customized to achieve your specific business objectives and use cases e.g. peak shaving and more!

### DIGITAL SMART CONTROL

District heating networks suffer from high peak demand leading to inflated operational costs in the form of fuel costs and pumping cost. Moreover, it can result in bottlenecks in the distribution network, reducing the reliability of heat delivery to end customers.

The STORM Controller addresses both problems with its advanced data-driven algorithms that can control demand and lower network return temperatures intelligently in real time, without compromising the quality of service delivered to end-consumers.

The STORM controller is an industry leading innovation that was developed by VITO for the global market. It is currently operational in several heat networks in The Netherlands, Sweden, France, Belgium, and China.



### USE CASES

#### Commercially available today:

- » **Peak load management:** Heat demand is shaved or shifted from peak times to off-peak times when relatively cheaper renewable energy is available.

#### Possible extensions:

- » **Return temperature reduction:** Return temperature from end-consumers is minimized.
- » **Power to heat optimization:** Heat demand is shifted so that CHPs can maximize electricity production and heat pumps can reduce electricity consumption during high prices on the day-ahead market.
- » **Add new connections without CAPEX:** Freed-up capacity due to reduced usage of peak heat production units can be used to serve additional connections.
- » **Reduced asset maintenance:** Number of starts and stops of peak boilers can be minimized reducing maintenance frequency and costs.

### BENEFITS

With STORM, network operators are able to **reduce their peak loads by up to 30%** resulting in substantial reduction in OPEX e.g. fuel costs. The excess free capacity of the peak production units thanks to reduced usage can be used to connect new customers at no additional CAPEX. In addition, STORM reduces building return temperatures, generating maximum value for heat networks.

**Reduce peak  
load by up to  
30%**

## PRODUCT OFFERING

### PILOT

**Ideal for network operators and companies who want a quick proof of concept and trial on their heat network**

- » Quick network scan for compatibility check with STORM
- » Standard peak shaving use-case
- » Customized use-case designed specifically for your business needs
- » Quick setup and integration within 2 months
- » IoT Hardware for each building connected and on-site installation by our technicians
- » Daily system monitoring by VITO experts
- » Data visualization dashboards for monitoring by customer
- » Detailed performance analysis and report
- » Maximum pilot duration 1 or 2 years

### PILOT API

**Ideal for companies who would like to start the integration of STORM to pilot at network operators with VITO as technology provider/partner**

- » Connect to our STORM API and integrate with your own data management solution
- » Third line support for the STORM application
- » Extensive training program for system operation, maintenance, and sales from VITO's experts
- » Possibility to partner with VITO in energy research and development projects

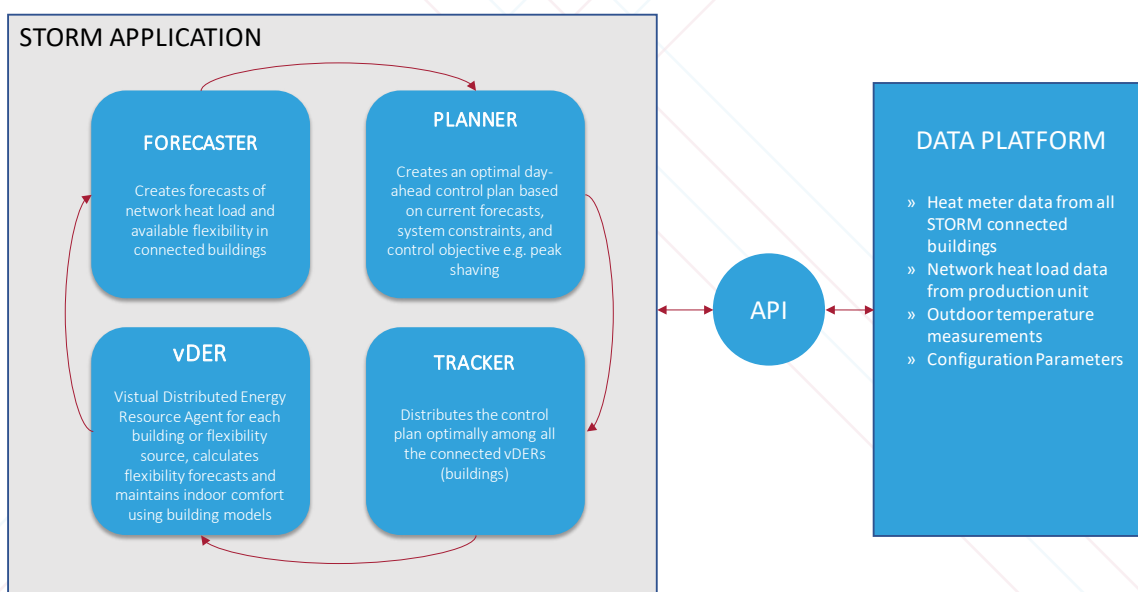
### TRANSFER

**Ideal for large companies who would like to own the STORM technology and integrate into their energy management systems**

- » High fidelity and well documented source code written in Python
- » In-depth technical documentation including functional guide, mathematical principles, software implementation, and user manual.
- » Extensive training program for system operation, maintenance, and development from VITO's experts
- » Possibility for transfer of patent
- » Access to VITO's wide network in the energy industry
- » Possibility to partner with VITO in energy research and development projects

## SYSTEM OVERVIEW

The STORM controller is a software application that consists of four functionally separated modules, the forecaster, the planner, the tracker and the vDER (virtual Distributed Energy Resource). High frequency data is collected from on-field sensors and IoT devices and stored in the data platform. The STORM modules receive this data and store back the controller output into the data platform via an API. The description of the STORM modules and input data requirements are described below.



## INPUT DATA REQUIREMENTS

Following table lists the data requirements for the peak shaving use case. Note that additional requirements maybe have to be fulfilled for customized use cases.

Network Location	Data Item	Description	Requirement
Heat Production Unit	Heat Load	Total network heat load on which the control objective will be applied e.g. peak shaving.	MUST HAVE Minimum frequency 15 min
	Outdoor temperature	Outdoor temperature ideally measured at the production unit	MUST HAVE Minimum frequency 15 min
Heat Consumption Unit  These are units whose heat demand is to be managed E.g. Building or Decentralized Substation or Heat Interface Units	Heat Load	Total heat load of the unit.	MUST HAVE Minimum frequency 15 min
	Outdoor temperature	Outdoor temperature ideally measured at the consumption unit.	MUST HAVE Minimum frequency 15 min
	Primary and secondary side supply temperature	The supply temperature entering the unit on the primary side and the supply temperature leaving the unit on the secondary side.	NICE TO HAVE Minimum frequency 15 min
	Primary and secondary side return temperature	The return temperature leaving the unit on the primary side and the return temperature entering the unit on the secondary side.	NICE TO HAVE Minimum frequency 15 min
	Primary and secondary side flow rate	Self explanatory	NICE TO HAVE Minimum frequency 15 min

Please visit us at <https://stormcontroller.eu/en> for additional information.

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