Smart Heating
Intelligent Energy Services by Noda

Noda Intelligent Systems develops and provides Smart Heat Grid Solutions for optimization of District Heating Grids, and Smart Heat Building Solutions for energy efficiency in buildings. www.noda.se
Almost 50% of all energy generated in Europe is used for heating or cooling. We need to better manage our use of energy.

Within the European Union buildings are responsible for 36% of CO₂.
“You can not manage what you do not measure. You should not manage what you do not analyze.”

- Patrick Isacson, CEO, NODA
NODA – Company facts

• HQ in Karlshamn, Sweden. Offices in Malmö, London and Nürnberg
• Customers in Sweden, Poland, Netherlands, Germany
• Over 1 500 buildings connected and the most prominent energy companies as customers
• A solid background in data science
• Owners: Sixth AP fund, Latour Industries, Sparbankens Näringslivsfond and founders
• Founded in 2005
Why digitalize the energy sector?

• Intelligent energy services generates efficiency and optimization, decrease operational cost and lower the CO₂ emissions.
• Production, distribution, consumption and storage appliances must communicate to synchronize the energy provision system
• Automated real-time data analysis is a key tool for optimization
• Knowledge and value based services will be part of the offering
• Enables information/ interaction with all value-chain stakeholders
• Invite the consumers, offer new services, and let them be part of the transformation

The energy sector needs to transform, from capacity driven and metering based to need driven and analyze based
Measure – Analyze – Act
NODA Smart Heating

Optimizing energy systems in real-time by calculating and managing the virtual energy storage in buildings

• Access buildings online
• Measure existing energy operations and usage
• Learn about the social behavior, external factors and energy pattern of the building
• Analyze and calculate the flexibility of the thermal inertia
• Forecast and plan the operational situation
• Manage the systemwide virtual energy storage capacity automatically to gain optimization and efficiency
NODA Smart Heating – Business areas
Utilizing the energy reserve for optimization and efficiency

Smart Heat Grid™
Optimizing Heating Systems

Cutting-edge technology for utilities to design smart district heating grids.

With NODAs data analytics the energy storage in buildings can be utilized in an intelligent manner. A cluster of connected buildings creates a Smart Heat Grid.

Smart Heat Building™
Energy efficiency in buildings

Powerful system to reduce energy consumption in buildings.

By analyzing and act upon a number of data points we reduce energy consumption and create a better indoor climate.
Smart Heat Grid

Why?

• DHC goes from a supply focus to a demand focus
• Decrease or remove peak loads
• Eco Smart – Fossil fuel can be reduced or removed completely
• Limit hardware investments
  • Storage tanks
  • Pipes
  • Peak load burners
• Stronger link between consumption and production cost
• The data can be shared and used by the property owner
Grid characteristics
By combining the operational energy signature for the cluster with the outdoor temperature it gives the conditions for how much energy that can be released during a certain period of time – The NODA Flex Grid.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>1-4 h</th>
<th>5-8 h</th>
<th>8+ h</th>
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</thead>
<tbody>
<tr>
<td>10°</td>
<td>2MW</td>
<td>1,5MW</td>
<td>0,6MW</td>
</tr>
<tr>
<td>5°</td>
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</tr>
<tr>
<td>-10°</td>
<td>6MW</td>
<td>4MW</td>
<td>2MW</td>
</tr>
</tbody>
</table>
What’s new?

“A cost-effective and eco-smart district heating network”
Smart Heat Building
Improved energy efficiency in buildings

- Cutting costs:
  10-12% in average

- Environment:
  Eco-smart solution

- From one to many:
  A connected property provides a number of data points that are analyzed

- Indoor climate:
  The indoor climate is controlled real time

- Extensive information:
  Customers have access to statistics

- Combine services:
  SHB can be combined with SHG
STORM – Smart Cities with hybrid energy systems

- The STORM project is funded by the European Union’s H2020 Programme.
- Main objective: Boosting energy efficiency at district level through the use of waste heat, renewable energy sources and storage systems.
- Members: VITO, Mijnwater BV, NEBER (Stichting Hogeschool Zuyd), NODA Intelligent Systems, Sigma Orionis and Växjö Energi.
- Duration: 42 months (from 2015-03-01)
- EU funding: €1.97M
- The project tackles energy efficiency at district level by developing an innovative DHC network controller.
- Web: http://storm-dhc.eu/
FHP – Flexible Heat & Power

- The FHP project is funded by the European Union’s H2020 Programme
- Main objective: Connecting distributed heat with power networks by harnessing the complexity in distributed thermal flexibility.
- Members: VITO, Honeywell, NODA Intelligent Systems, SP, Karlshamn Energi, Tecnalia and Ecovat.
- Duration: 36 months (from Nov 2016)
- EU funding: €3.8 M
- The project tackles synergies between Energy Networks - Next generation innovative technologies enabling smart grids, storage and energy system integration with increasing share of renewables: distribution network
- Web: N/A
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