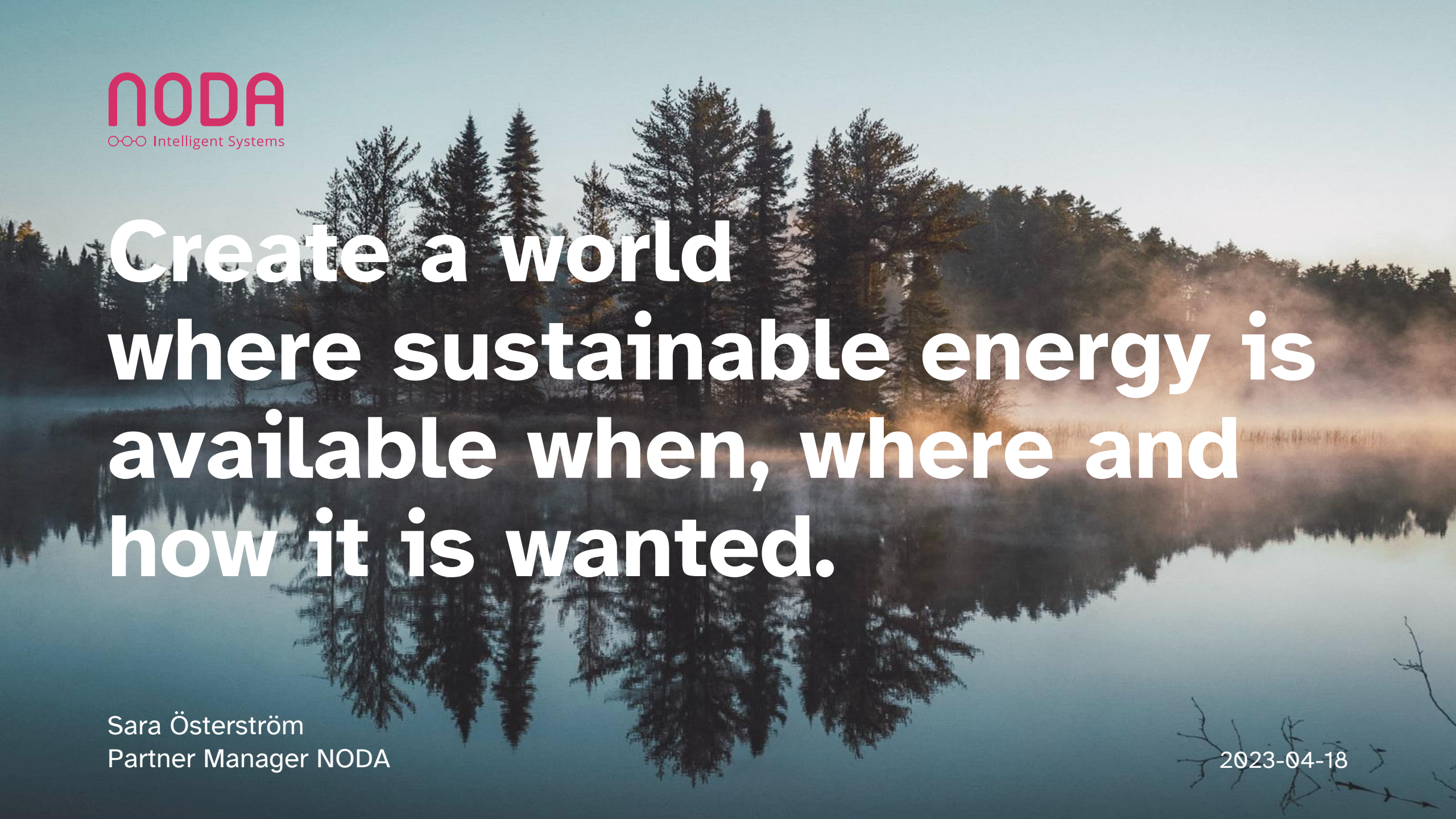
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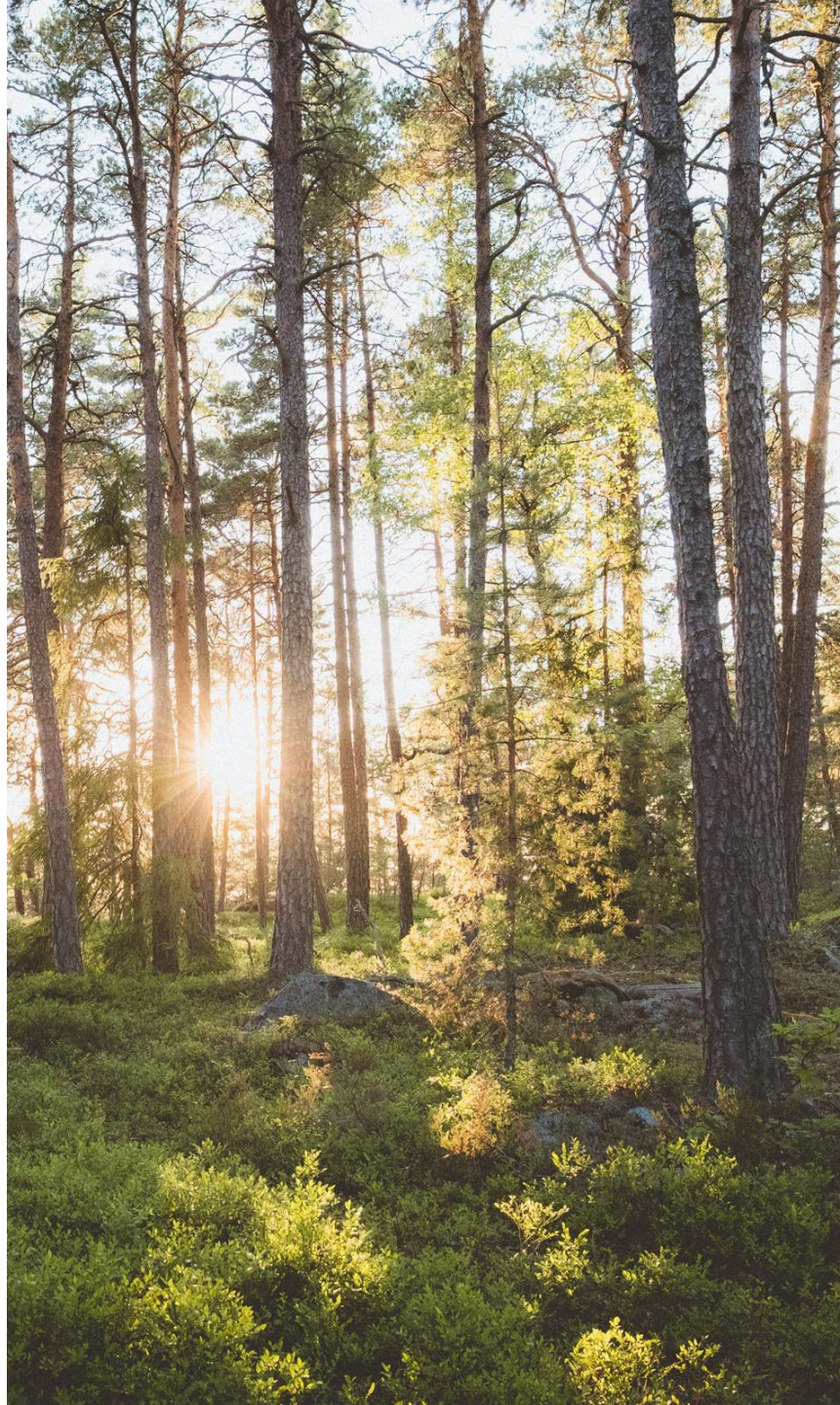
Create a world where sustainable energy is available when, where and how it is wanted.
Sara Österström
Partner Manager NODA
2023-04-18

We need to decarbonize our energy systems

- Heating and cooling accounts for 50 % of energy use
- Buildings emit more than 1/3 of CO2
- Digitalization enables innovative solutions with significant impact



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We create content in your digital energy infrastructure

Creating best-in-class digital thermal AI since 2005
Based in Sweden with offices in Karlshamn and Malmö supported by know how, engaged and customer focused people

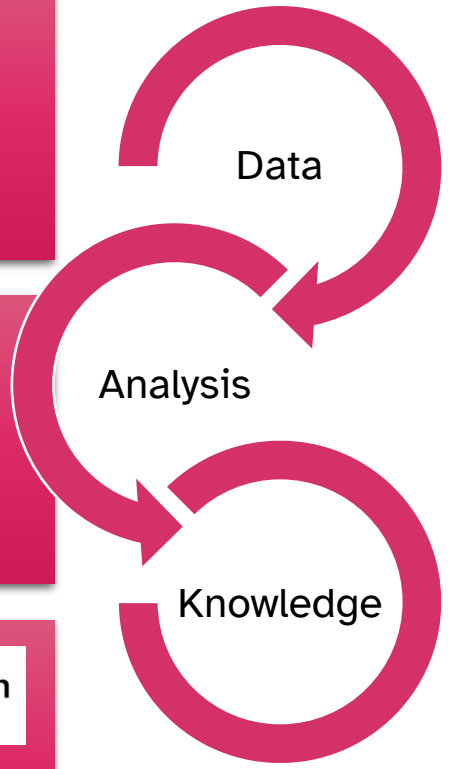
Captures innovation and knowledge built over many years of experience

Our focus is to develop and market AI based solutions to thermal systems as district heating, district cooling, heat pumps and gas.
NODA solution portfolio, delivered by cloud, tech transfer & knowledge

Customers and Partners in Europe, North America and Asia

Proven results and cooperation with leading energy companies

Customers



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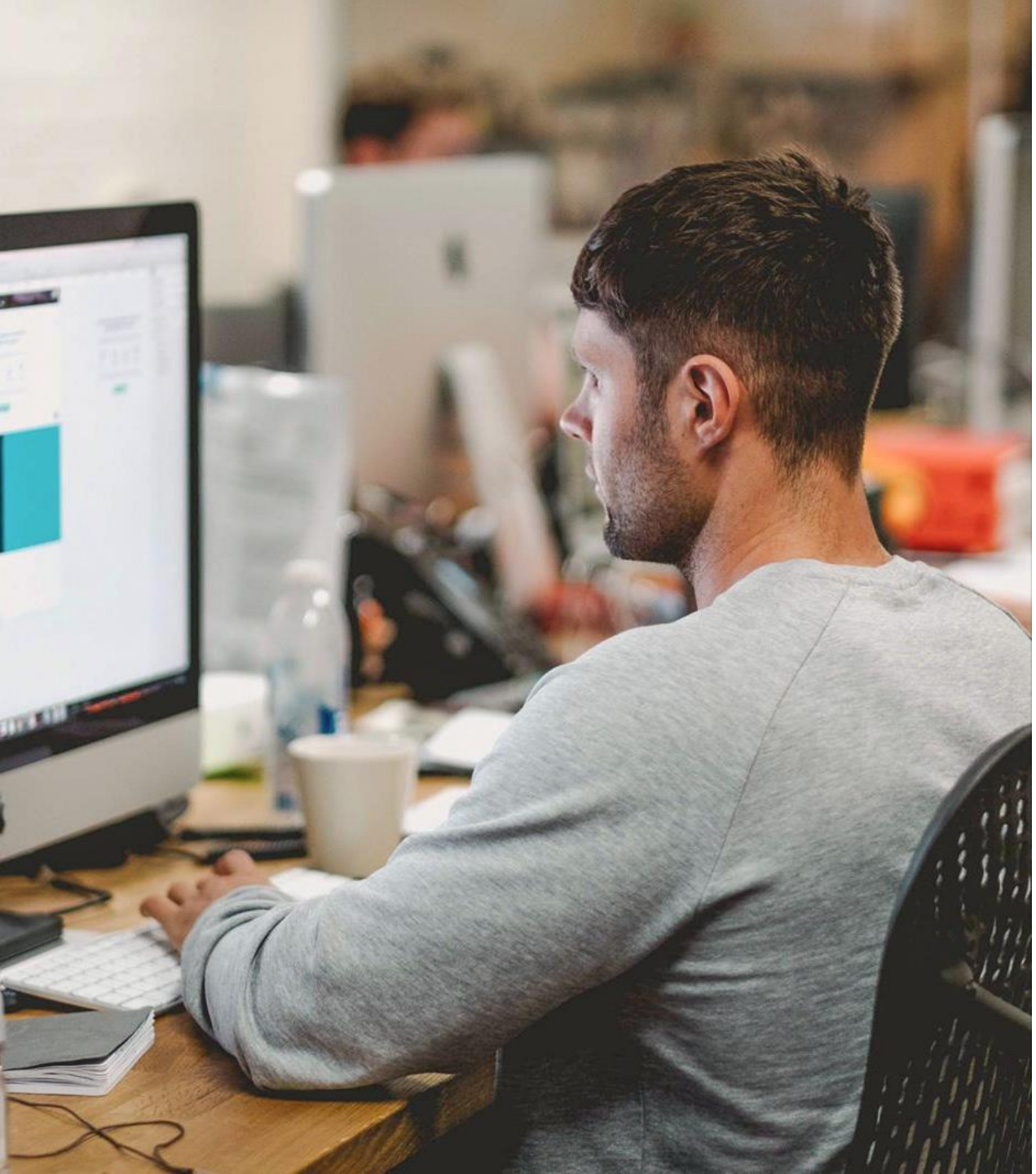

Create business value with actionable insights

Smartness Up – people and organisations

- A platform for insight-to-action
- Predictability and continuity for financial budgeting, environmental reporting and predicting maintenance
- Improved customer dialogue and relation

Smartness Down – system

- Scalability throughout the system
- Self-learning based on available data
- Significant financial and environmental impact with improved indoor climate.

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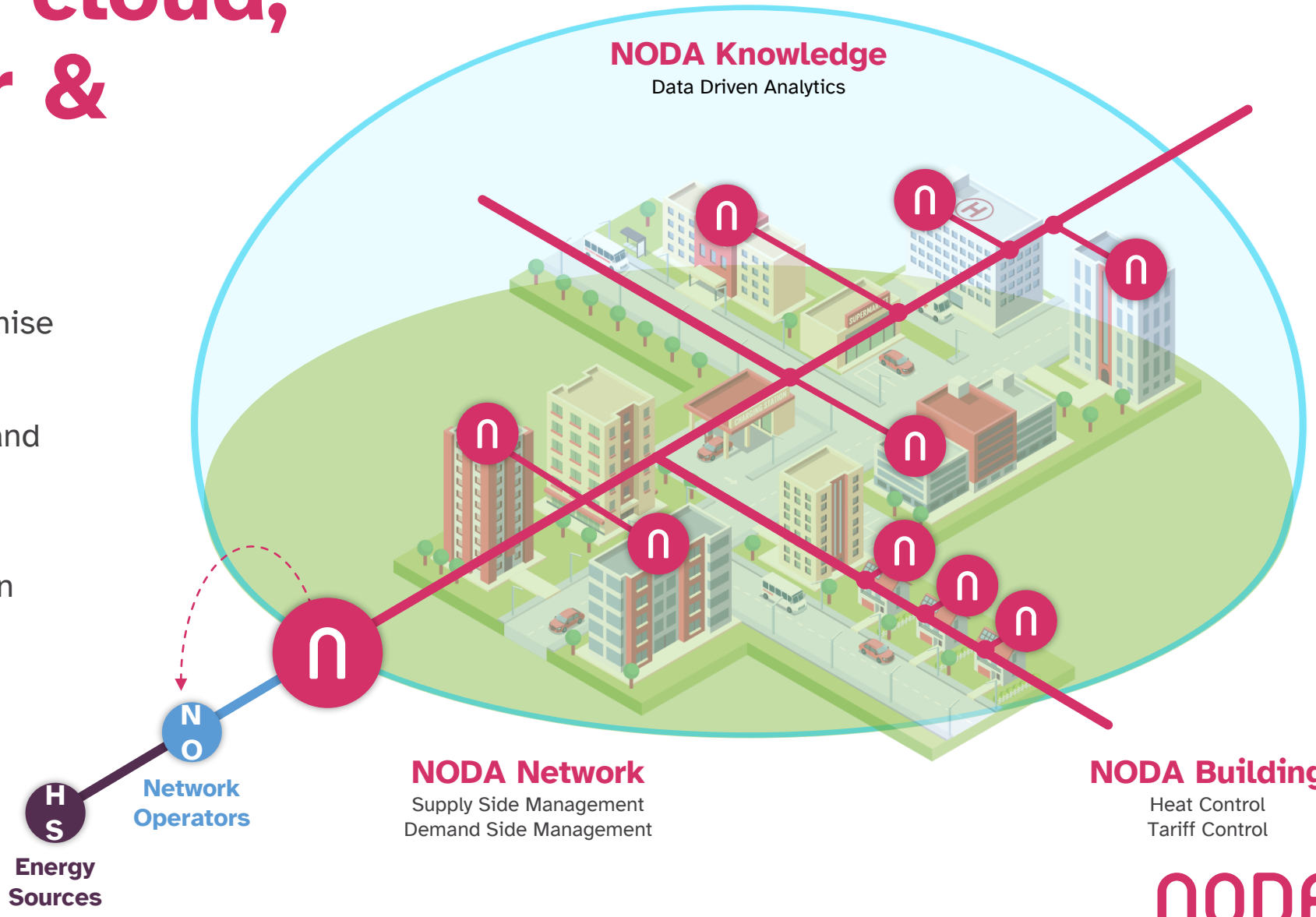
Delivered by cloud, tech transfer & knowledge

Balance supply and demand to maximise business value

Active energy services to save cost and improve indoor climate

Scaling your business through technology and business innovation



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Data Driven Analytics(DDA)

In short, NODA cleans the data through a process consisting of several different steps.

We start by resample the data to a common time frame while making an estimation based on practice for missing values as long as the gaps are not too large.
This is followed by how well the substations can be made to perform and summarizes the results in a number of metrics that describes the system before and after correcting suboptimal components.

The processed data is also used to generate graphics over the corresponding statistics by means of various interpolation techniques.

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Data Driven Analytics(DDA)

- **Benefits**
- DDA identifies the worst performing sub-stations in the heat network
- Many network operators want to further leverage the measurement data from heat meters in their networks
- Collecting the data is only the first step - information and knowledge needs to be created from the data
- DDA is a platform that transform data into information and knowledge
- Enables predictive maintenance and creation of targeted consumer communication content
- Functions as a decision support tool that helps the operator analyze vast amounts of data, in order to identify and highlight relevant information
- Based on a structured process that lets people focus on understanding the results of the analysis

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NODA Building

What is the challenge?

There is no good connection between actual heating demand and the way building energy management systems work, and even modern automation solutions struggle with anything else than reactive behaviour. This causes:

- Suboptimal indoor climate
- Unnecessary heat costs
- Underutilised capital investment

What is NODA's solution?

NODA Building learns how to proactively match indoor climate demand with appropriate levels of energy usage while providing actionable insights for property owners, building managers and tenants. This leads to:

- Satisfying indoor climate
- Improved heat economy
- Ease-of-use

How does it work?

- Access, Analyse, Act
- External data:
  Weather and wind, Marginal cost, Spot prices, etc.
- Measure indoor climate:
  Temperature, Humidity etc.
- Building controller:
  Control signal, Secondary side
- Meter: Gas meter, Primary side for district heating / cooling or electricity

Satisfied & happy customers

kraftringen
Cetetherm
norrenergi
RONNEBYHUS
SIEMENS
MÖLNDAL ENERGI
OsbyBostäder
ENGIE
kamstrup
HUDSON SQUARE PROPERTIES

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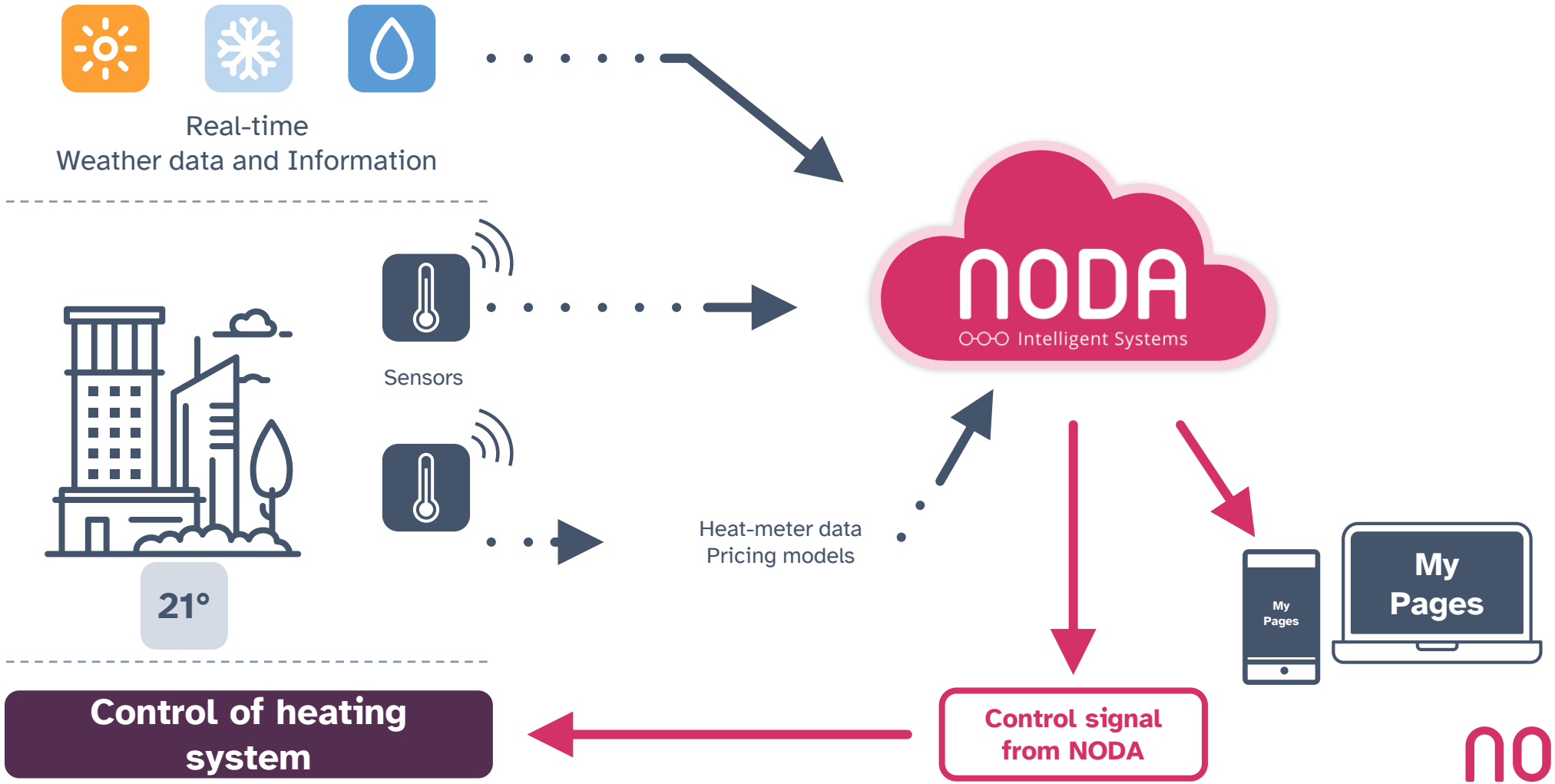
NODA Building – How does it work?



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NODA Network

What is the challenge?

An energy system is demand-driven!

However, you only control the supply, and this is normally done in a less than optimal way. This causes:

- system losses
- unused capacity
- underutilized capital investments

What is NODA solution?

NODA Network greatly improves control of the supply, introduces precise control of demand and provides actionable insights for systems, people and organisations. This leads to:

- reduced dependence on fossil
- increased capacity of renewables
- optimized capital return

How does it work?

- Access, Analyse, Act
- Connects to the SCADA system for production and distribution
- Meter data management system for network analysis and control.
- Building controller for demand response

Satisfied & happy customers

ENGIE
RUNA 瑞纳智能
kraftringen
Mpec Olsztyn
SIEMENS
kamstrup
norrenergi
EWG Energie-Wende-Garching
MÖLNDAL ENERGI

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NODA References

Peak load management

Two city areas connected through network stations

27 % and 23 % peak load reductions with 11 % energy savings

Geothermal capacity increase

Two city clusters controlled in relation to the backbone system

more than 40 % of increase in extraction from the geothermal well

Demand response & energy services

Many connected buildings within the main city and most large ones in a nearby city

Savings of on average 12-15 % and flexibility capacity for narrow sections

Virtual storage expansion

About half of the demand connected in a smaller city network

Reduced primary fuel usage of 13.7 %

RUNA 瑞纳智能 SMART EQUIPMENT

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kraftringen

ENGIE

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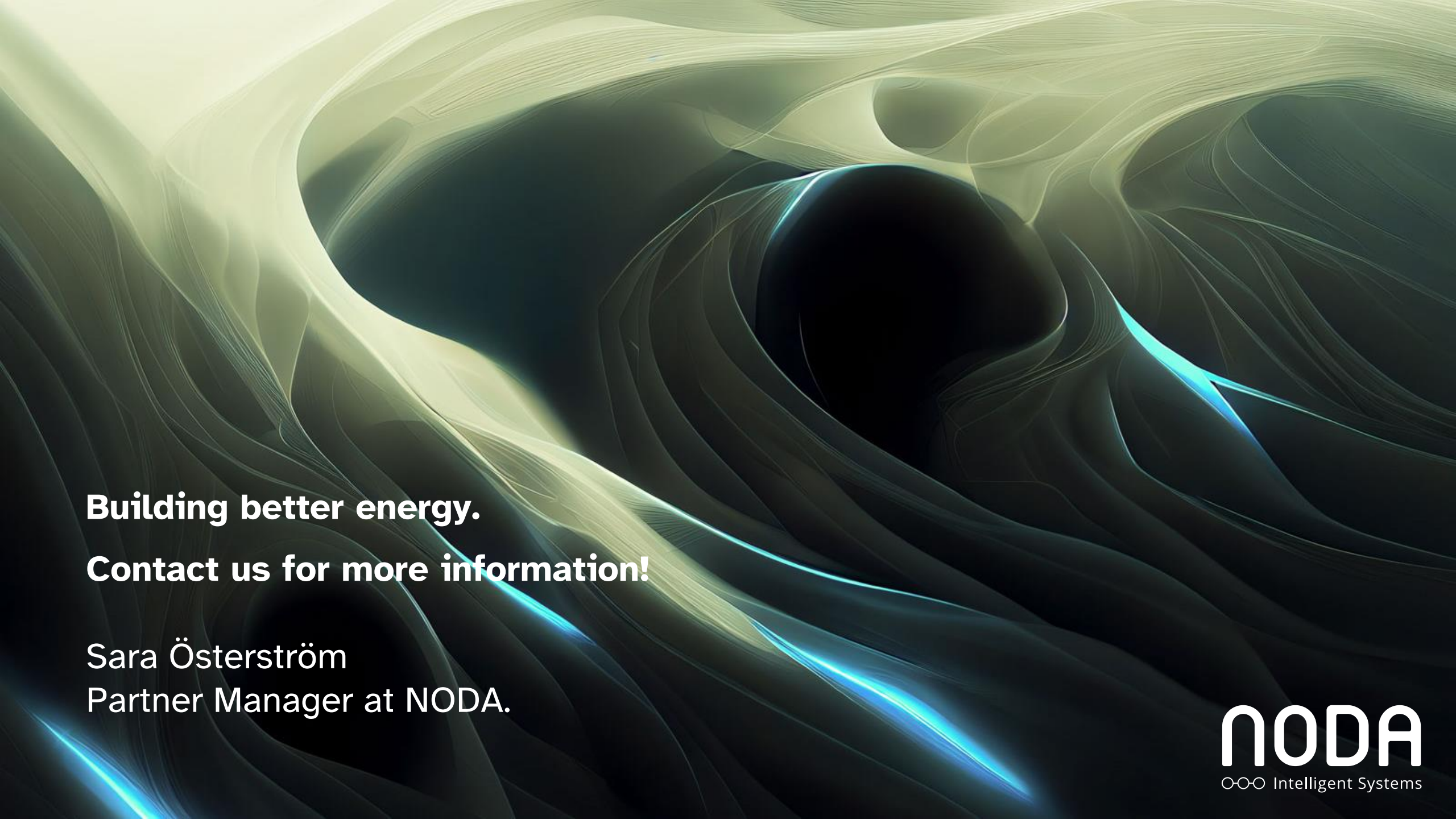
Building better energy.
Contact us for more information!
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