HEAT 4.0

J.no. 8090-00046B

Introduction by Alfred Heller, NIRAS

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Digital Supported Smart District Heating

HEAT 4.0 aims to create the next generation digital platform for the district heating sector

- A high-tech platform that creates synergy between design, operation, production and maintenance of the entire district heating system by integrating the latest technologies and research knowledge into one unified product: HEATman.
- The result is a maximized economic effect for the district heating utilities, energy efficiency and CO2-reduction.

Supported by:
Innovation Fund Denmark

Key Performance Indicators

The following success criteria for assessing the progress of the HEAT 4.0 project are:

- Achieve energy savings in the heating network of min. 2% in comparison to the baseline.
- At least 3 Danish district heating plants have installed a minimum of 2 tools from the HEATman platform.
- At least one foreign district heating plant has implemented parts of the concept.

Steering Committee

- Helge S. Hansen, Trefor (chairman)
- Atli Benonysson, DANFOSS (vice chairman)
- Michael Lassen Schmidt, NIRAS
- Henrik Madsen, DTU
- Kristian Haldrup Overgaard, LOGSTOR
- Thorkil B. Neergaard, Brønderslev Forsyning
- Søren Wandahl, Aarhus University

HEATman Partners

17 partners have signed up for the project and represent following sectors:

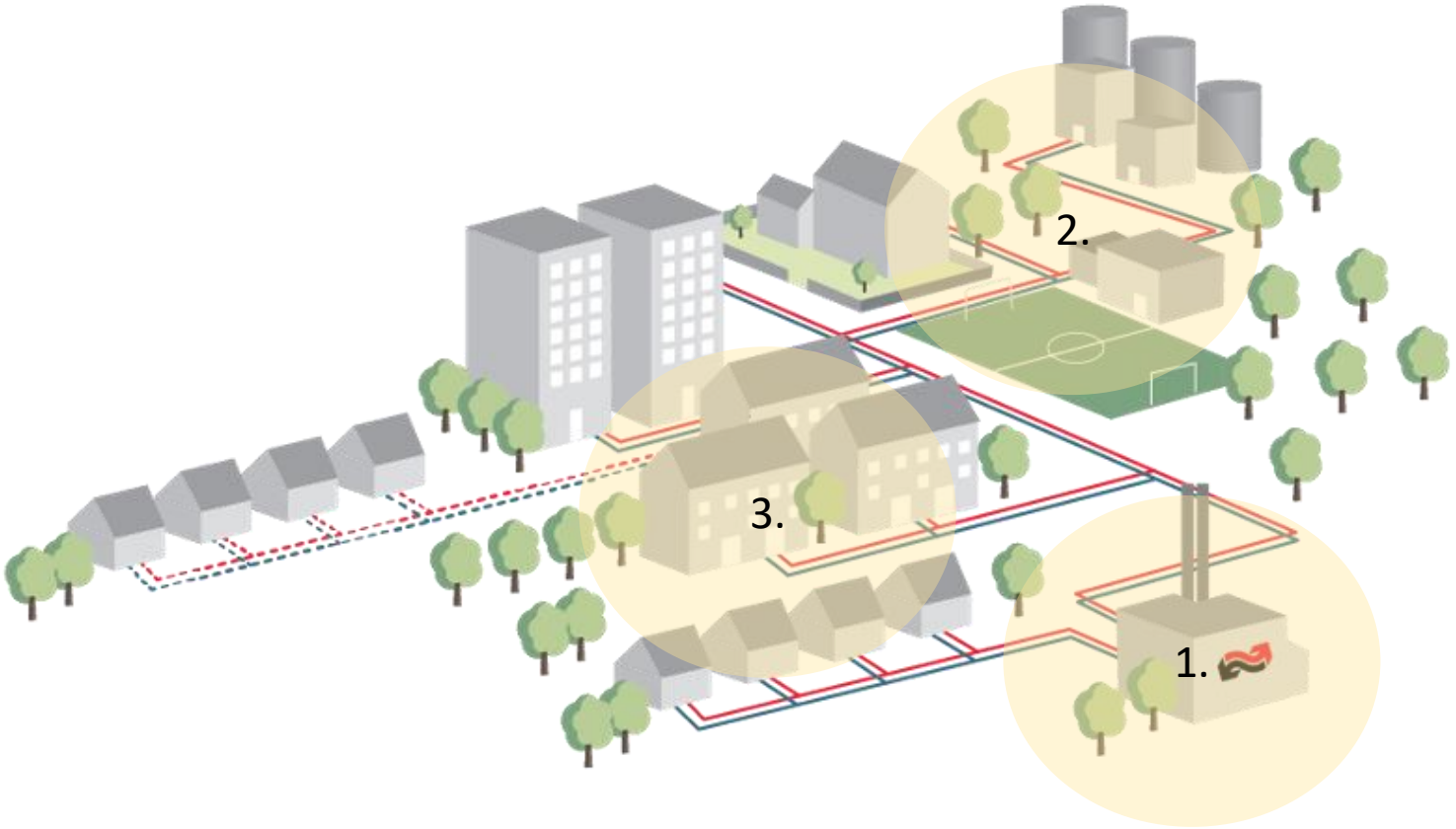
- District heating suppliers (components, software, hardware)
- Research institutes and universities
- District heating plants

Digital improvements in the DH system

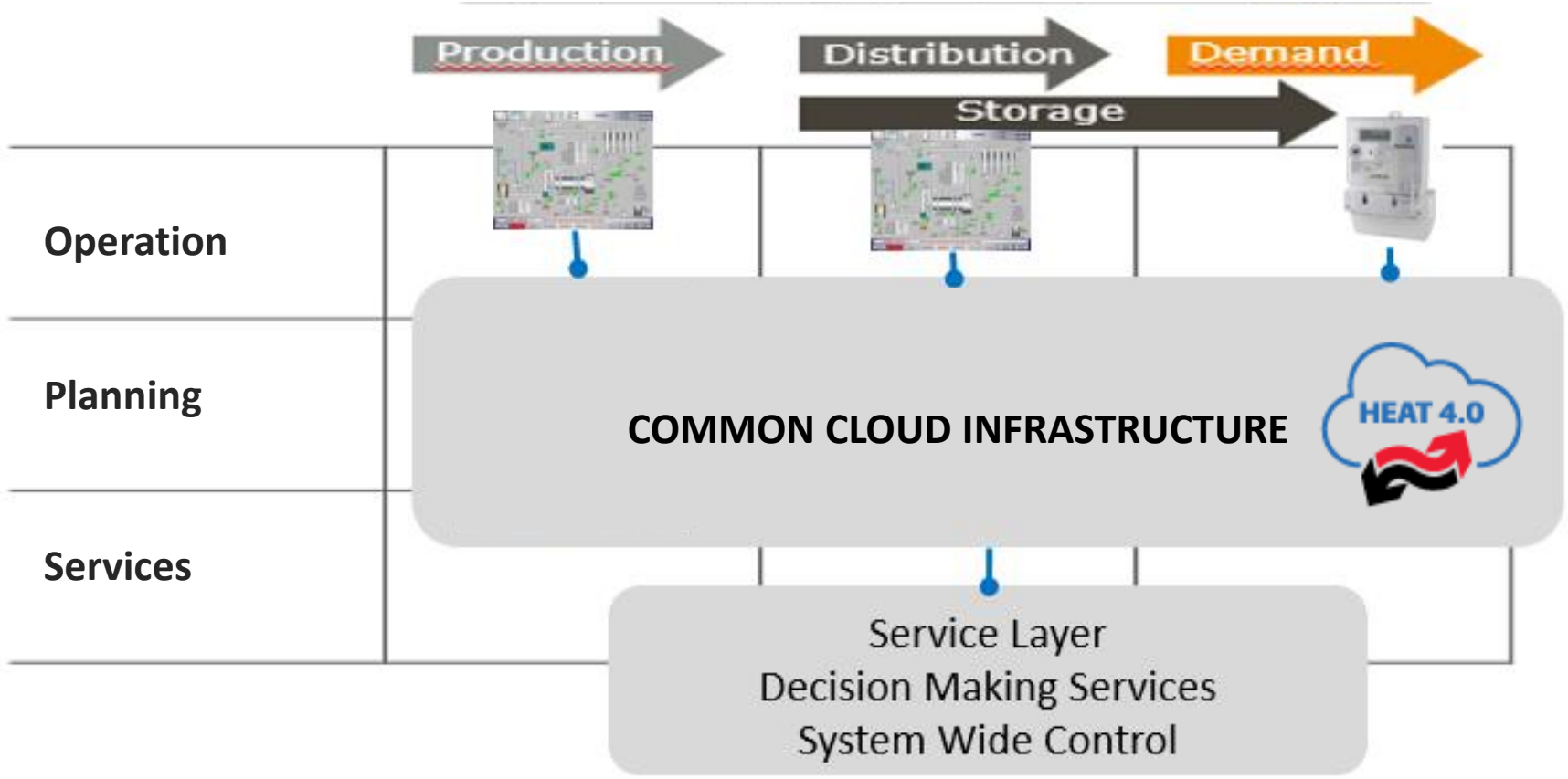
1. Production
Production utilities
Heat storage

2. Distribution
Network
Consumer supply pipeline
Booster stations

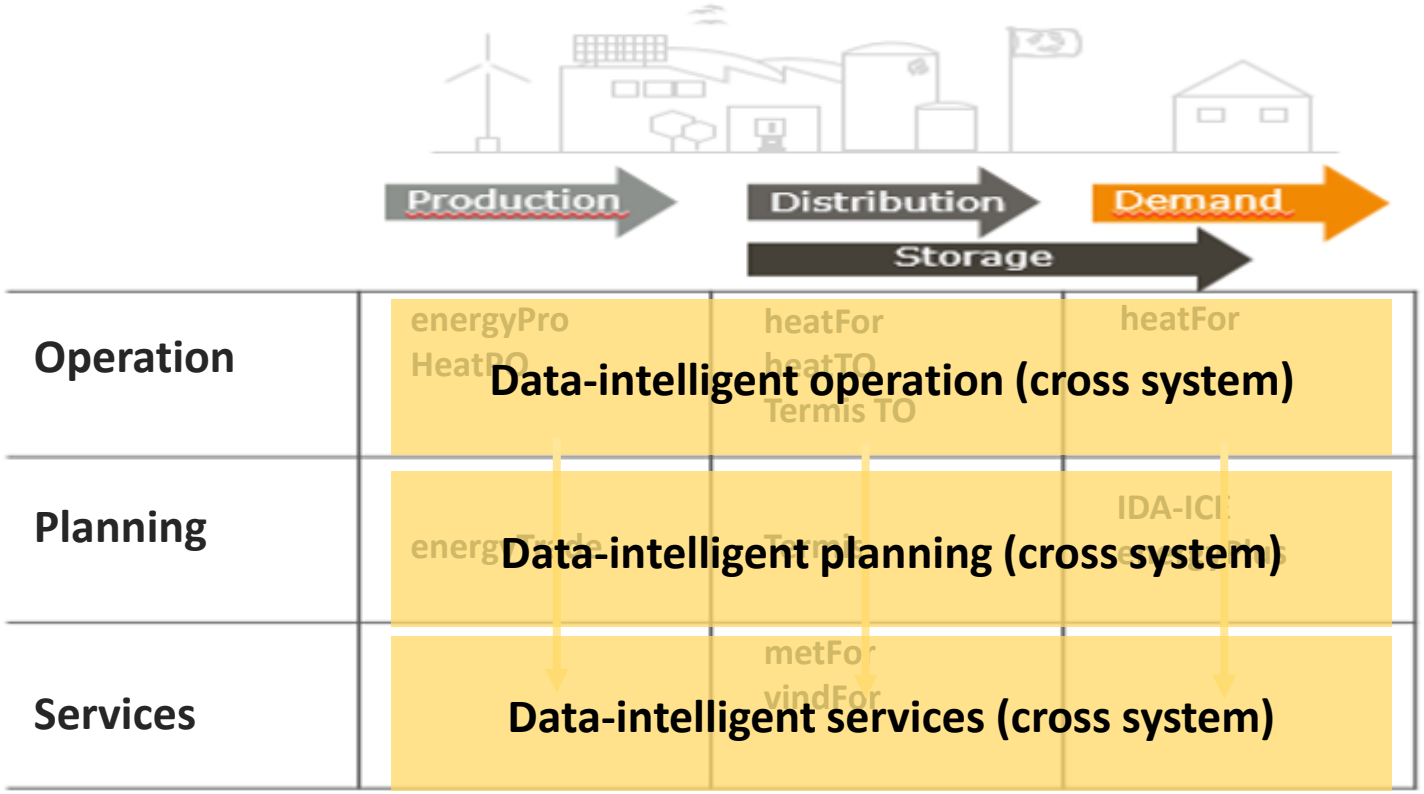
3. Consumer (heating demand)
Building installations
Heating units



HEAT 4.0 – Extended infrastructure



Existing software tools



Communication and cooperation between software systems are needed.

Called HEAT 4.0 Ready

DATA PROVIDERS DH CONSUMERS

KAMSTRUP:
- Provides data from smart meters

RESEARCH DEVELOPMENT

DTU: develops algorithm
AU: develops algorithm
ENFOR: develops algorithm

ENERGY INDUSTRY

LOGSTOR:
- Provides data from DH grid

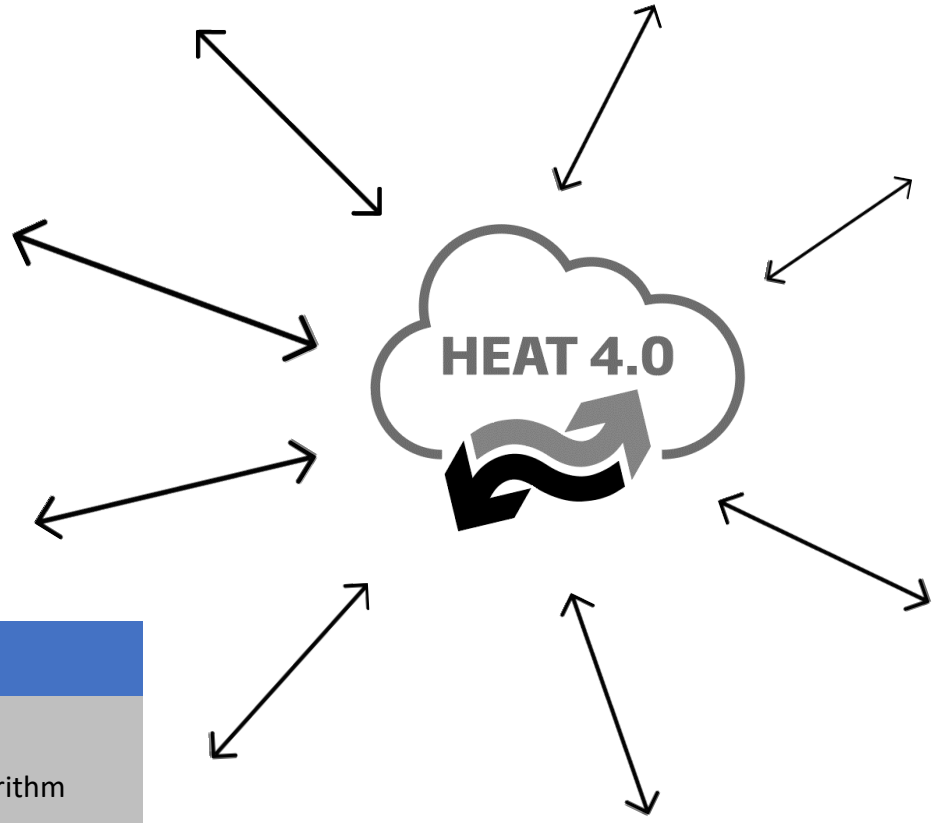
ENFOR:
- Cross system optimization and T.O.

Desmi:
- Pump optimization in network

DH OPTIMIZATION BUILDINGS

Neogrid:
- Provides data from buildings and devices
- Analyse data
- Control ECL directly

LeanHeat:
- Provides data from buildings and device
- Analyse data
- Control ECL directly



DH CONNECTION UNITS

DANFOSS ECL:
- Provides and controls data from units

DH PRODUCTION OPTIMIZATION

EMD:
- Provides and analyse data from production

TEST OF HEAT 4.0

Hillerød Forsyning:
- Test and implement components, software, algorithm

TreFor:
- Test and implement components, software, algorithm

Brønderslev Forsyning:
- Test and implement components, software, algorithm

Dansk Fjernvarme:
- Collect and verifies data from test plants (baseline)
- Screening tool

SCIENCE / COMMERCIAL CLOUD

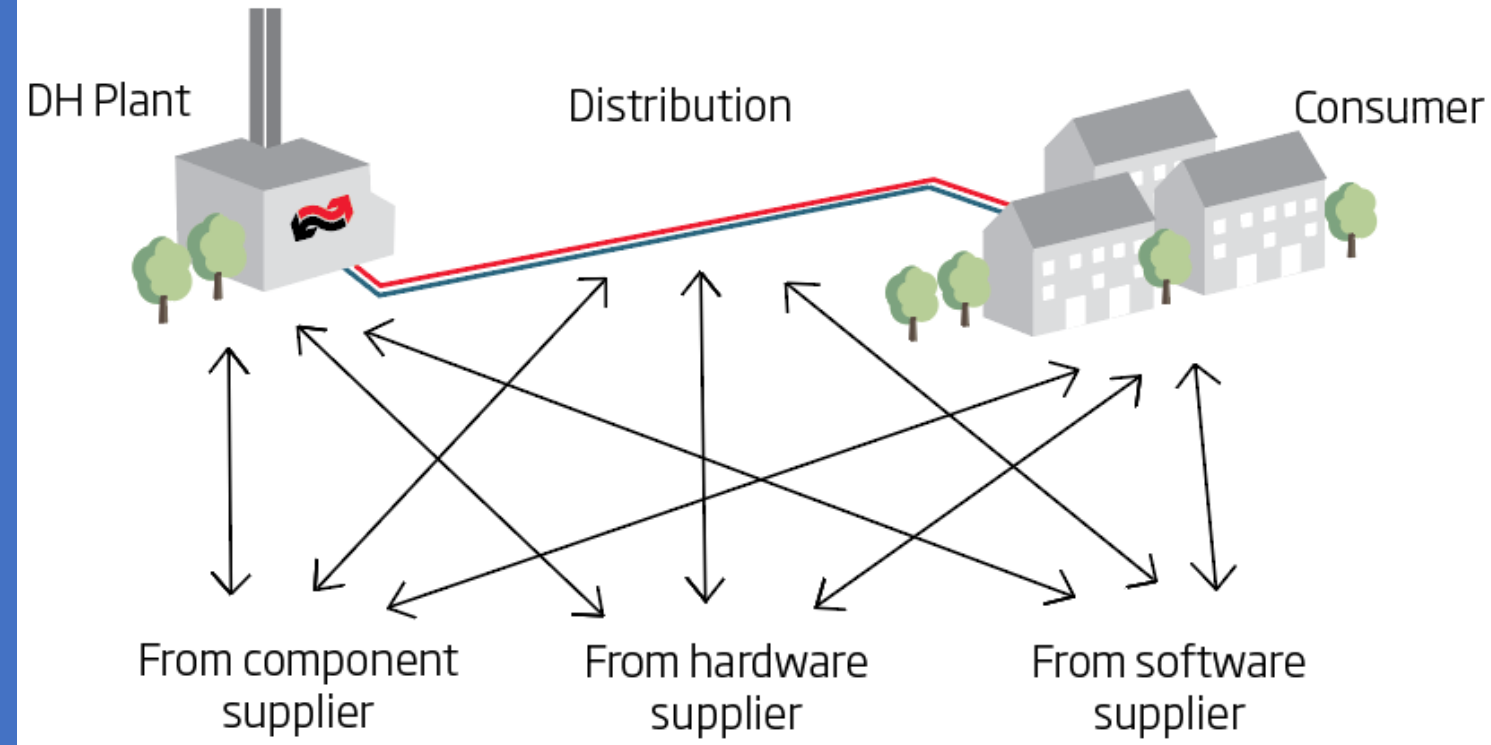
Center Danmark:
- Tools and cloud solution

INTEGRATOR

NIRAS:
Project project leader and integrator

The DH digital infrastructure AS IS

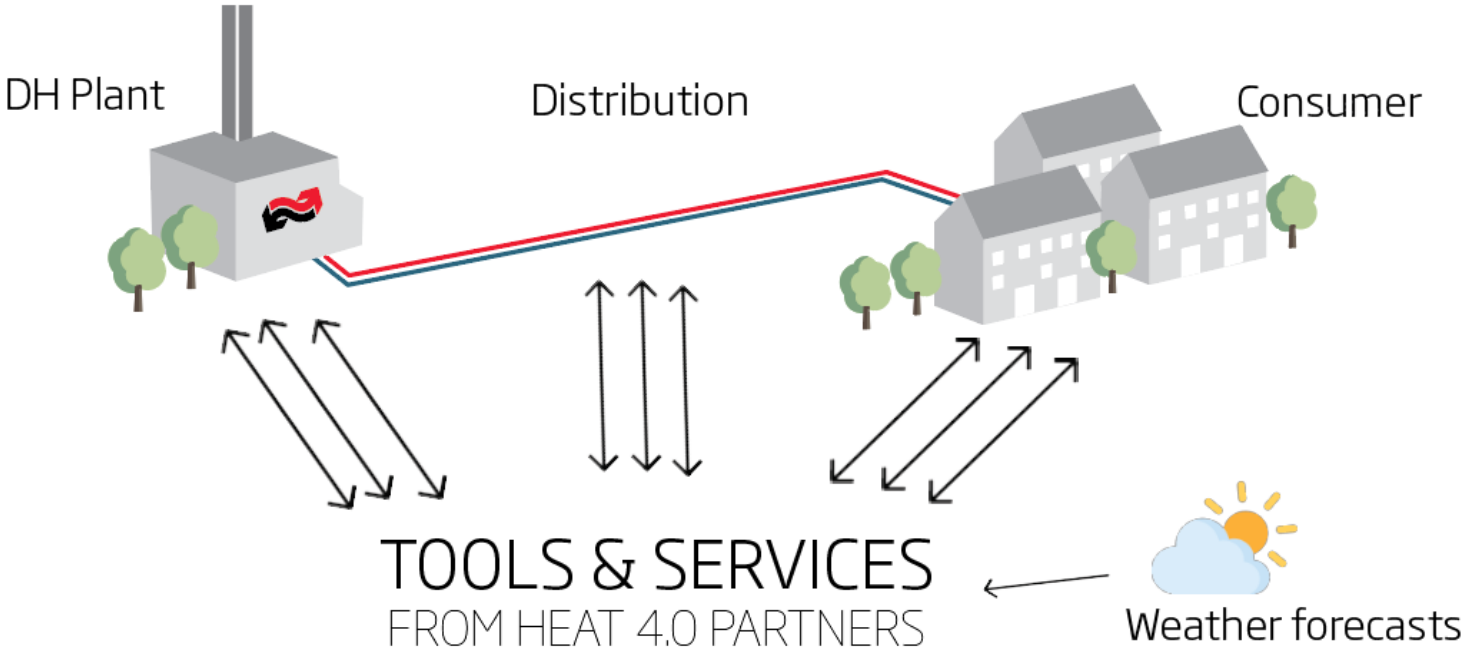
No coordinations of data



The DH digital infrastructure

STATE OF THE ART

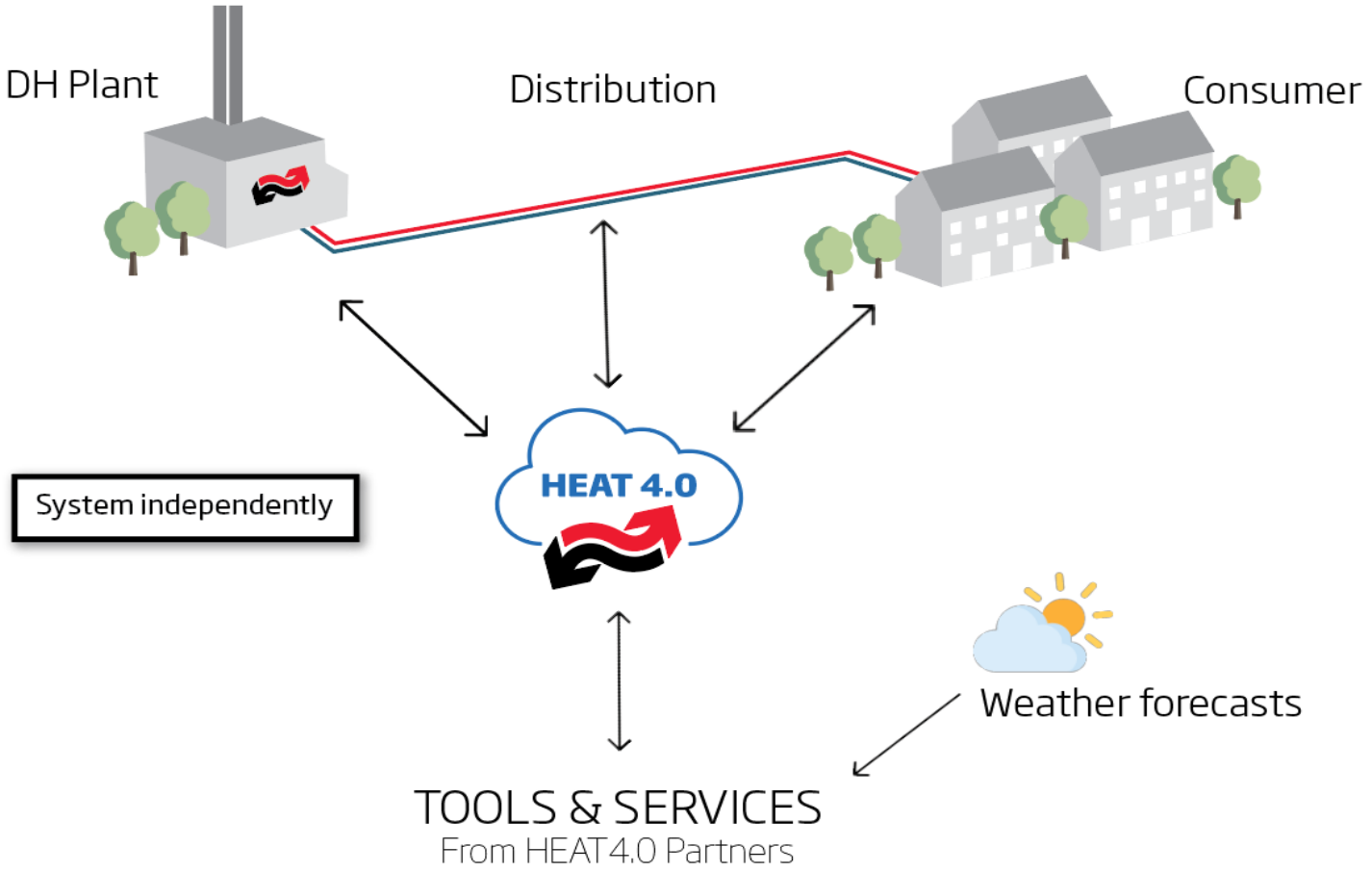
Communications and cooperation



The DH digital infrastructure

HEAT 4.0

Cloud solution



Overview of some of the digital tools

Digital technologies

- IoT
- Cloud
- Standardised communication
- ICT solutions

Software solutions

- Cross System Services
- Temperature optimisation
- Peak shaving, flexibility services
- Leakage detection

Machine-intelligence

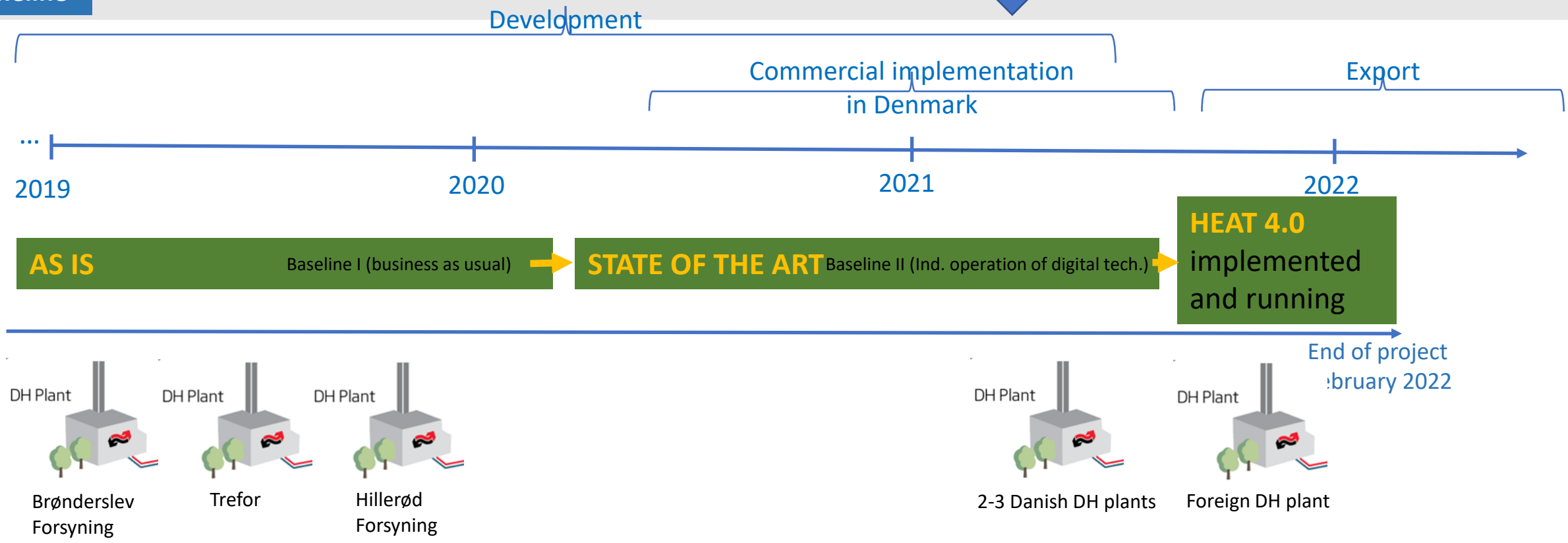
- Data-intelligent control
- Artificial intelligence (AI)
- Machine learning (ML)
- Algorithms

Hardware

- IoT temperature, vibration, monitoring devices
- ECL communication
- MPC

HEAT 4.0 – project proces

Timeline



Thanks for listening

Alfred Heller, NIRAS (Project Leader)

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