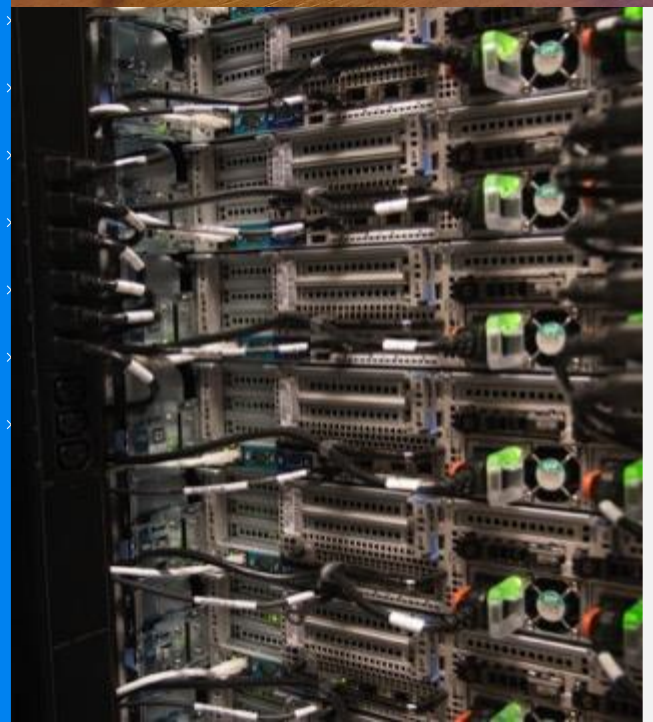
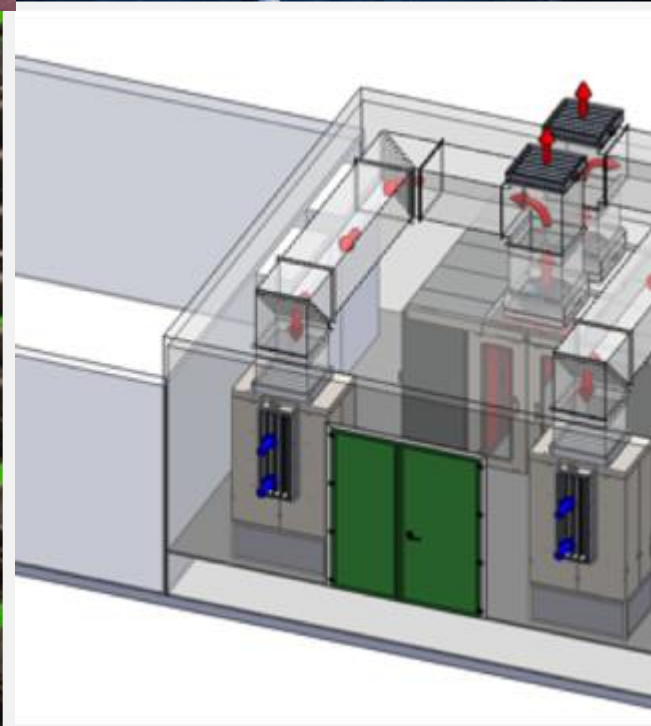
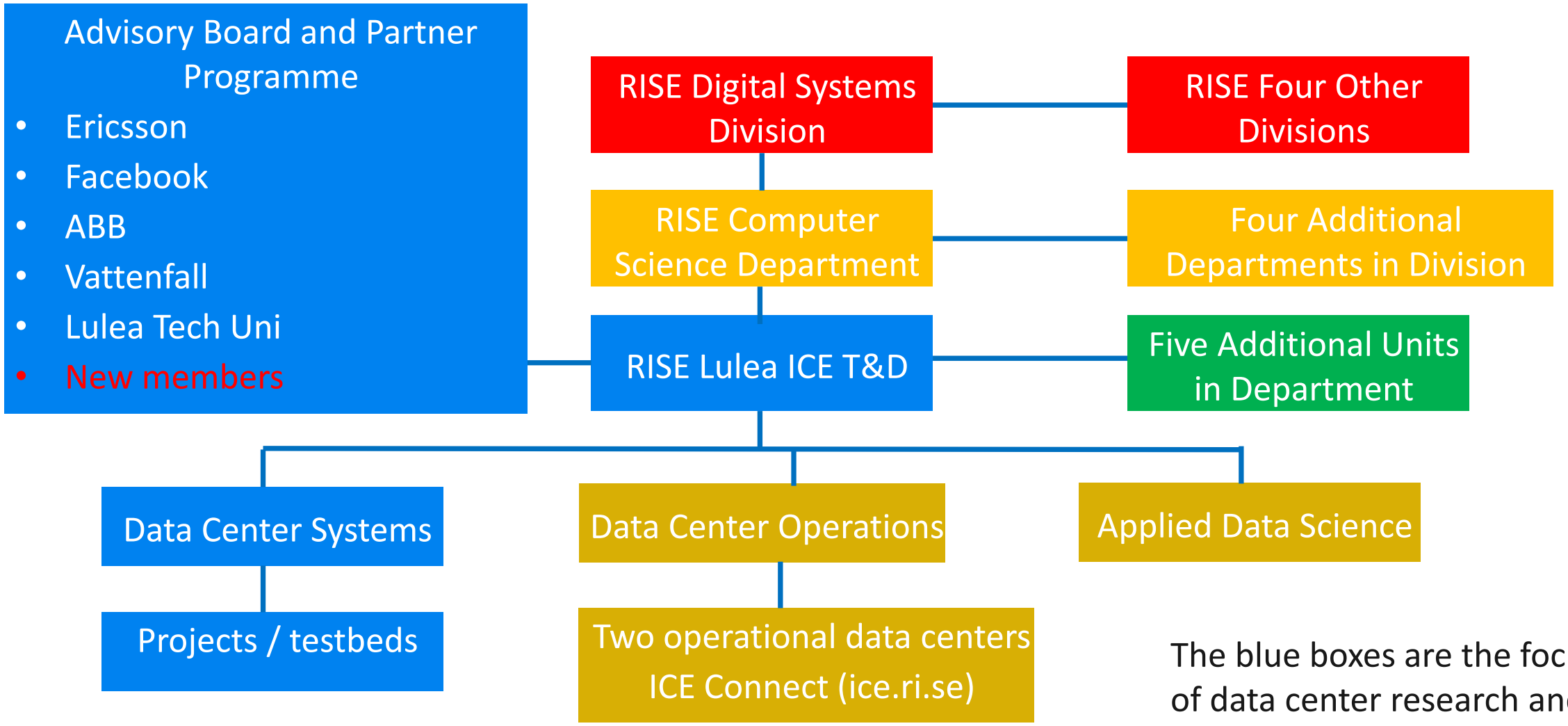
ICE by RISE projects

Head of Lab
Tor Björn Minde
RISE ICE datacenter research





RISE Lulea – ICE test and demo facility in RISE organisation



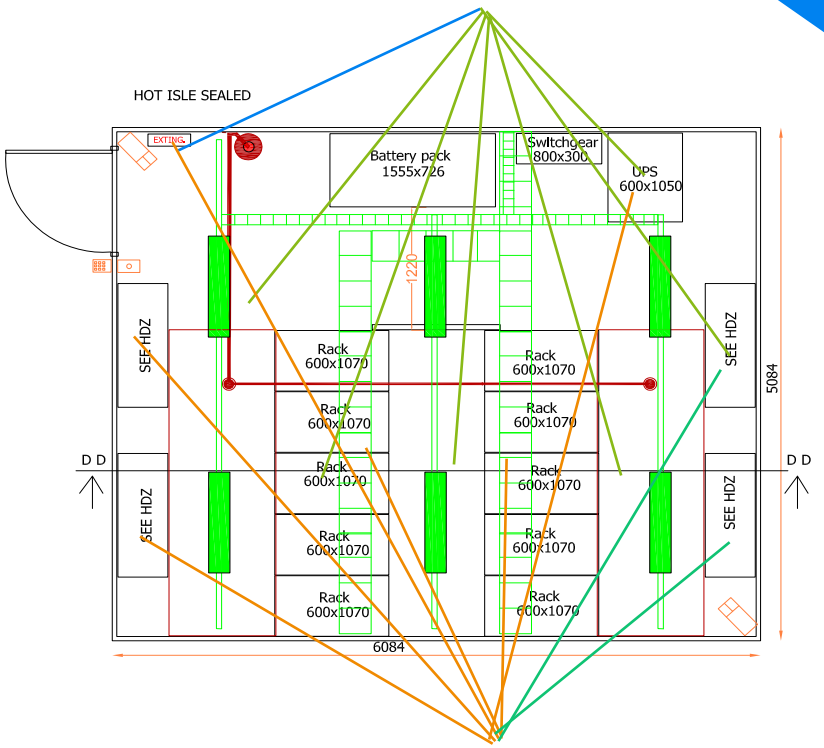
The blue boxes are the focus of data center research and development

SENDATE EXTEND

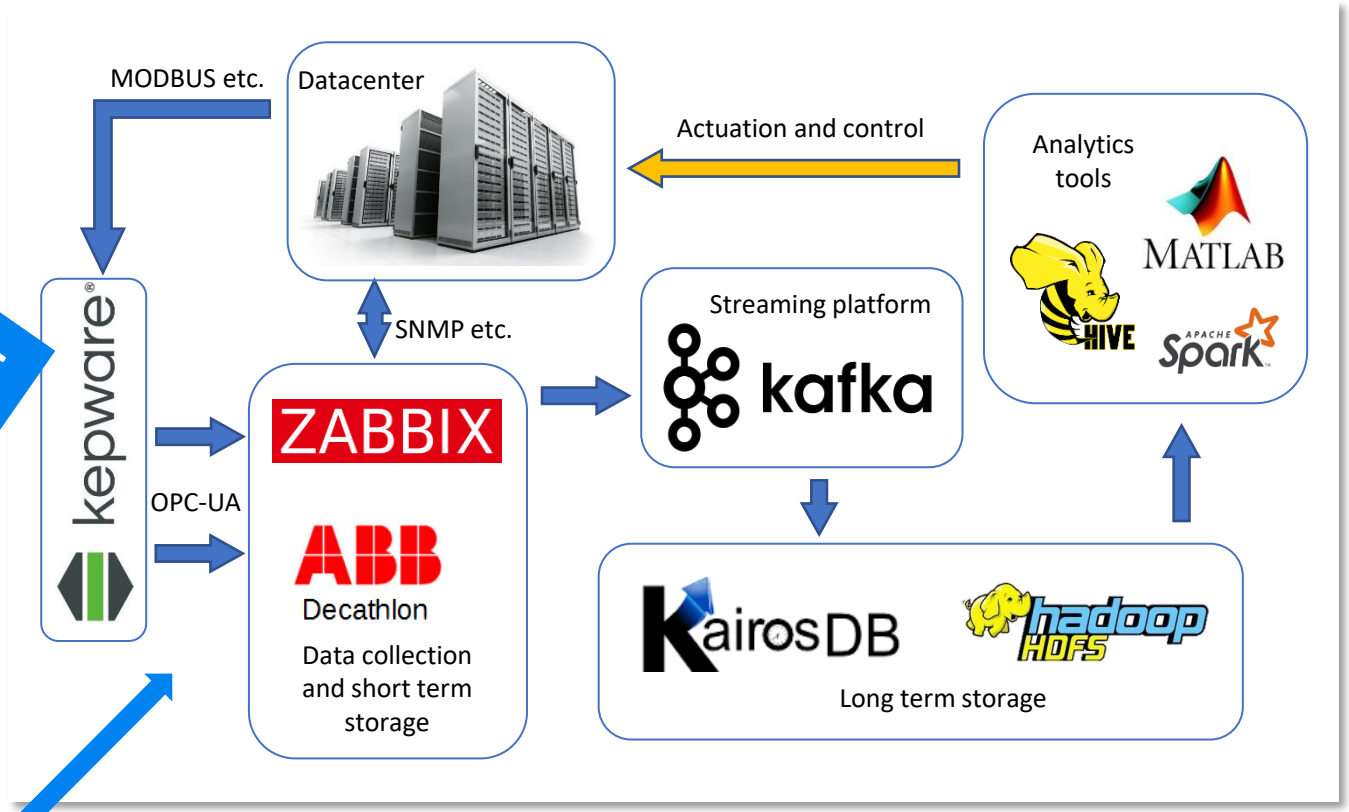
funded by Celtic-Plus

COMPLETE

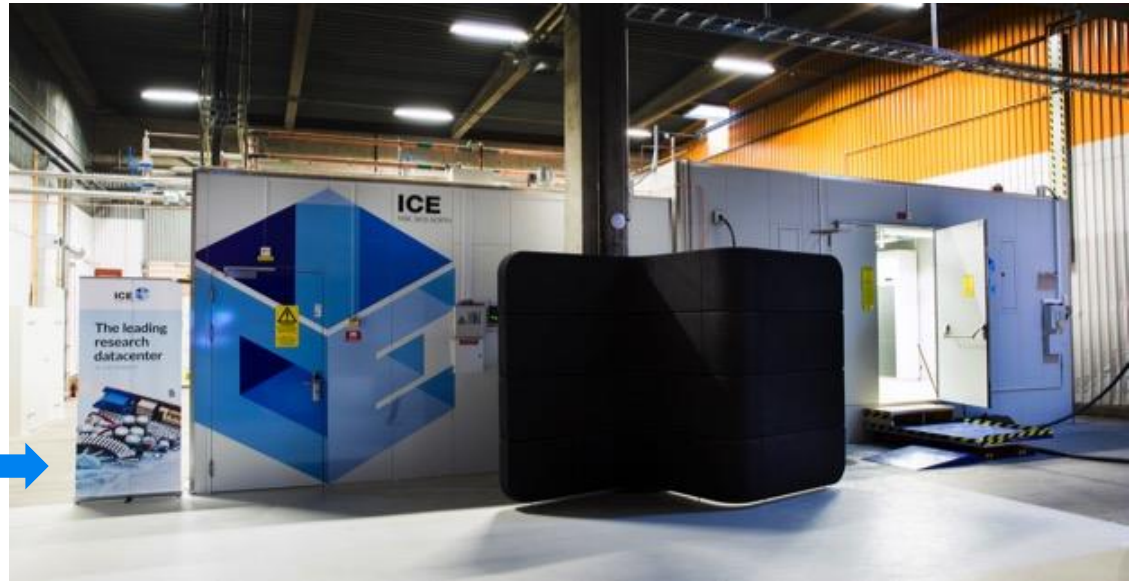
Environmental Sensors



Metrics collection



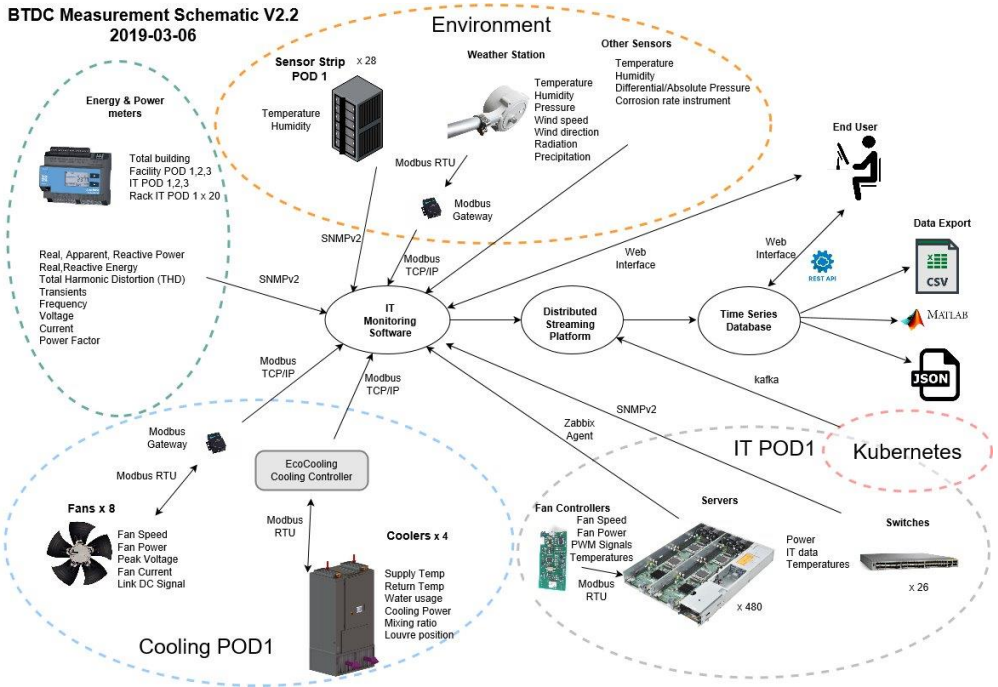
1. Developed a monitoring system built on open source tools.
2. Built two operational data centers – pods in facility.



BTDC – Energy and Cost efficient datacenters funded by EU H2020

COMPLETE

GA 768875



A H2020 project with partners H1 Systems, Ecocooling, Fraunhofer, RISE ICE, BBA

Goal is the Most Energy and Cost efficient datacenter in the world

It is a Greenfield datacenter project with Fresh air cooling, **Wooden structure**, Open Source data collection, no centralized UPS and Holistic cooling control with a PUE < 1.1

(ISO PUE=1.0148)

Completed Dec 2020 with a published open access data set

BTDC – Energy and Cost efficient datacenters funded by EU H2020

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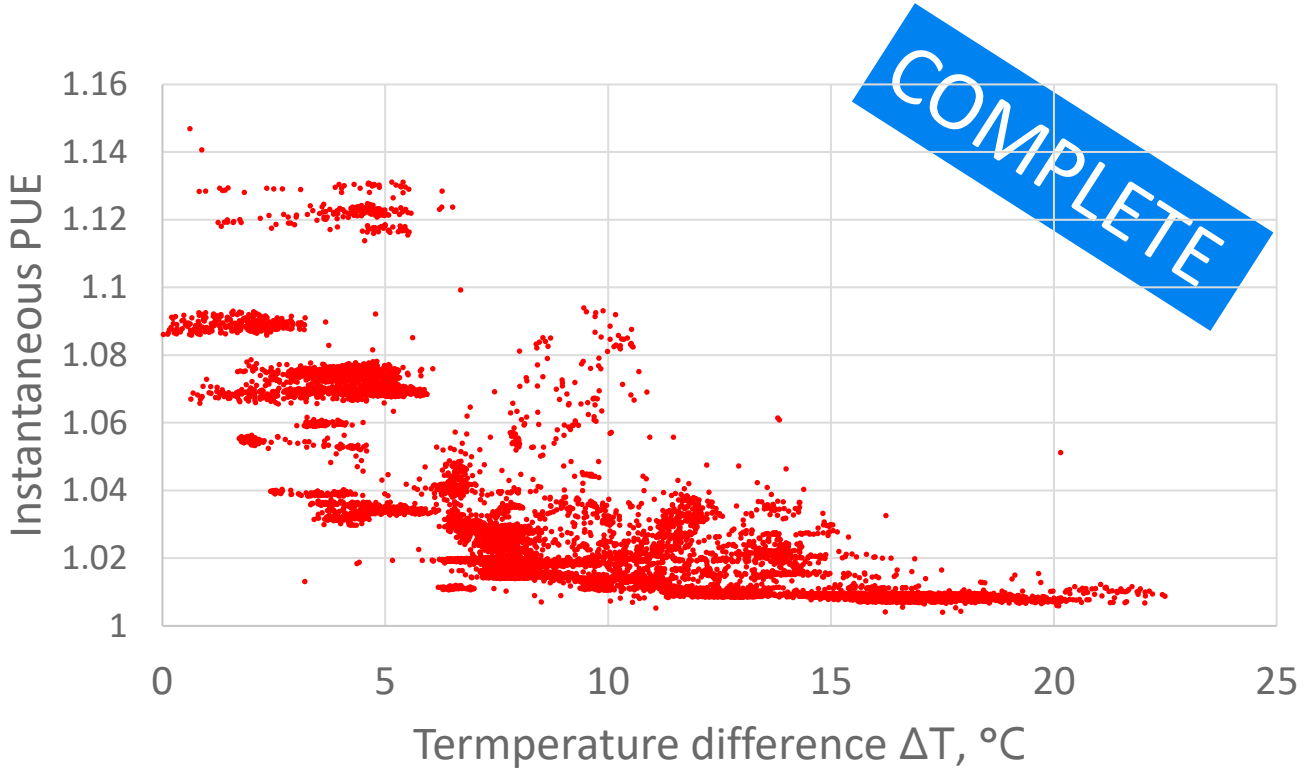

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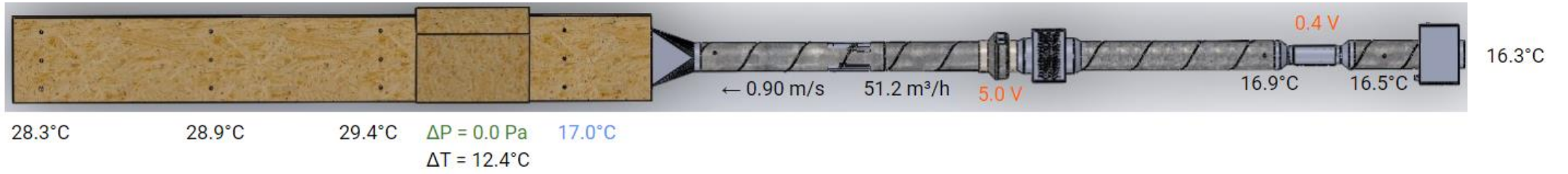

DIR – Datacenter Innovation Region funded by EU RUF

Datacenter
Innovation Region

Objectives

Datacenter Innovation Region provides an opportunity for small and medium-sized enterprises, with operations in Norrbotten and Västerbotten, to gain support for the development of products and services in the field of data centers and clouds.

We support SMEs with expertise and the experimental facility for test before invest

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The AutoDC project

The goal is to lower OPEX by making datacenter self-healing, self-optimizing and robust. Use cases are edge DC, rural DCs and mega-scale DCs

AutoDC is an ITEA3 project about autonomous datacenters

Total project is 73 MSEK over 3 years

Ericsson manage the project and RISE ICE is Swedish coordinator.

Partners are Ericsson, Swegon, OP5, SwedishModules, Hi5, Comsys, Clavister, KTH, LTU, LU + Finnish and Canadian partners

ArctiqDC – Datacenters in the Arctic region funded by EU InterregNord

EU Interreg Nord funding for a project on pre-conditions, values and challenges with datacenters in the arctic region

The partners in the project are RISE ICE, Hydro66, Xarepo, Älvsbyn, HHS from Sweden and OuluDC, AuroraDC, Oulu Univ, SFTec from Finland

In a border regional collaboration, show that investing and operating datacenters in the arctic have low CAPEX and OPEX, show solutions for heat reuse and show that efficient IT operation can be delivered as well

Cloudberry research center
funded by Swedish Energy Agency

The objective is to run a PhD program (10-12 PhDs) to improve Swedish competence

A Swedish Energy Agency project called Cloudberry research center at LTU-CDT, with RISE ICE as a partner

A PhD program with 12 PhD students in all fields from building to cloud

Jon Summers have 2 PhD students working for him

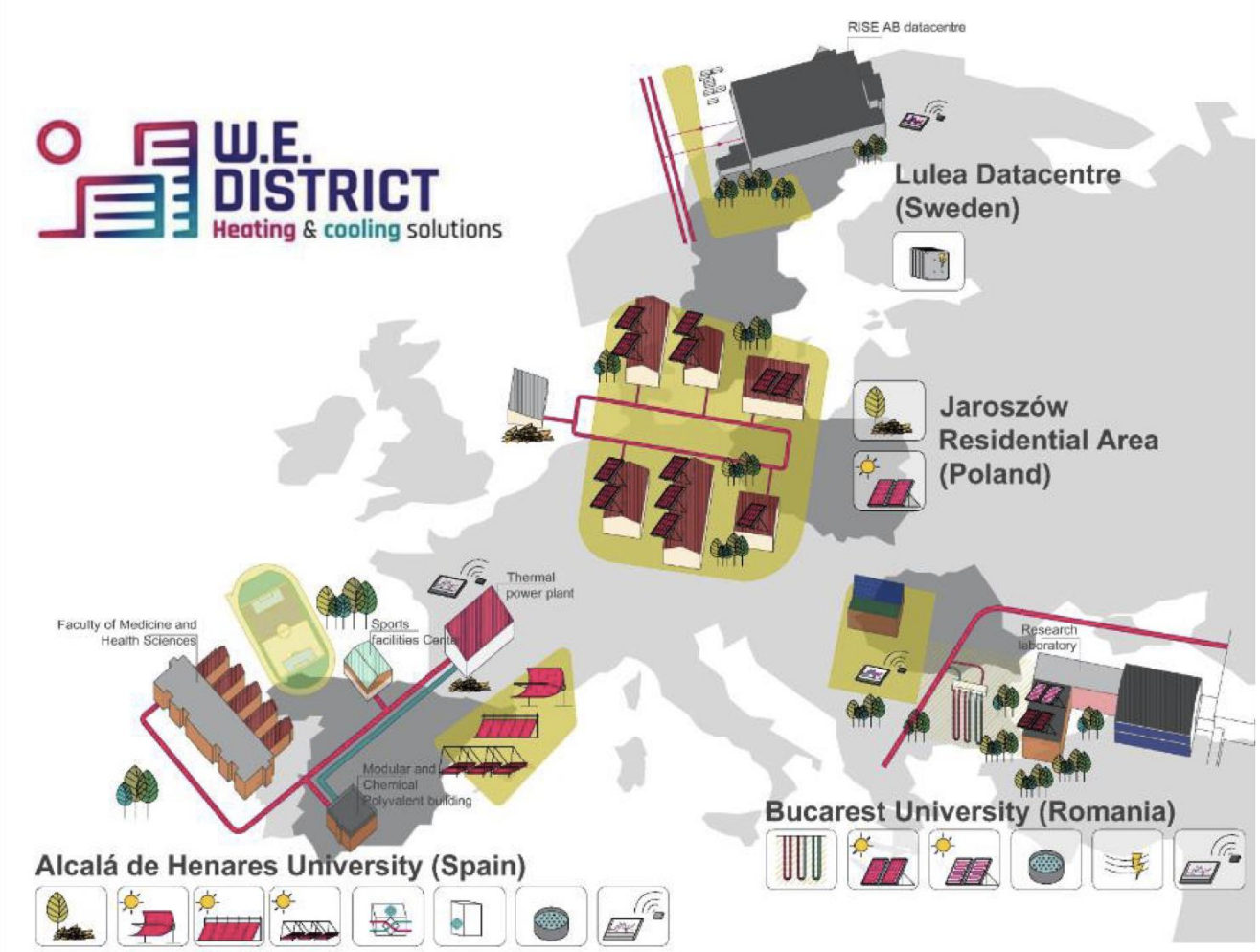
Supporting partners are ABB, Ericsson, Vattenfall, Nodepole, Skellefteåkraft, and more

The DC-Farming project
funded by Vinnova

The total project is 4,8 MSEK for the partners RISE ICE, LTU and The Food Print Lab. (RISE 2,3 MSEK)

The goal of the project is to find technical, economic and social synergies between greenhouse (GH) and data centers (DC) that can contribute to make vegetable farming competitive and sustainable in Nordic countries.

WEDISTRICT - Datacenters and fuel cells funded by EU H2020

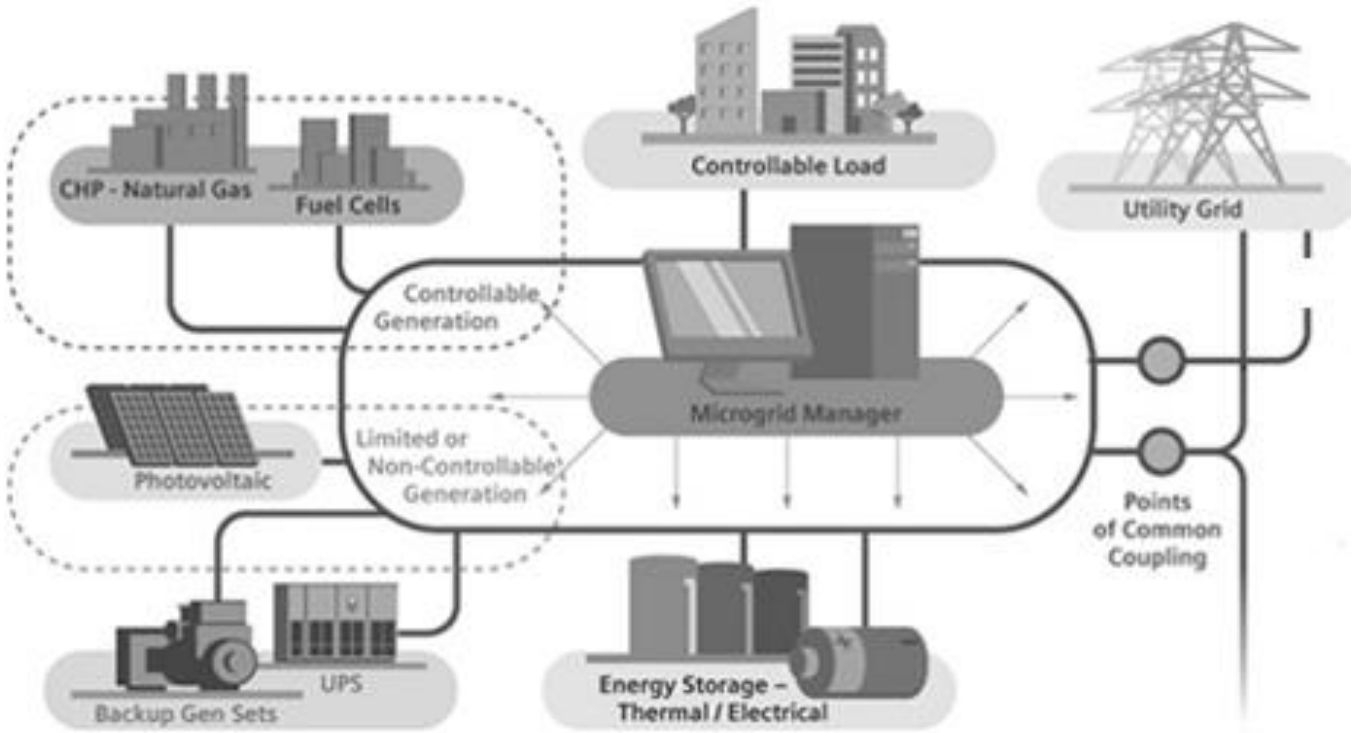


The project focus is to demonstrate multiple RES based District Heating and/or Cooling systems in Europe.

The total budget is about 200 MSEK and our funding is around 12 MSEK.

Our focus will be the recovery process using liquid cooling and a fuel cell to increase the temperature and use the electricity from the fuel cell for the datacenter

SONDER – optimization of energy regions funded by ERA-NET

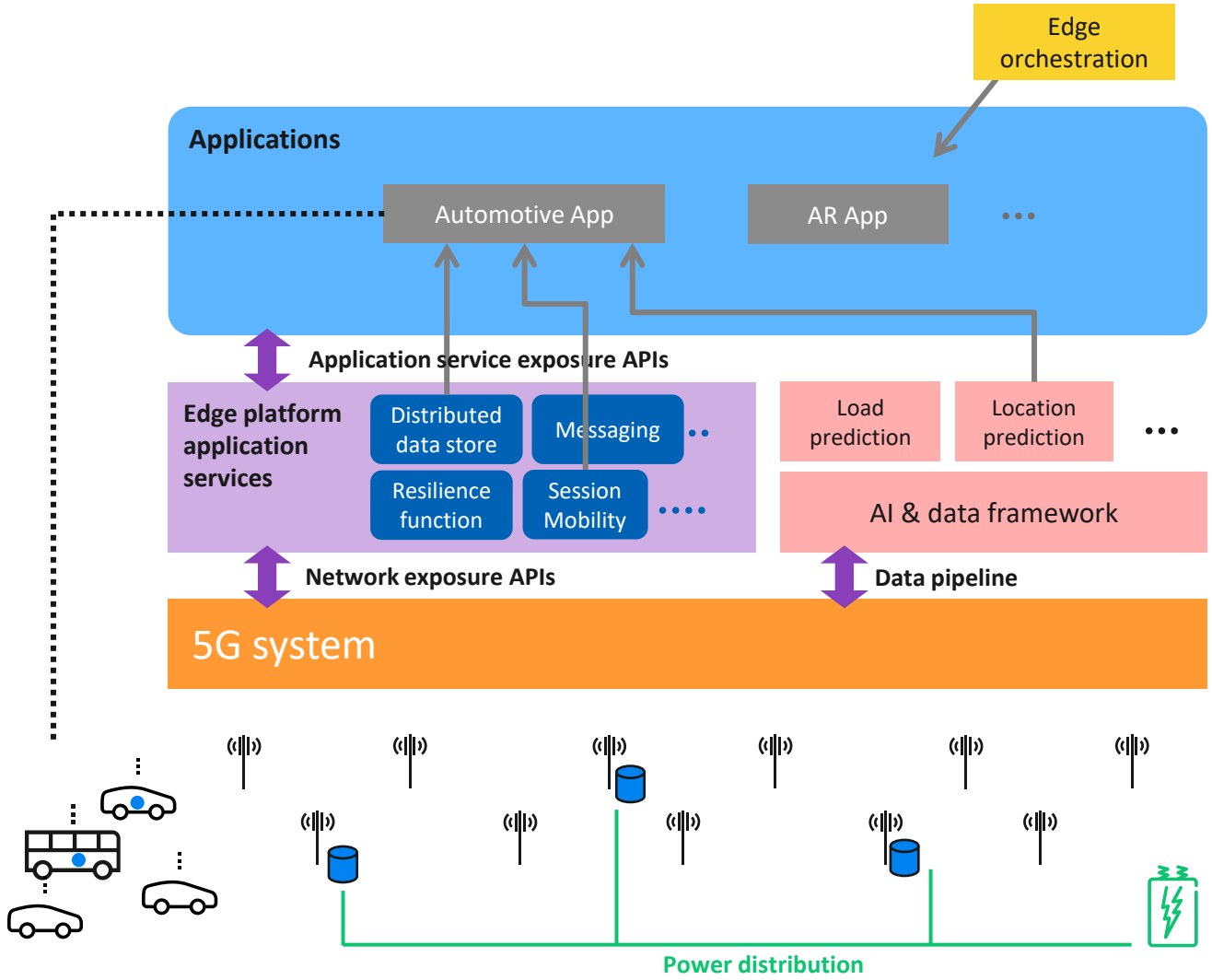


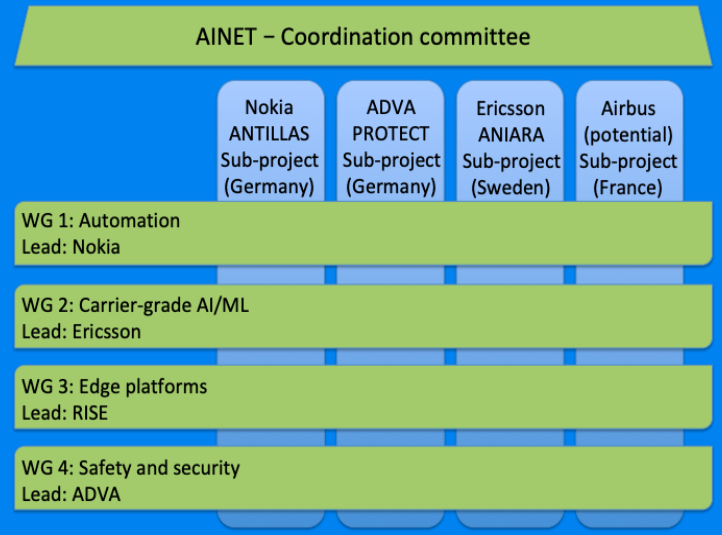
The LTU project application “SONDER – Service Optimization of Novel Distributed Energy Regions” together with RISE and Acon was granted by the Swedish Energy Agency in the ERA-NET program.

The Swedish project part is LTU and RISE led by Professor Valeriy Vyatkin.

Four partners from Austria and Switzerland respectively is also part of the project consortium.

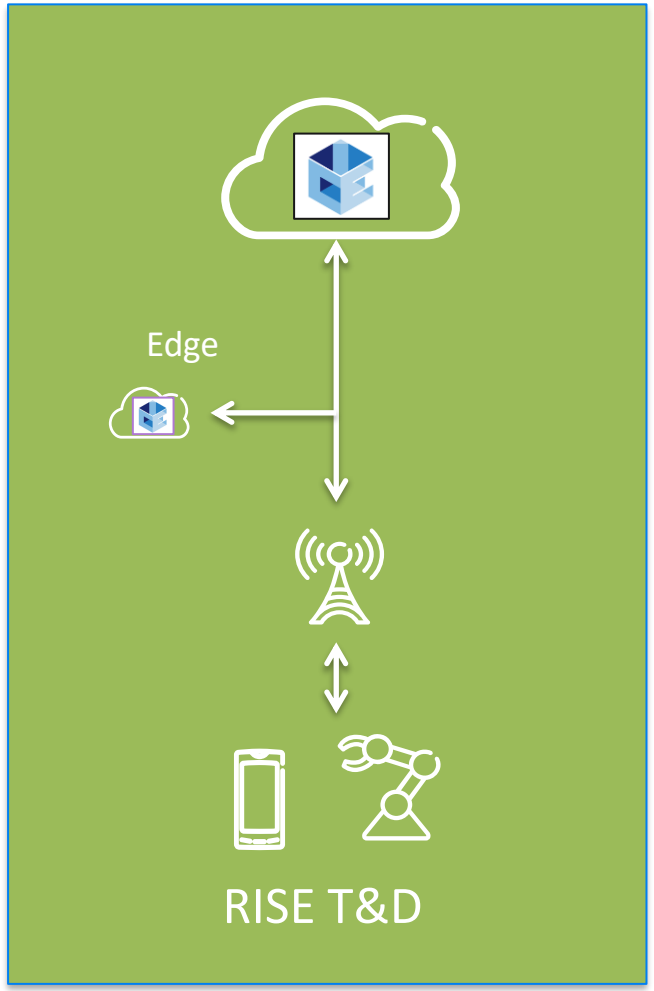
ANIARA – Automation of edge network funded by Vinnova

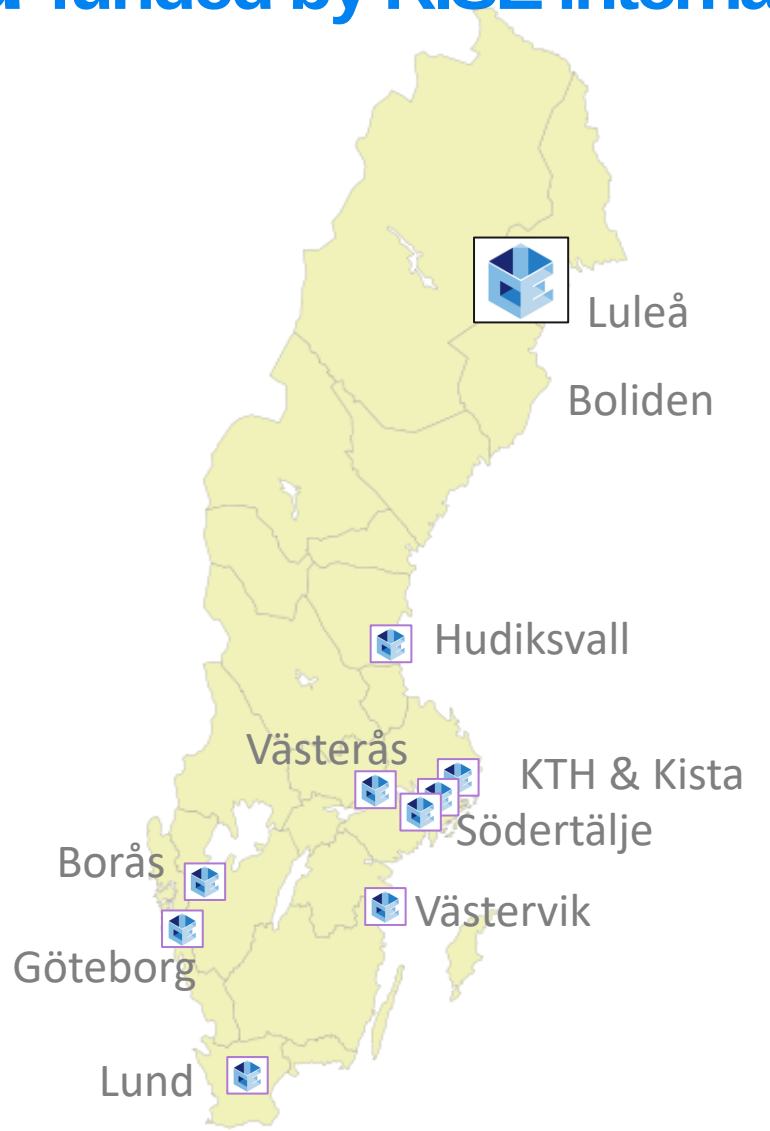




- An European cluster project on automation of a network of edge datacenters, with orchestration, availability, robustness, optimization and reliability. Ericsson led.
- Celtic Next program. Budget 70 MSEK over 3 years
  (RISE ICE budget 6 MSEK)

ICEEDGE - A National RISE T&D Edge Testbed funded by RISE internal





Objectives

- To expose RISE data platform resources to developers and researchers at RISE T&D
- To develop technologies, usage, products and services
- To strengthen Swedish companies to compete on the world market
- To enable Sweden to be world leading in different areas for example edge compute, IoT, mobility, AR/VR

Simplified Solar Installation with BIPV on Prefabricated Buildings

funded by Swedish Energy Agency

1,5 year
700 kSEK

Objectives

The aim of the project is to increase the availability of BIPV for those buying prefabricated buildings (datacenter modules)

By doing that the time from planning to a finished building will decrease, the total cost will be reduced, and the construction will be more resource efficient.

The calculation model developed in this project will assist the customer in determining electricity production as well as the financial savings due to solar PV.

RI. SE

Smart tariffs/integration
funded by Energiforsk + Energy agency

Call: Digitalisation enabling energy and climate-adaptation.

Joint project with Energiforsk that funds part of the project.

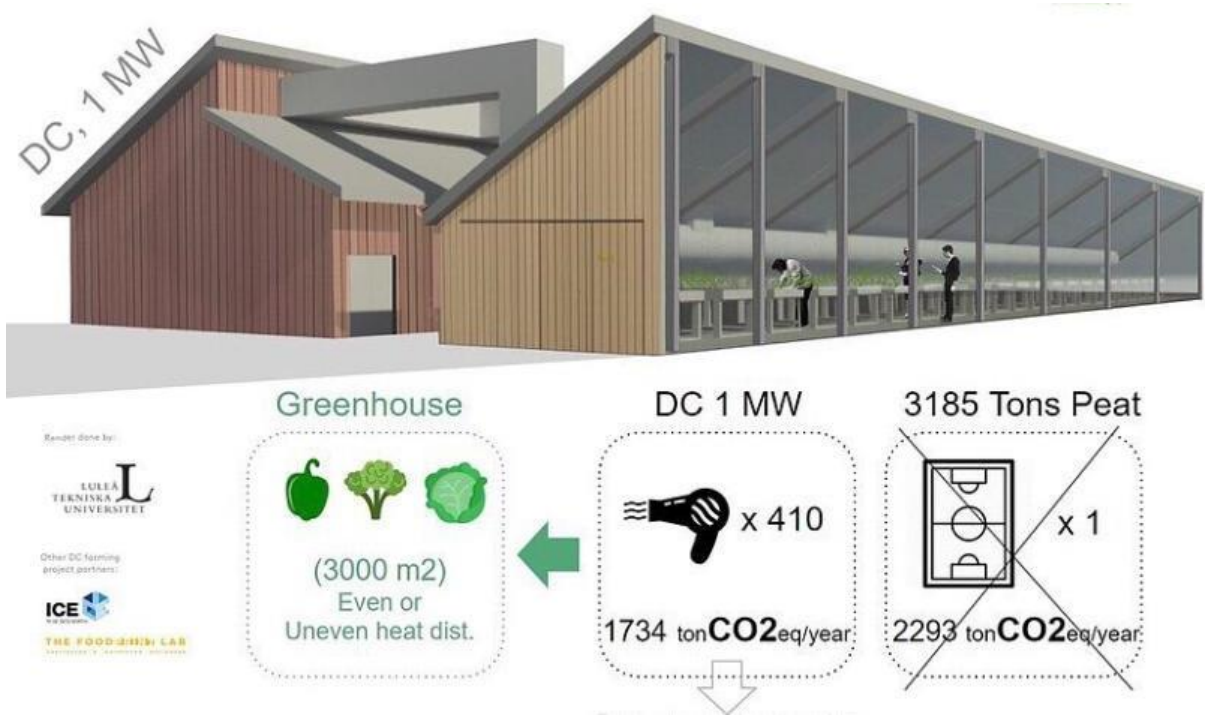
The total budget is 2,2 MSEK over two years.

Objectives:

to study how subscriptions and tariffs affect the operation of an AI-controlled micro-grid consisting of solar cells, batteries and a datacenter.

to optimise datacenter with new strategies based on knowledge of power- and micro-grids and to develop self-optimising solutions.

Energy efficient greenhouses
funded by Swedish energy agency



Pre-study on how Low-temperature energy sources and heat recovery can be used in interaction with cultivation.
Project together with RISE Energy resource and LTU.

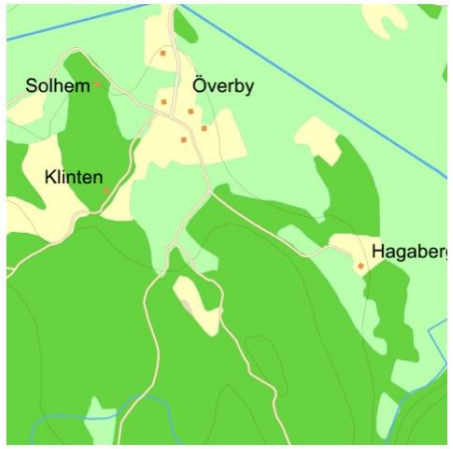
The objective is to create conditions for sustainable and competitive greenhouse cultivation in Sweden through synergies between different industries and technologies.

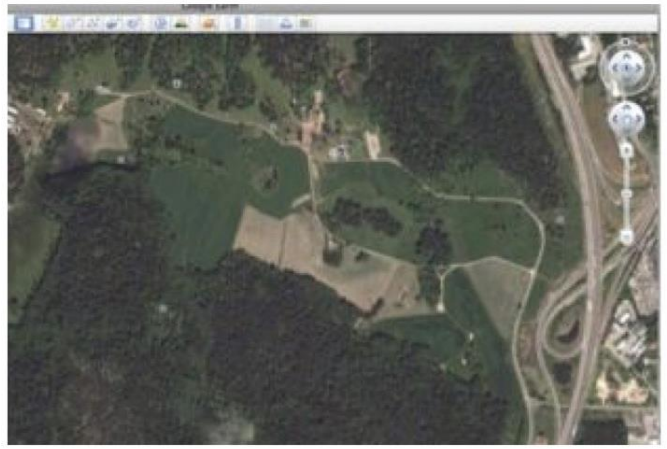
As an enabler, a new concept is proposed, in which energy and cultivation efficiency interact.

Study how energy-efficient greenhouse technology can reduce energy demand, as well as use low-temperature energy sources, combined with heat recovery,

1,7 MSEK for 1 year

AI area monitoring - pilot study
funded by Vinnova





Jordbruks verket

Objectives

Create automated methods for Swedish Board of Agriculture (SJV) and others, to determine whether land is being used for agricultural practices or is abandoned, using machine learning based on satellite images

The goal of the project is to develop algorithms on a limited area to automatically detect whether pastures have been mowed or grazed during the year. To be scaled-up later.

Pres-study 500 kSEK

RI. SE

Thank you!

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