CSC

ICT Solutions for Brilliant Minds

CSC Finland: 52 years of leadership in European HPC

Kimmo Koski, May 9th 2023

Non-profit state organization with special tasks

Volume in 2022

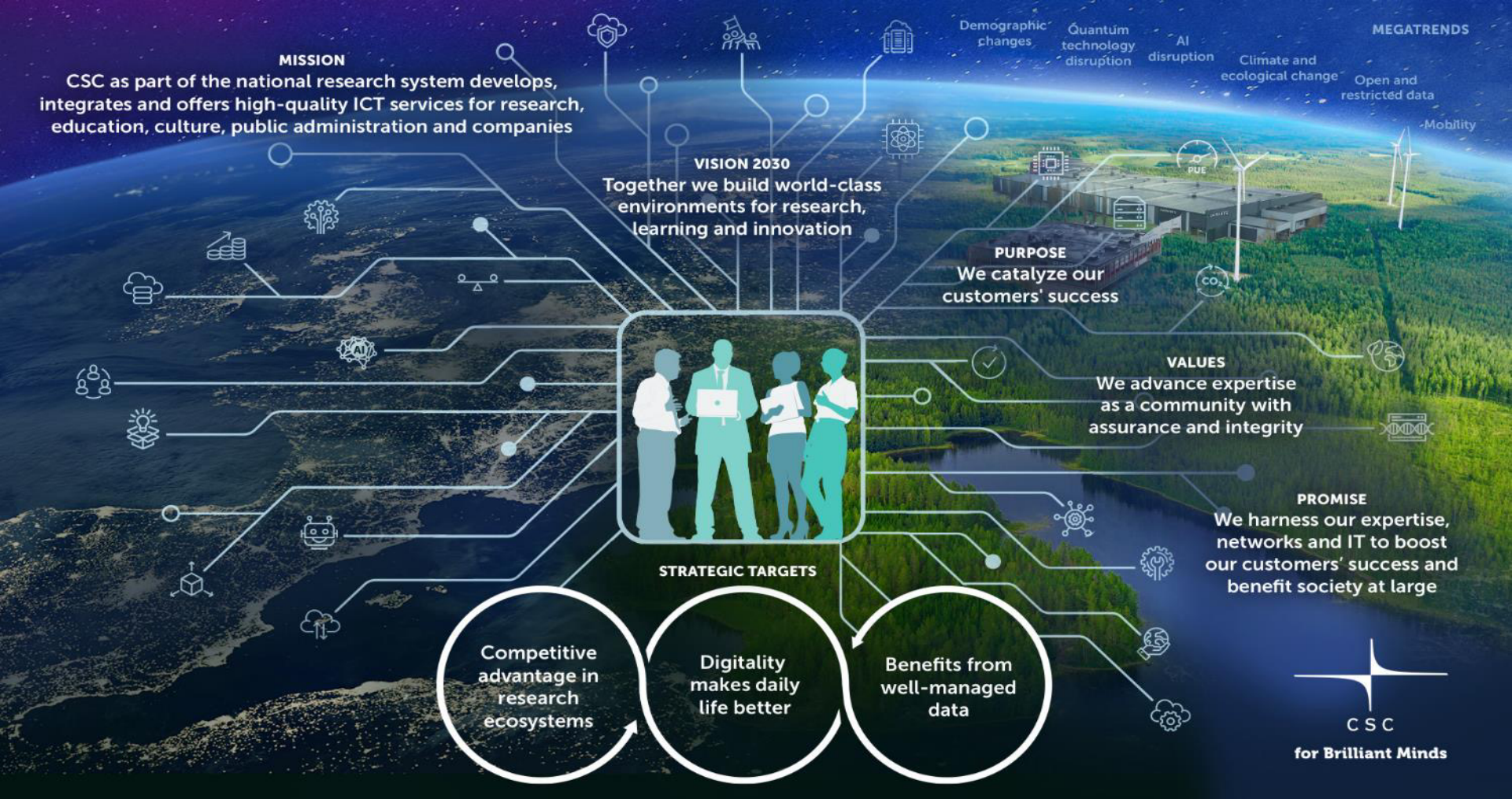
75M€

Headquarters in Espoo, datacenter in Kajaani

Owned by state (70%)

and all Finnish higher education institutions **(30%)**

Over **600** employees today


MISSION
CSC as part of the national research system develops, integrates and offers high-quality ICT services for research, education, culture, public administration and companies
VISION 2030
Together we build world-class environments for research, learning and innovation
MEGATRENDS
Demographic changes
Quantum technology disruption
AI disruption
Climate and ecological change
Open and restricted data
Mobility
PUE
PURPOSE
We catalyze our customers' success
VALUES
We advance expertise as a community with assurance and integrity
PROMISE
We harness our expertise, networks and IT to boost our customers' success and benefit society at large
STRATEGIC TARGETS
Competitive advantage in research ecosystems
Digitality makes daily life better
Benefits from well-managed data
CSC
for Brilliant Minds

Information technology and service development solutions in different areas of expertise

Research

Expertise and scalable ICT solutions for supporting research

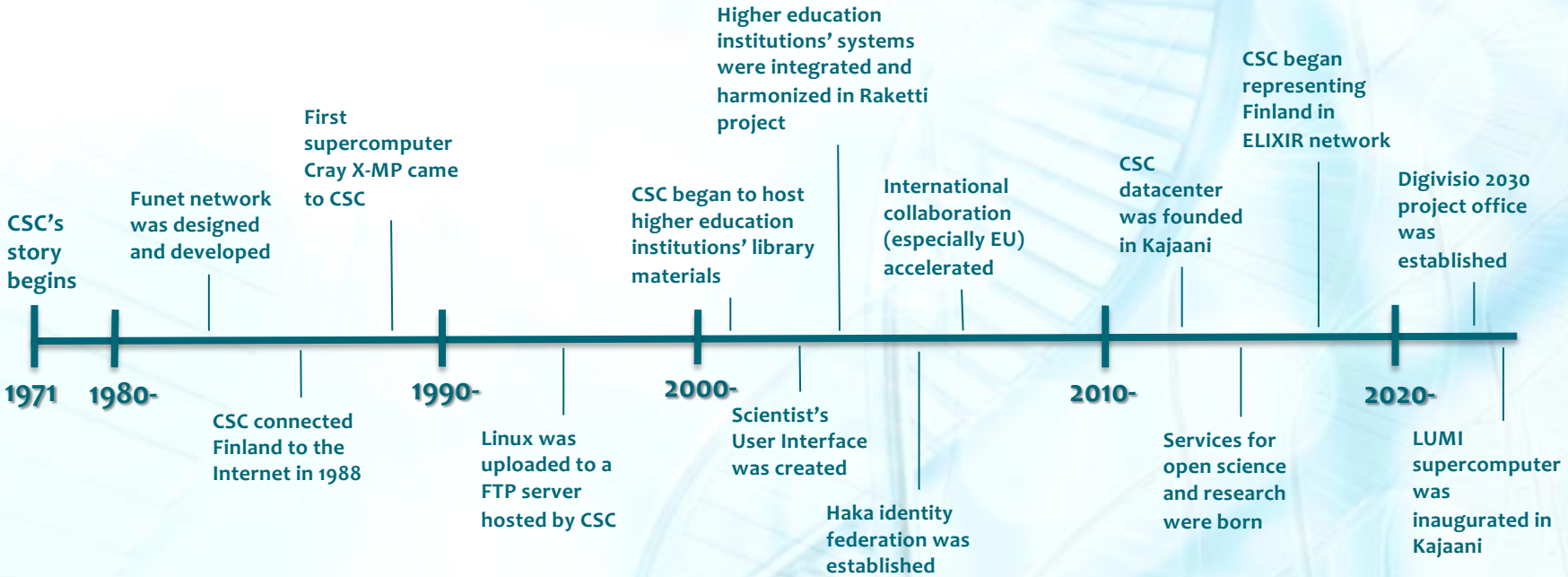
Education

Reliable partnership in advancing education and teaching

Culture and Public Administration

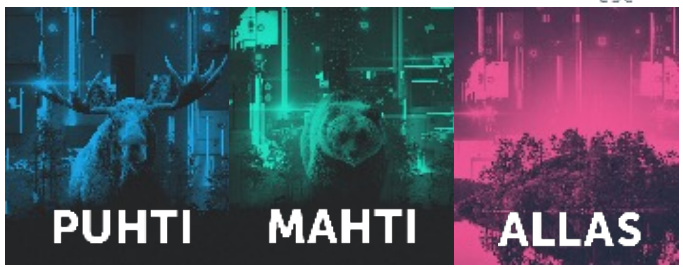
Interoperable information systems tailored to the diverse range of customer needs

CSC's history



Finnish scientific computing infrastructure

National (DL2021)



For all use cases in scientific computing in Finland

- Large (tier-1) scale simulations
- High throughput computing
- High-performance data analytics
- Data streams

EuroHPC/LUMI

- Most resource-intensive projects (Tier-0)
- Science and innovation policy priorities (flagships, CoEs)
- Artificial intelligence
- Support for large research infras
- Collaboration with industry
- International collaboration

LUMI: one of the fastest supercomputers in the world

- LUMI is an **HPE Cray EX** supercomputer manufactured by **Hewlett Packard Enterprise**
- HPL performance over **309 petaflop/s** makes the system one of the world's fastest
  - #3 Top500, #2 HPL-MxP, #3 HPCG
  - #1 in Europe

1 system

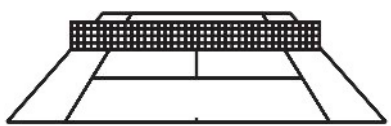
309 Pflop/s

Sustained performance

Computing power equivalent to

1 500 000

Modern laptop computers



Size of two tennis courts

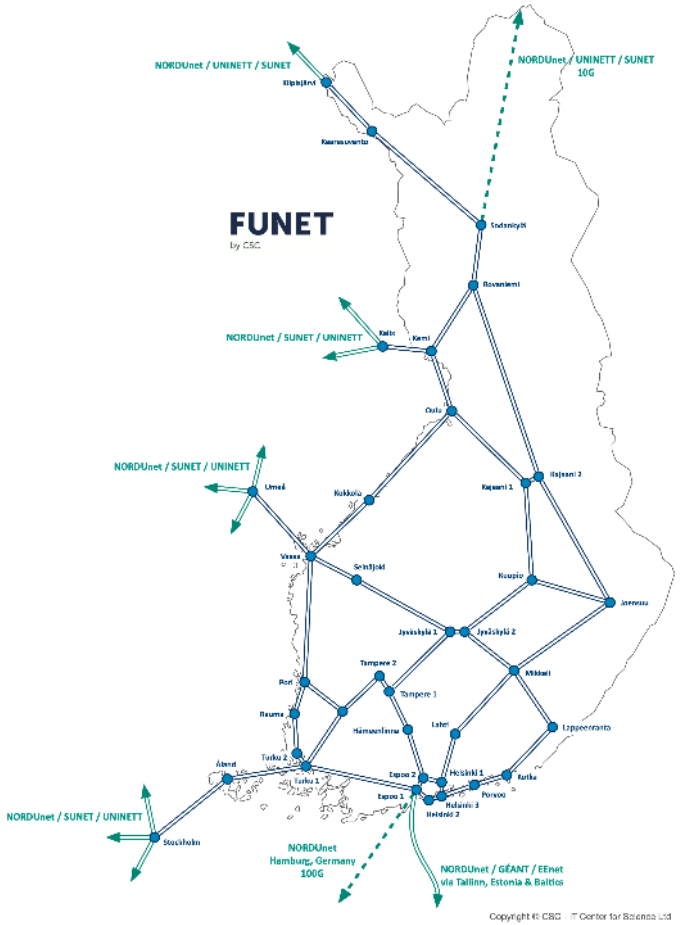
Modern platform for

High-performance computing, Artificial intelligence, Data analytics

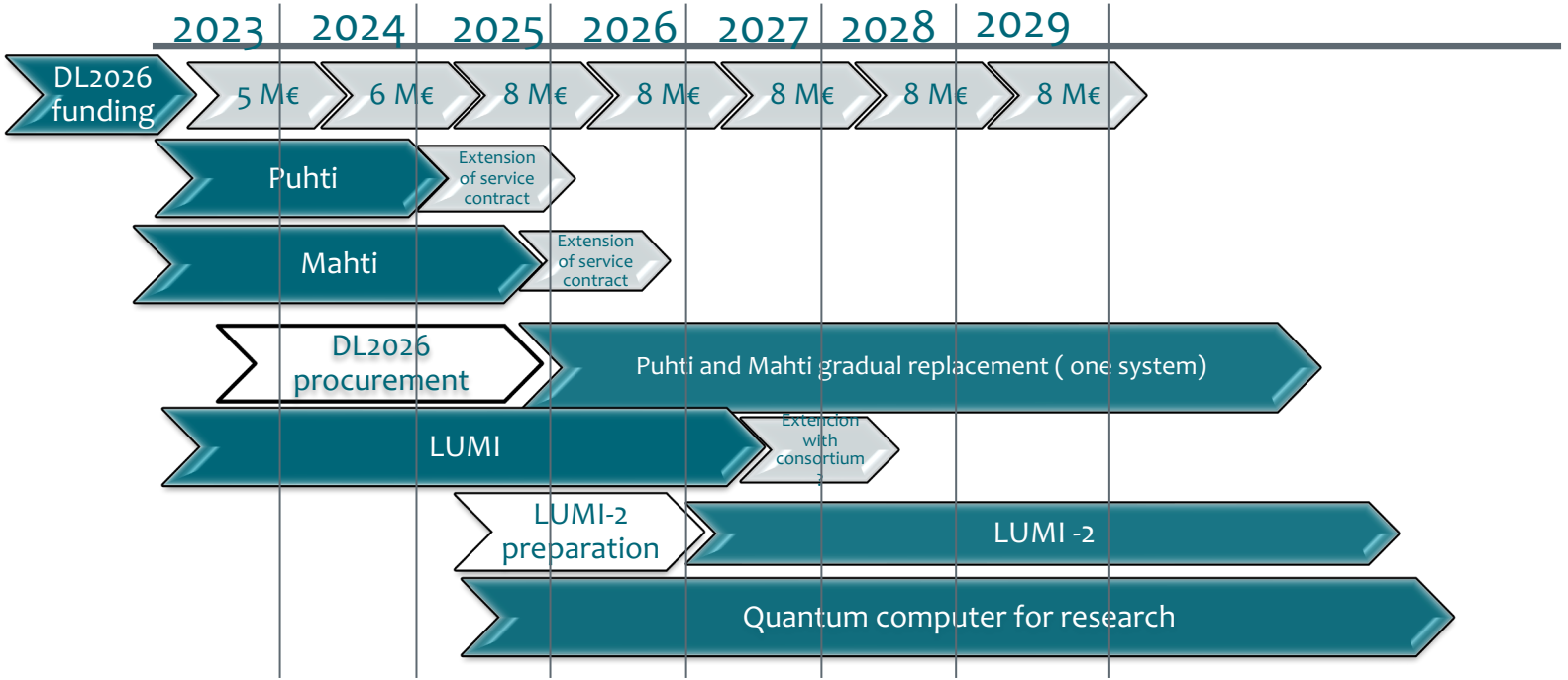
Based on GPU technology

The reliable high-speed data communications networks of the data center are designed specifically for HPC

- LUMI research infrastructure is a **direct part of the Nordic backbone**
- Scalability for multi-terabit transmission needs already today, and readiness for future transmission technologies
- The Funet 2020 network supports the EuroHPC installation perfectly **without needs for additional investments**
- The next-generation NORDUnet connects the Kajaani LUMI site to GÉANT, ensuring European-wide availability of any HPC resources installed in Kajaani



Roadmap (tentative)



Green Deal for HPC

100% hydroelectric energy up to 200 MW

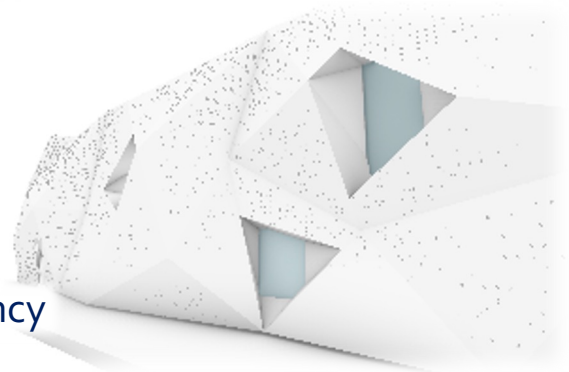
Very reliable power grid: Only one outage in 40 years

100% free cooling available, PUE 1.02 (air cooled)

Waste heat reuse: effective energy price reasonable, negative CO_2 footprint: 13500 tons reduced every year

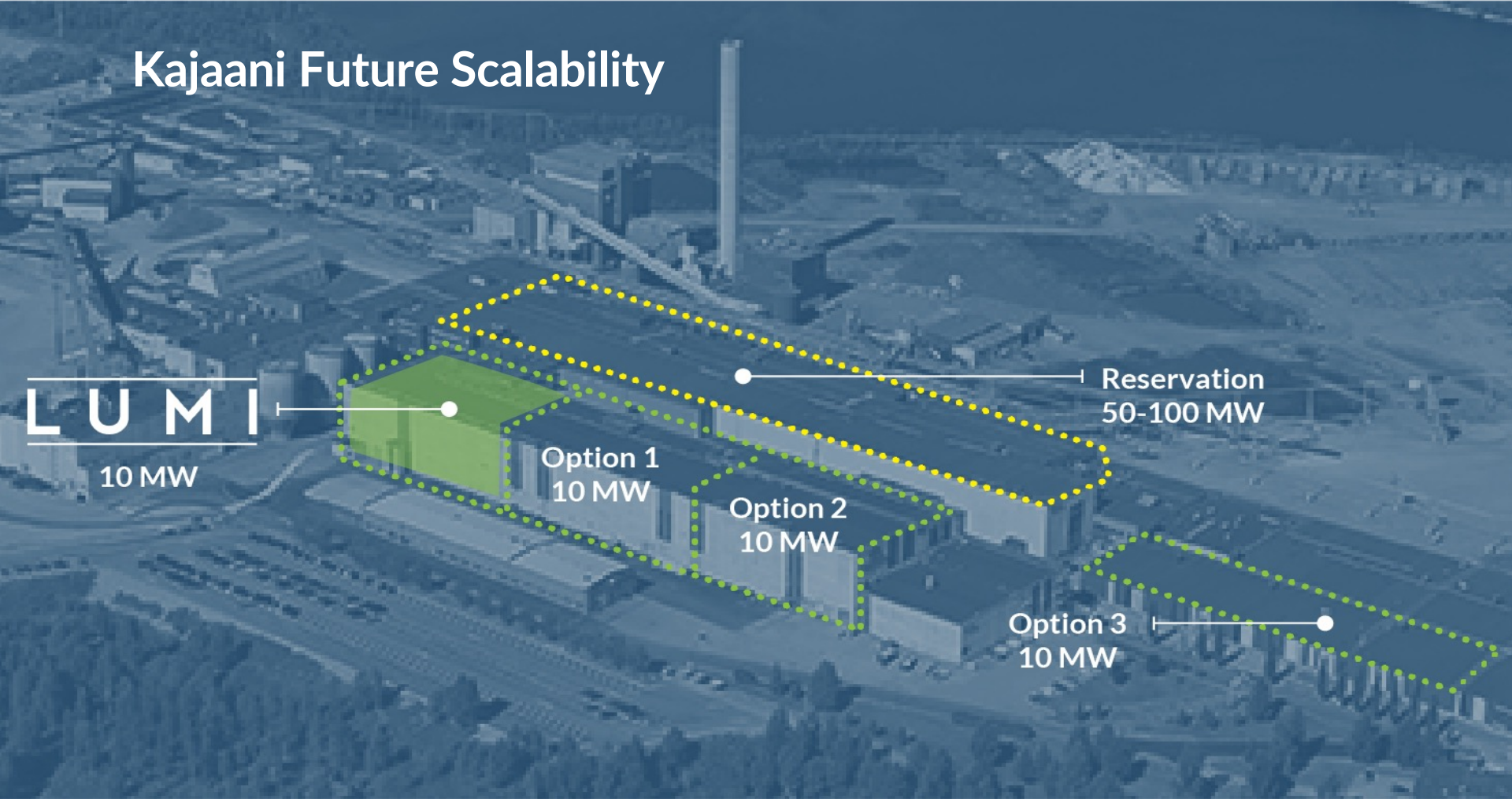
Extreme connectivity: Kajaani DC is a direct part of the Nordic backbone. 4x100 Gbit/s to GÉANT, can be easily scaled up to multi-terabit level

Elevated security standards guaranteed by ISO27001 compliancy




Renforsin Ranta Business Park, Kajaani Finland
Greenfield (200 ha)
National grid substation (1000 MW)
Excess heat utilisation to district heat network
3 x
230 MW existing transformer capacity
LUMI
CSC national HPC data centers

Kajaani Future Scalability



Global collaboration

State-level cooperation

– leveraging state-level agreements and statements e.g. Joint Statements

Organization-level collaboration

– based on areas of common interest e.g. collaborative projects.

EU-level structures for global cooperation

– e.g. Team Europe Initiatives and EU funded projects

Utilizing international/global networks

– e.g. Research Data Alliance to define areas of collaboration and identifying key partners

Building on bilateral and other MoUs focusing on areas such as HPC, green transition or topics like artificial intelligence, quantum.

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