



ERIC Forum 2 Project| From Research
Infrastructures to Impact - ERICs and EIROForum
contributing to the Green and Digital Transition

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Funded by the
European Union



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www.ericforum.eu

13 European countries joining forces and sharing a common ambition

Host States:

Sweden, Denmark.

Member States:

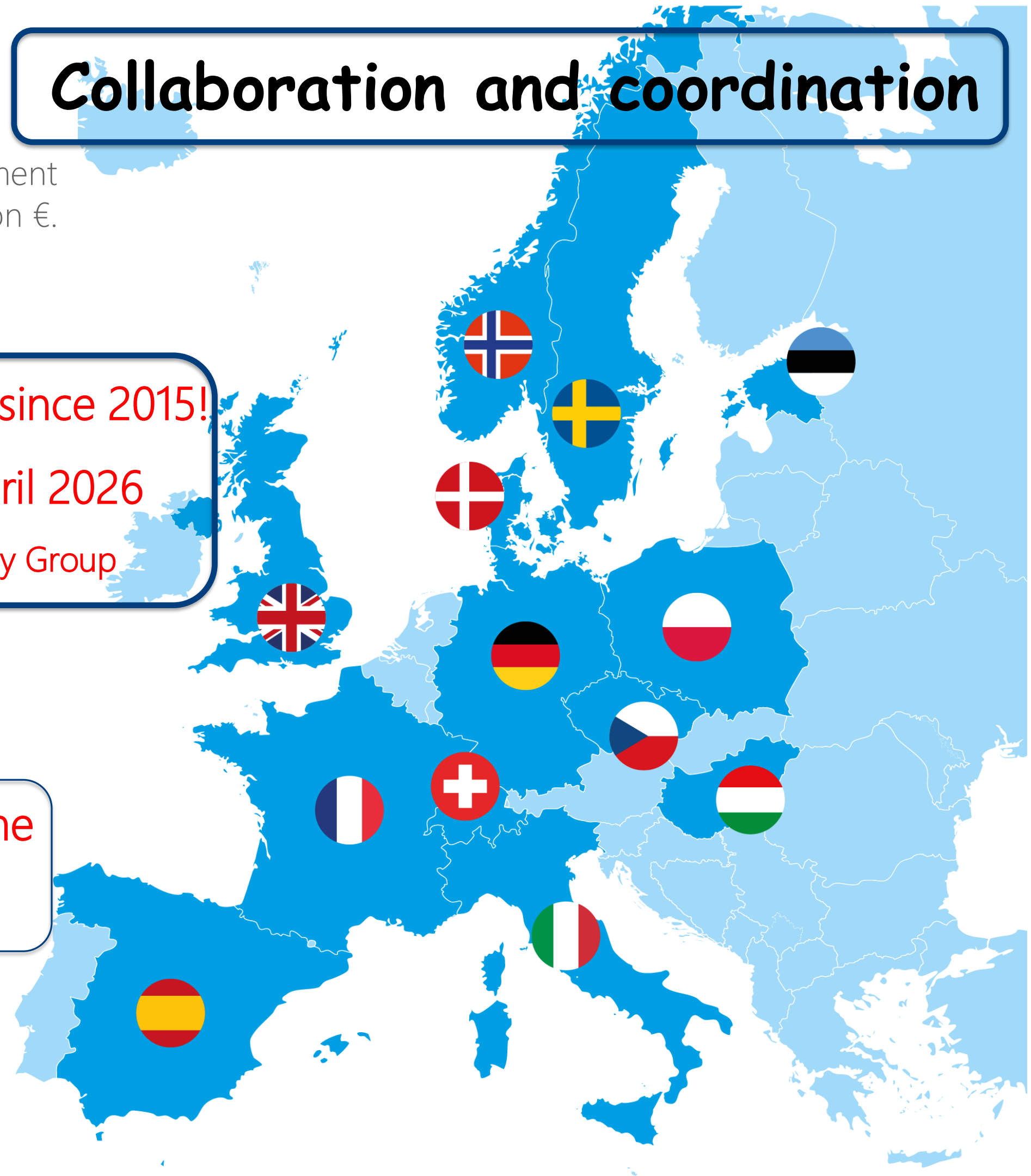
Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Norway, Poland, Spain, Sweden, Switzerland, United Kingdom

A 3 Billion € project,
with an estimated annual
operations and development
cost of close to 200 million €.

Collaboration and coordination

ESS has been an ERIC since 2015!
& EIROforum since April 2026
-> Environmental Sustainability Group

ESS is the largest of the
29 established ERICs



ESS will be a world-leading facility for neutron-based research



Build and operate the most powerful linear proton accelerator ever built 5 MW nominal power (currently 2MW installed capacity)



Build and operate a full suite of Instruments with unprecedented performance



Welcome around 2 000 Users every year



Conduct more than one thousand experiments every year



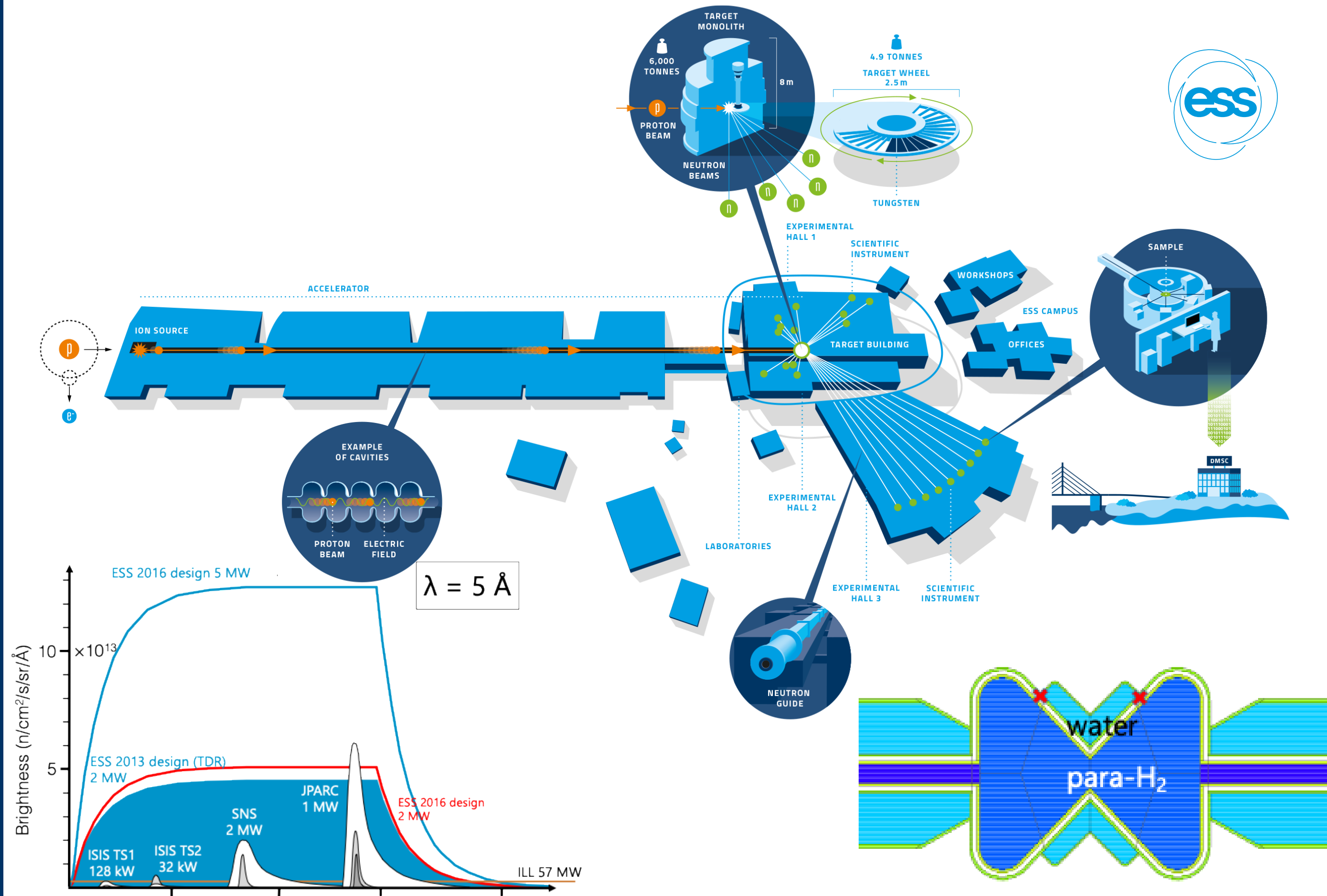
Assure responsible and sustainable operation as well as stewardship of entrusted resources

Europe's next flagship neutron facility

A highly innovative, but equally proven design

Key design parameters:

- 2MW initial to 5 MW final average proton beam power
- 2.86 ms long proton pulses @14 Hz
- Solid tungsten target wheel
- Low-dimensional para-H₂ moderator



15 instruments under construction

Each instrument designed to open up so far inaccessible terrain



Life sciences



Soft condensed matter



Chemistry of materials



Energy research



Magnetism &
superconductivity

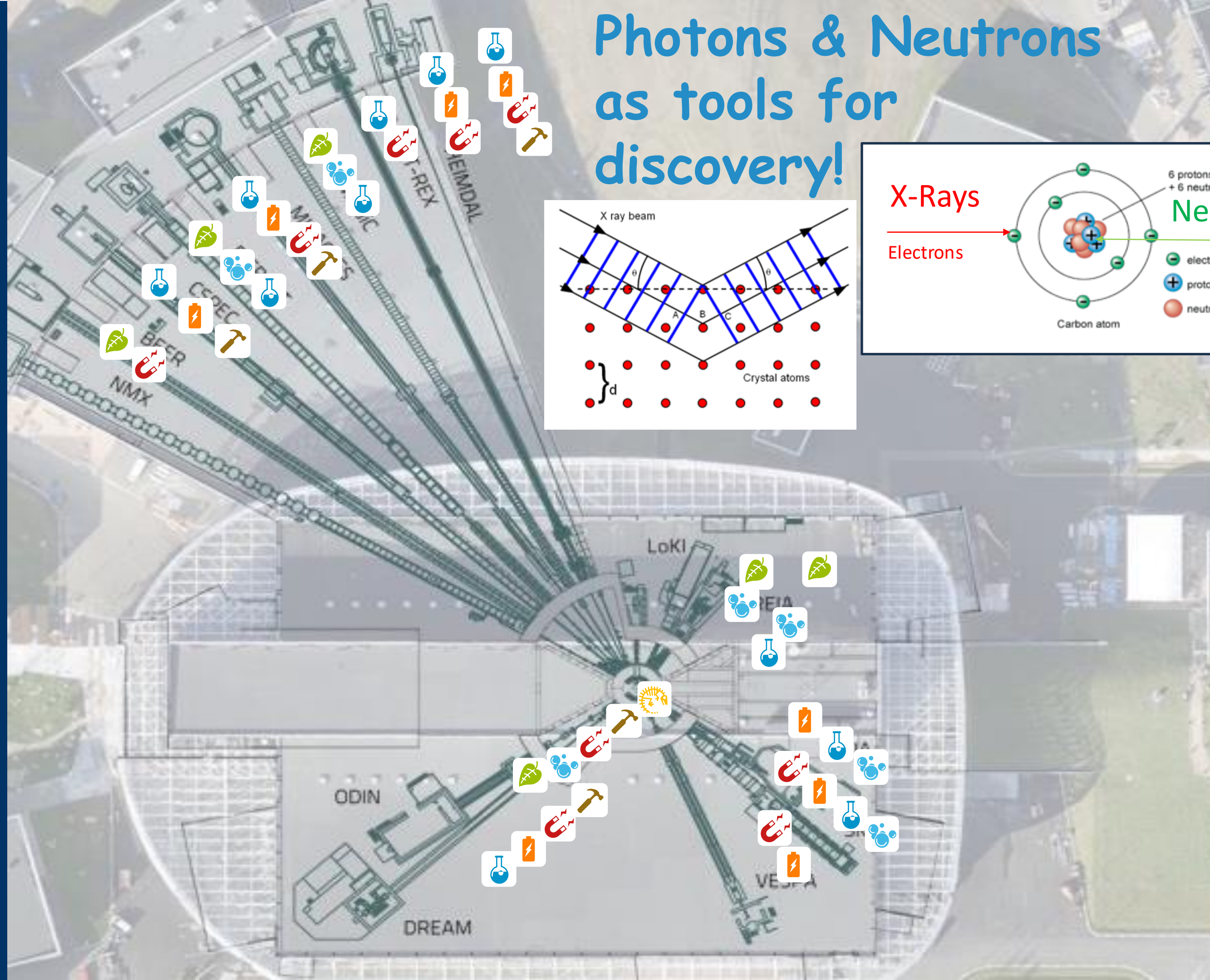
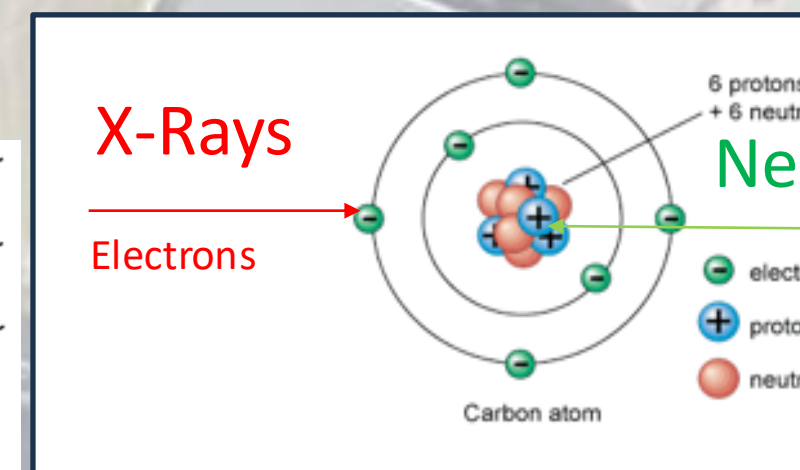
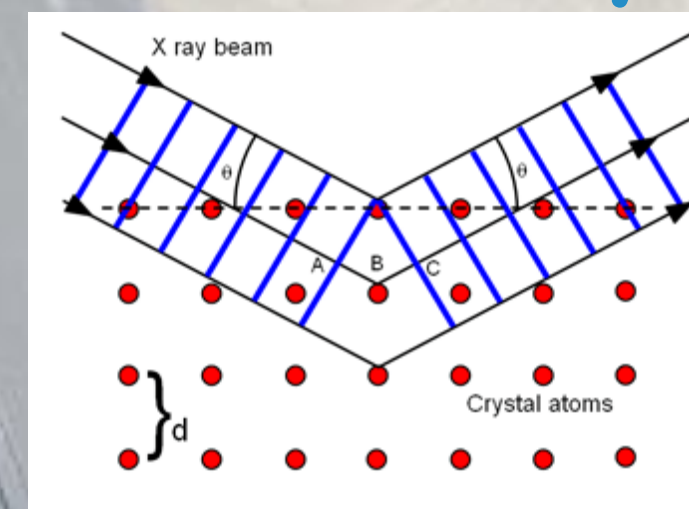


Engineering &
Geo-sciences



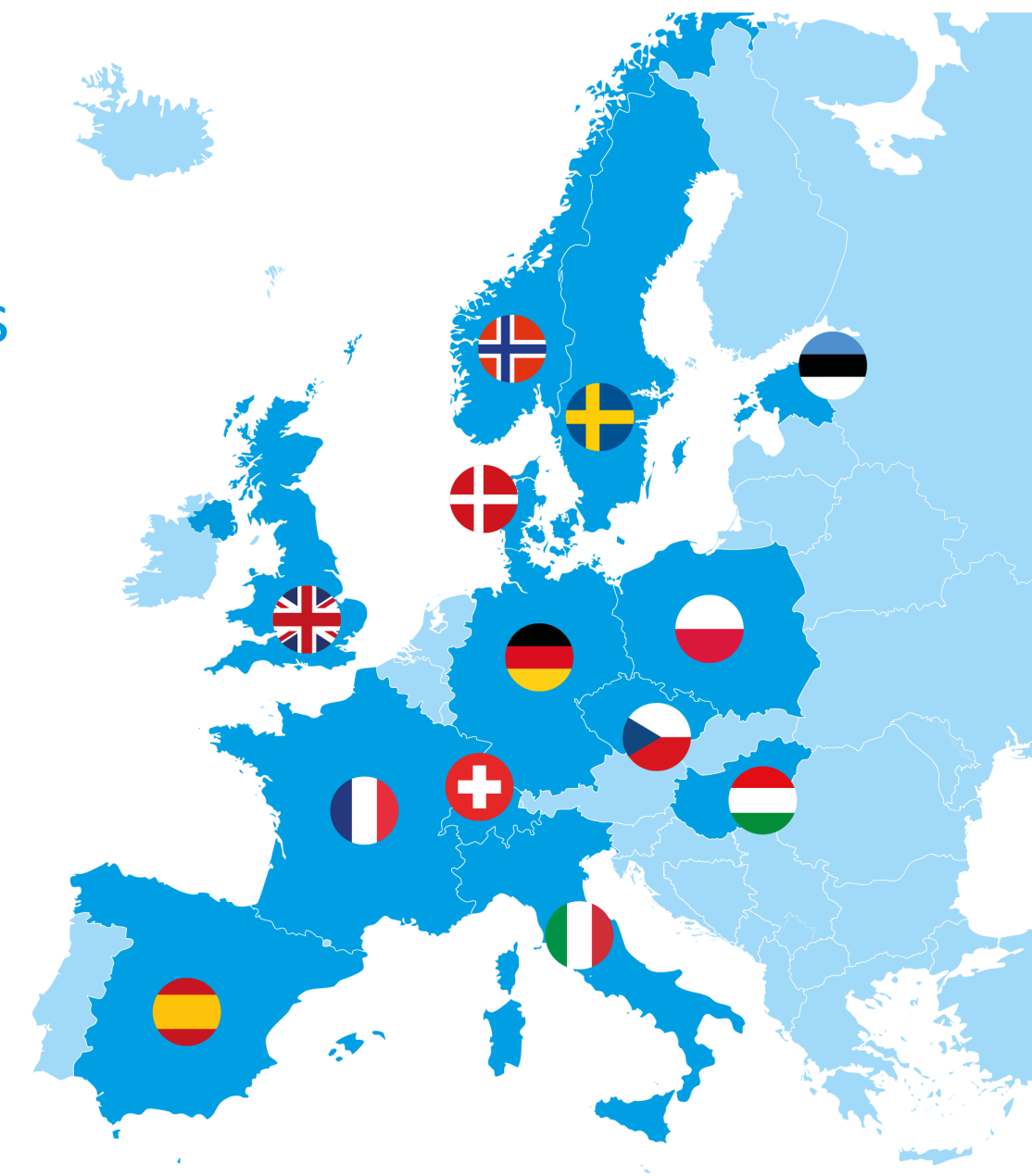
Archeology & Heritage
conservation

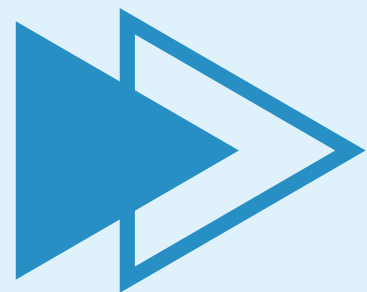
Photons & Neutrons as tools for discovery!



ESS is a dual site facility

With 13 member states out of which Sweden and Denmark are host states





Embedding sustainability across the full lifecycle of the European Spallation Source

Key Focus Areas

- **Energy & Carbon**

Energy-efficient buildings and accelerator systems

Heat recovery and low-carbon energy integration

- **Resource Efficiency**

Water optimization, recycling, and waste reduction

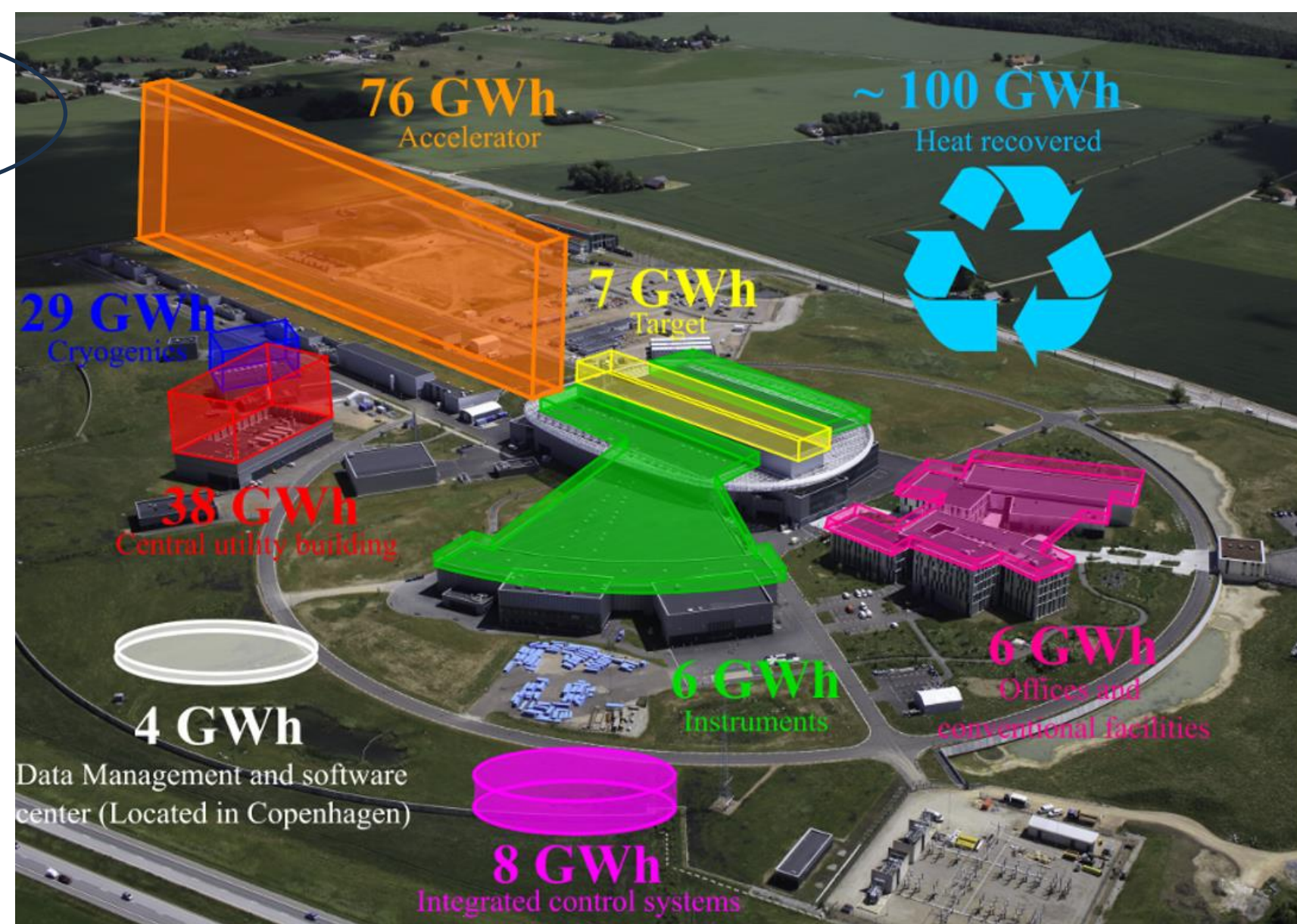
Sustainable operations and laboratory practices

- **Responsible Procurement**

Sustainability criteria in purchasing & supplier engagement

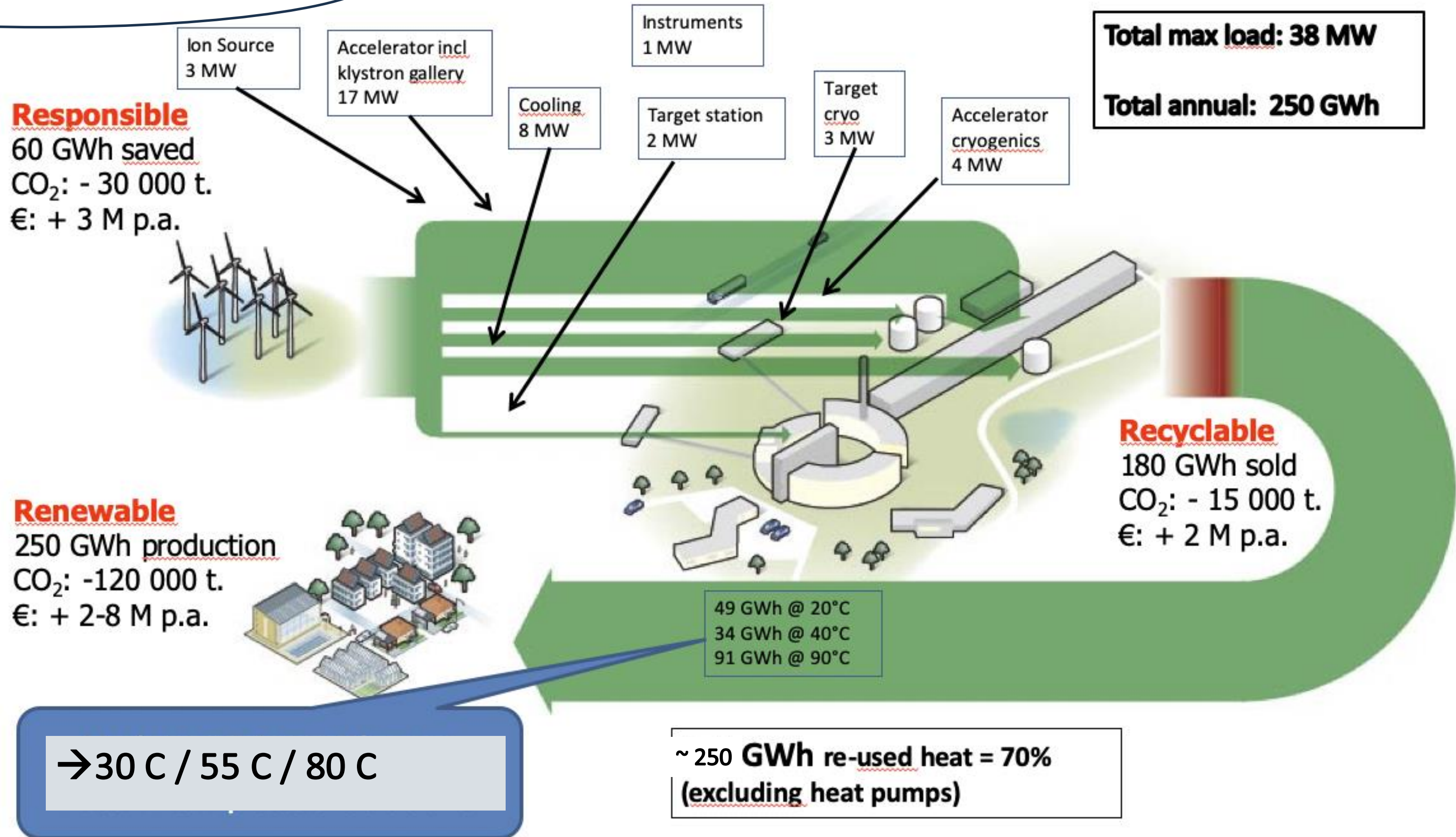
Collaboration through Lund CoAction and ESS networks

Energy perspective
for 2 MW operation



Energy Perspectives

Initial estimate for 5 MW operation

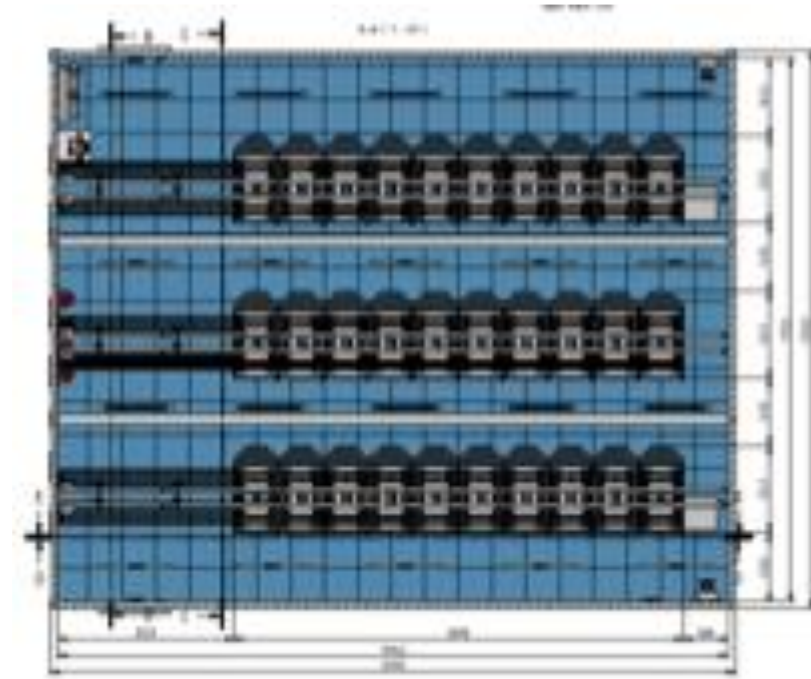


New DMSC data center: Project overview



- Common project with DTU
- 30 racks
- Total capacity: 1MW IT load
- Redundant power and cooling
- Excess heat is sent to the DTU central cooling system for harvesting
- Construction and foundations is done as light constructions minimizing carbon emissions from concrete

Joining forces with DTU enables for the economy of scale and allows for investments that will return in lower OPEX and environmental impact.



ESS Procurement and sustainability



1. **Sustainability is one of the five main objectives in the ESS Procurement Rules**
2. In each **Call for Tender procedure**, there is a selection **criteria** requiring the tenderers to explain how they work systematically with sustainability. This can be by confirming **ISO:14001 certification** or other schemes to systematically address sustainability
3. Since introduction of the procurement ERP module in 2016/2017, SPL division has been working on digitalising the work processes and since the pandemic, **all work is done digitally**, no more paper versions of contracts or other documents are used for the 8000+ procurements per year
4. The common tender and agreement for the procurement of electricity via a broker includes **requirements for the supply of electricity from renewable sources**
5. Wherever possible, **sustainability is considered in the setting of award criteria in tender procedures**, but this is an area where we hope to make more progress in the future when the supply patterns for operations become clearer
6. As part of the **EIRO Forum Procurement Working Group**, ESS is benchmarking sustainable best practices and learning from CERN and other Big Science organisations

ESS Logistics and sustainability



1. Over the years, ESS has changed their **transport vehicles to electric versions**
2. Via the ESS founded non-profit organisation **RI.Logistica**, ESS drives optimisations and best practices that include sustainability considerations and more and more research organisations are joining
3. The ESS 4PL logistics provider is sharing **quarterly emission reports** on the basis of which ESS logistics is reviewing the portfolio of transporters and a review is made how effective our strategies to reduce emissions from transports are
4. ESS is part of **CoAction Lund** and driving an initiative for the sustainable procurement of **transport solutions**, bringing together municipalities and other public actors with the aim to find opportunities for **coordinating transportation** needs and ways to optimise them and reduce transport related emissions
5. ESS logistics has implemented a **compliance scheme for the EU Carbon Border Adjustment Mechanism (CBAM)** and in relation to that, it is even evaluated how sourcing from outside the EU can be reduced
6. **ESS logistics** is conducting continuous competence development for customers to raise awareness and **promote sustainable choices**

Grants and Funding Mechanism

Digital transition:

- 24-EU-DIG-QCI.dk-CB **(EC)**
- AI4SE1DK **(IFD)**
- PaN-Finder **(OSCARS Programme)**
- NEUDATA4LIFE **(Danish Agency for Higher Education and Science)**
- FlexRICAN **(EC)**
- iSAS **(EC)**
- ERIC Forum II **(EC)**
- COORDINA-INNOV **(EC)**
- EPITA **(EC)**

Green transition:

- Sustainable and Functional Materials from Local Resources **(Swedish Research Council (Vetenskapsrådet - VR))**
- AoA Materials – Shapeshyer **(Chalmers University)**

Relevant to both green and digital transition:

FlexRICAN

iSAS

PaN-Finder

NEUDATA4LIFE

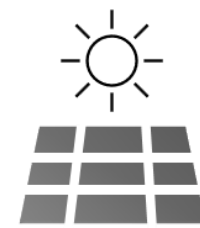
FlexRICAN: Flexibility for Research Infrastructures for global Carbon Neutrality

- Topic: HORIZON-INFRA-2023-TECH-01-01 - New technologies and solutions for **reducing the environmental and climate footprint of Ris**
- Type of Action: **HORIZON-Research and Innovation Action**
- Duration: **36 Months (KO 03/2024)**, Budget: **5 MEUR**
- 8 Partners

See presentation by
ELI

FlexRICAN aims to improve resource efficiency and reduce environmental impacts through a **multi-energy approach (wind, solar, biogas)**, validated at **ESS, ELI and EMFL**

[More information about FlexRICAN](#)



Photovoltaics

Quantify the net production
& histogram of production



Electricity Storage

Quantify the net and
modulation capacity



Waste heat recovery

Manage intermittency
Manage low temperature
Test machines with moderate TRL



Flexibility

Quantify the flexibility of RIs
Multi-energy modelisation
Towards services to the grid

Implementation of flexibility & carbon reducing solutions in RI's
Instrumentation & mode of energy consumption by
integrating the flexibility, LCA ...

Scability & Dissemination Roadmap
To project stakeholders city district,
public structure, to other RIs and to
user communities

iSAS: Innovate for Sustainable Accelerating Systems



ESS Involvement

Integration activities

- WP5 : (Leading) In the design of a new energy-saving cryomodule
- WP6 : In current and future research infrastructures accelerators
- WP7 : Into industrial solutions



Horizon-Infra-2023, Contributions:

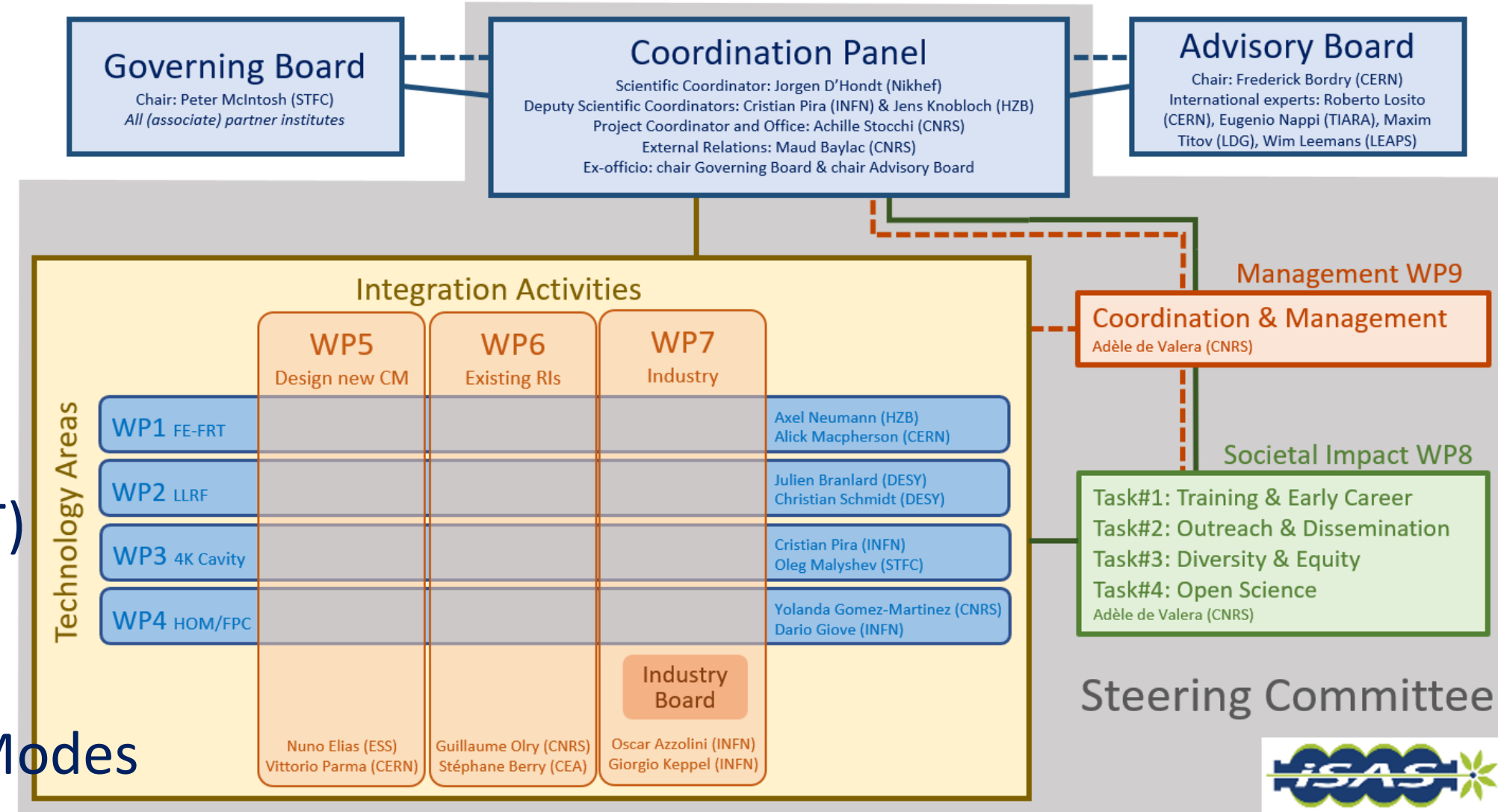
- EU: 5 MEUR
- Matching Funds: 8 MEUR

Resources and partners

- Total project budget of ~13 M€ with ~5 M€ funded from Horizon Europe
- Partners : 12 RI & 6 industrial companies
- HR ~1000 person-months spread over 4 yr

Development of 4 technologies

- WP1 : Ferro-Electric Fast Reactive Tuner (FE-FRT)
- WP2 : Optimized Low Level RF control (LLRF)
- WP3 : Nb₃Sn films on Cu for 4.2 K cavity op.
- WP4 : Couplers, Fundamental & Higher Order Modes



Work supported by funding from European Union's program EU HORIZON-INFRA-2023-TECH-01-01 under GA n°101131435

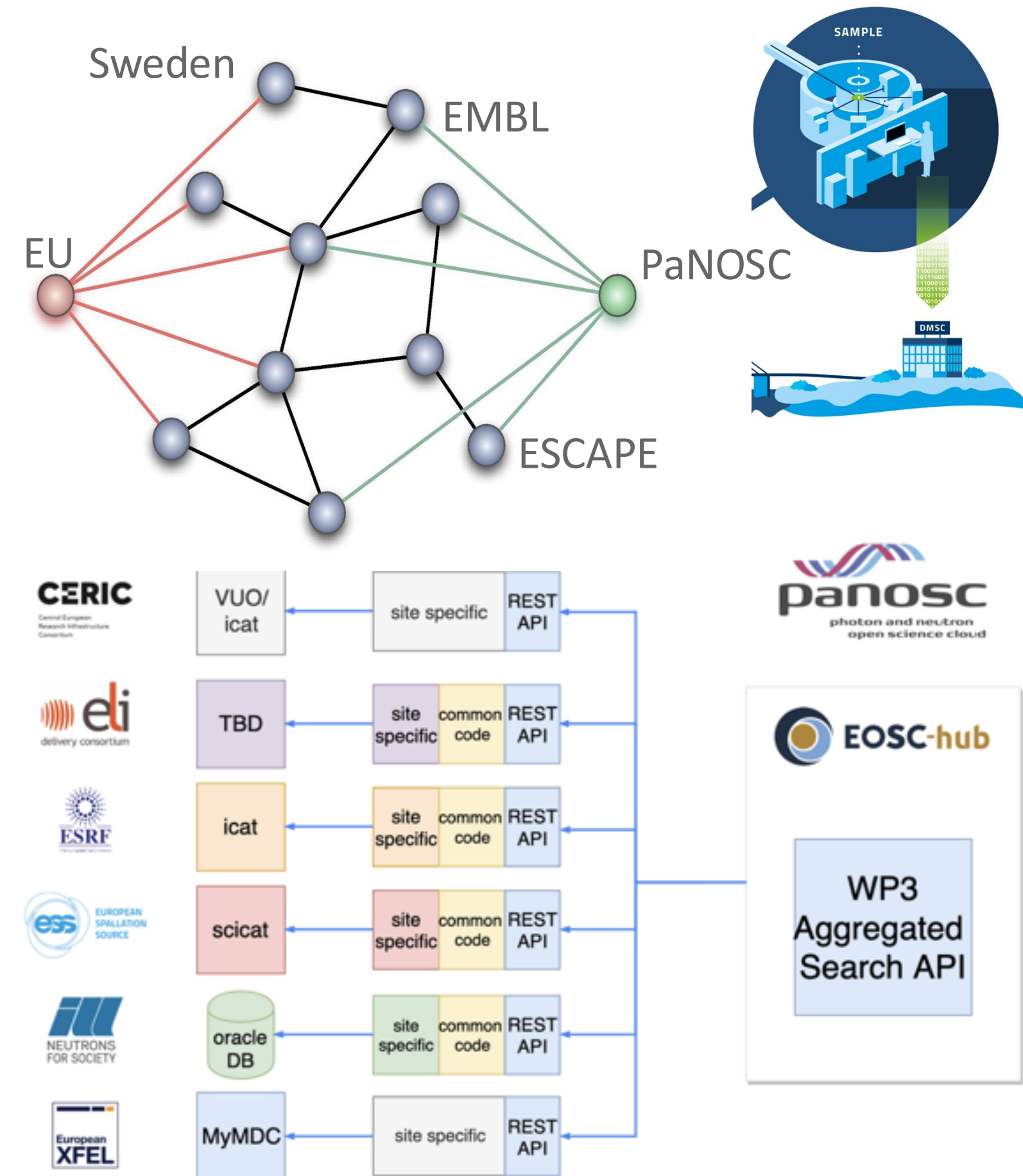
PaN-Finder @ Data Management & Scientific Computing centre (DMSC)

- European Open Science Cloud (EOSC) and FAIR
- PaNOSC/ESS Data Policy:
 - ESS stores all raw data and metadata
 - Basic metadata is published promptly
 - Data is restricted to the experimental team for 3 years
 - Data becomes open access after the embargo
 - Analysis results are accessible only to the analysis team

PaNOSC provides a unified search service for photon and neutron scientists to find and filter data across facilities



<https://pan-finder.panosc.ess.eu/>



Sustainability Forum at ESS

Organisation and responsibilities



- A **cross-functional cooperation**, established to provide an overall and integrated view of sustainability matters within the ESG areas – **Environmental, Social and Governance**.
- **Monthly meetings** for joint tasks, information and sharing of experiences.
- Responsible for identifying ESS's main sustainability matters within the ESG areas and **recommend sustainability goals** for decision by the Executive Board.
- Responsible for regular **reviews of the ESS Sustainability Policy**, and alignment between this and internal procedures.
- Responsible for **proposing and recommending activities** to improve sustainability within the ESG areas, and for advising on sustainability related topics.
- **Members are accountable for communicating** information, suggestions and recommendations from the group to their part of the organisation.
- Members are responsible for escalating significant sustainability-related risks, concerns, or deviations from agreed goals.

Members of the Forum:

- WoW Area Owner – Manage Safety & Licensing
 - Sub-WoW Area Manager – Environment
 - Environmental Engineer (Chair)
- Representatives from at least the following functions:
- Human Resources Division
 - Site & Building Maintenance Group
 - Finance & Business Control Division
 - Supply, Procurement & Logistics Division
 - Communications Group
 - Operations Division
 - Science Directorate
 - DMSC – Data Management & Scientific Computing centre (DMSC)

Sustainability Forum at ESS



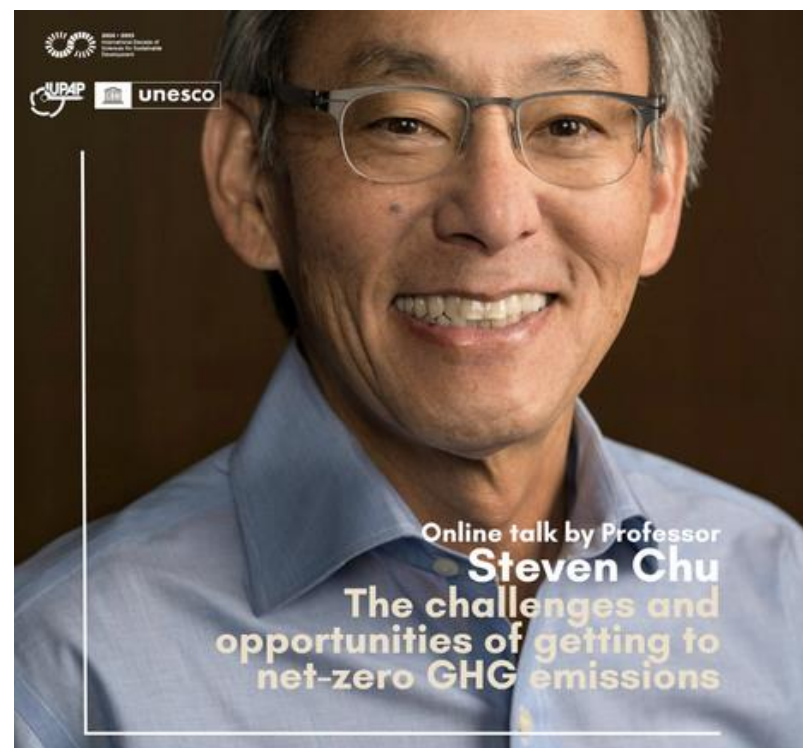
On-going work

- During spring 2026 a **Double Materiality Assessment (DMA)** for sustainability was performed, **according to the EU Corporate Sustainability Reporting Directive (CSRD)**
 - **Aim:** To identify our **major sustainability impacts, risks and opportunities (IRO)** within the Environmental, Social and Governance (ESG) areas.
 - Performed by **four master students from School of Economics and Management** was established, as their master thesis work.
 - 30 major IROs were identified – most of them in the areas of climate change, circular economy, and business conduct.
- The Forum have started the work to decide on actions, indicators and goals – based on the results from the DMA.
- In parallel work is on-going to identify and decide on how to report sustainability forwards.

Additional Activities and sustainability forum



- HEP workshop/conference: [Sustainable HEP 2026 — 5th Edition \(8-July 10, 2026\)](#) · Indico Global
- [DMSC Summer School 2026 \(23-28 August 2026\)](#)
- [French-Swedish Academy for Scattering Experiments and Modeling](#)
- [IUPAP - International Union of Pure and Applied Physics WG14 - Accelerator Science](#) & Ambassadors
- Colloquium series including **Green and Digital Transition**
 - IDSSD and [IUPAP&UNESCO International Colloquia on Physics For Society](#)
 - [FIP - Forum on International Physics; PHYSICS MATTERS](#) and [All events](#)
- IAEA CRP F12027 - *Expanding Neutron Beam Capabilities at Low and Medium Flux Neutron Sources*



Accelerating Sciences is a Matter of Facts !

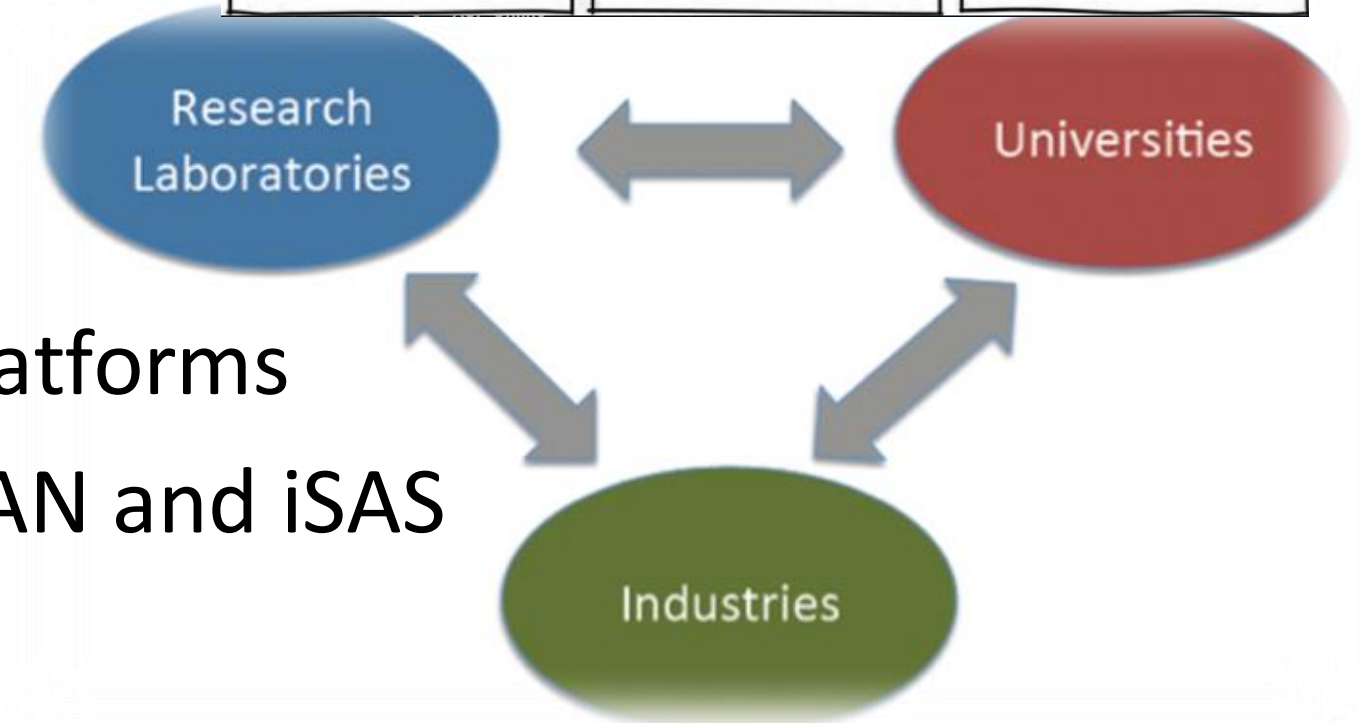
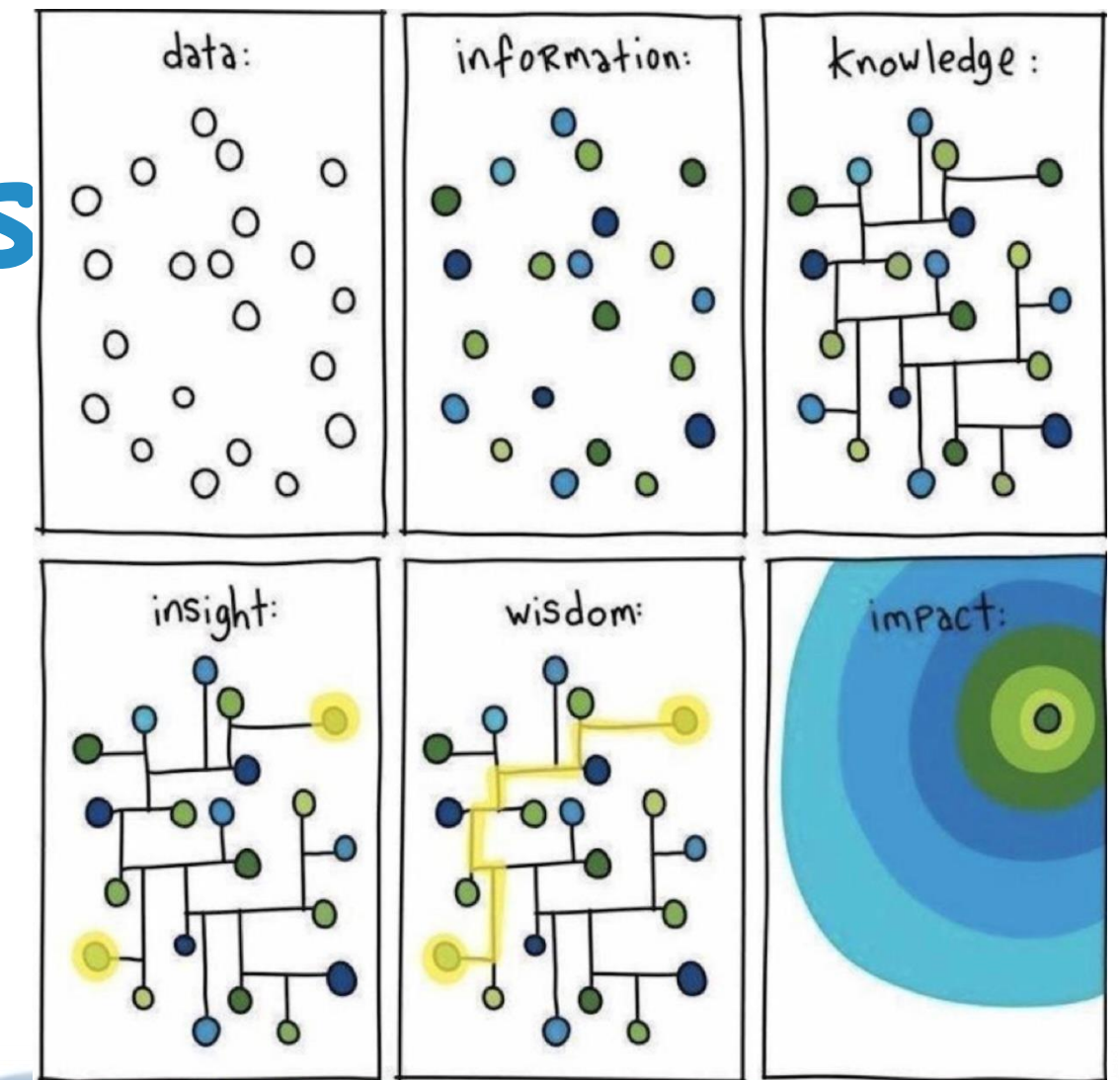
[SESAME Light Source](#) (members and observers) and Developing Communities

- Matters for Users: Scientific Cases using Photon and Neutron Sources
- Particle Accelerator and large Research Infrastructure
- Outreach & Education
- Organizations & Collaborations
- Forums and Topical colloquia:
 - ❖ Environment & Sustainable developments
 - ❖ Health & Life Science



Concluding comments

- ESS Green and Digital Transition
- Energy-efficient facilities and smart operations
- Low-carbon and renewable energy solutions
- Resource efficiency and circularity; ESS Sustainability Forum
- Sustainable procurement and industry integration
- Innovation in construction and infrastructure
- Climate-resilient lifecycle planning
- Digital initiatives through DMSC, PaNOSC, and related platforms
- Contribution to sustainable RI initiatives such as FlexRICAN and iSAS



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