

I.FAST Program and Workpackage on Sustainable Accelerators

Mike Seidel, PSI/EPFL
DESY, Hamburg
6th February 2023



6.–8. Feb. 2023
Hamburg
Europe/Berlin Zeitzone

Übersicht
Zeitplan
Anmeldung
Information
Participant list
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Critical Materials and Life Cycle Management: The Example of Rare Earths – curse or blessing?

Life Cycle Assessments get more and more in the focus in industry and also in science. iFAST presents a platform for discussing and finding solutions in these topics.

In our workshop we want to focus on the Life Cycle Management using the example of Rare Earths Elements (REE), the key material in permanent magnets used in a variety of fields like accelerator, turbines, hard drives and many more.

On the workshop we will discuss the following points:

- Life cycle management
Consider entire life cycle of technical component using critical materials:
construction – operation – deconstruction
- Mining and processing of REE
a socio-ecological approach – energy savings versus destructive mining and processing
- Using permanent magnets
Examples of the use of permanent magnets and its Pro and Con
- Certification for mining and processing of REE
How to force more sustainable thinking in the production of REE
- Recycling of permanent magnets
New processes for the re-use and recycling of permanent magnets
- Alternatives for permanent magnets with REE
New magnetic materials as well as improved electromagnets

Science, industry, politics and NGO in cooperation can forces to tackle the problem – we can develop solutions together.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004730.

🕒 **Beginnt** 06.02.2023, 11:00
Endet 08.02.2023, 14:00
Europe/Berlin

📍 **Hamburg**
Flash Conference Room
DESY

Innovation Fostering in Accelerator Science and Technology (I.FAST)

I.FAST aims to enhance innovation in the particle accelerator community:

- breakthrough technologies common to multiple accelerator platforms
- **49 partners**, including **17 companies** as co-innovation partners
- explore **new alternative accelerator concepts and advanced prototyping of key technologies**
- Examples: new accelerator designs and concepts, advanced superconducting technologies for magnets and cavities, techniques to increase brightness of synchrotron light sources, strategies and technology to improve energy efficiency, new societal applications of accelerators.
- Website: <https://ifast-project.eu/home>
- Newsletter: Accelerating News



PROGRAMME: Horizon 2020 (Research Innovation Action)

DURATION: May 2021 – April 2025

TOTAL BUDGET: 18.7 M€

TOTAL EC CONTRIBUTION: 10 M€

CONSORTIUM: 48 participants from 14 countries

PROJECT COORDINATOR: Maurizio Vretenar (CERN)



Work Package 11: Sustainable Concepts

task 1: Sustainable Concepts for RIs:

networking, workshops on selected topics, deliverable: report

- 1) System Efficiency of Accelerator Concepts (N.Catalan Lasheras, CERN)
- 2) Key Technologies and Components for High Efficiency (C.Martins ESS)
- 3) Cross Linking Accelerator R&D with Industrial Approaches (P.Spiller GSI)
- 4) Ecological Concepts (D. Voelker DESY)

task 2: High Efficiency Klystron (O.Brunner CERN, THALES, ULANC)

- deliverable: industrial prototype
- replacing klystrons in LHC

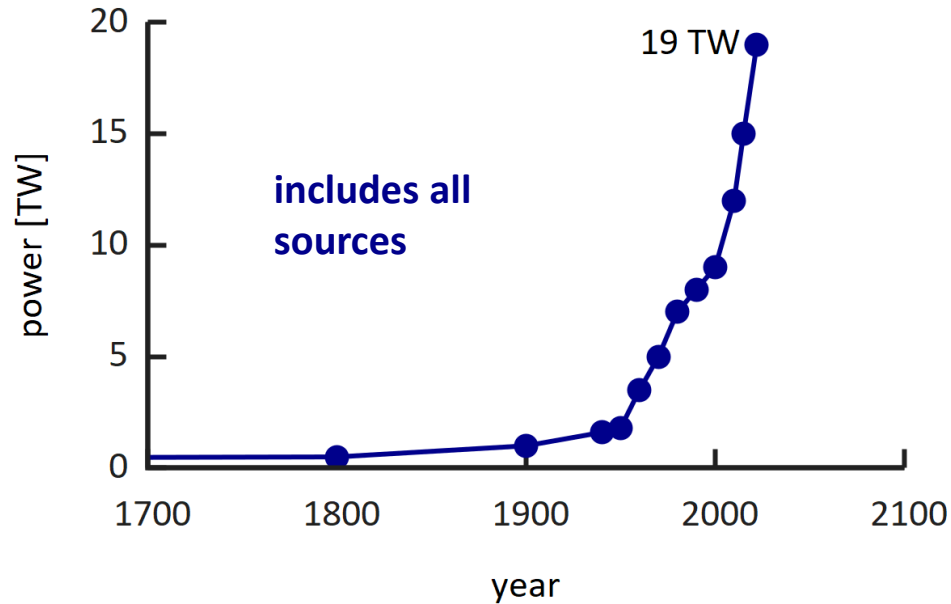
task 3: Permanent Combined Function Magnets for Light Sources (B.Shepherd, UKRI, DLS, KYMA, DESY)

- deliverable: magnet prototype, applicable for Diamond upgrade, PETRA-4
- several advantages of permanent magnets, not just power consumption

Website with links to
all workshops/docs:

www.psi.ch/scat

Energy Consumption - Motivation

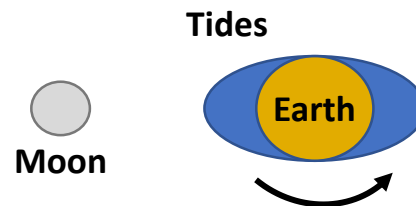


The world energy consumption has been continuously rising, reaching **19 TW** today, 2022.

As a science community we rather want to contribute to solutions and not be part of the problem.

example from nature:
the Earth-Moon system dissipates **3.8 TW** power from the rotation energy of earth

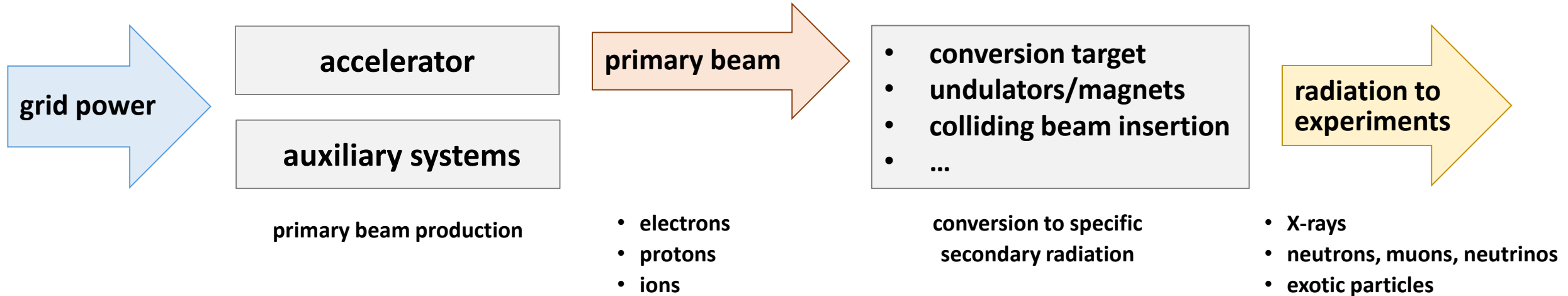
[Williams, Boggs, 2016]



School Strike
for Climate
Wikipedia



Accelerator driven Research Infrastructures (RI)

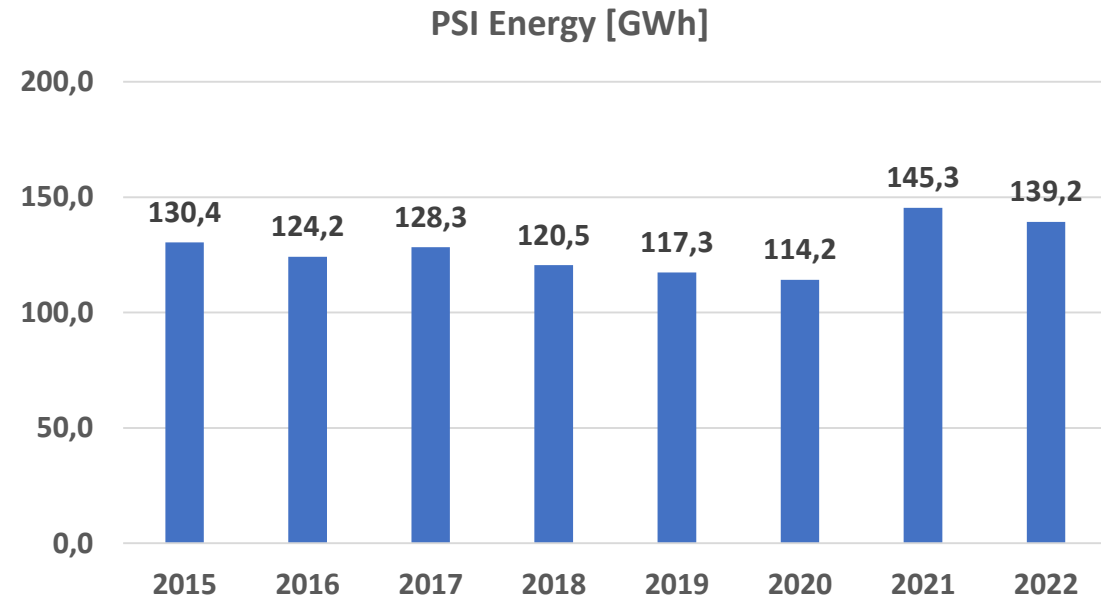


high level goal:

Science output per grid power, per operating/investment cost.

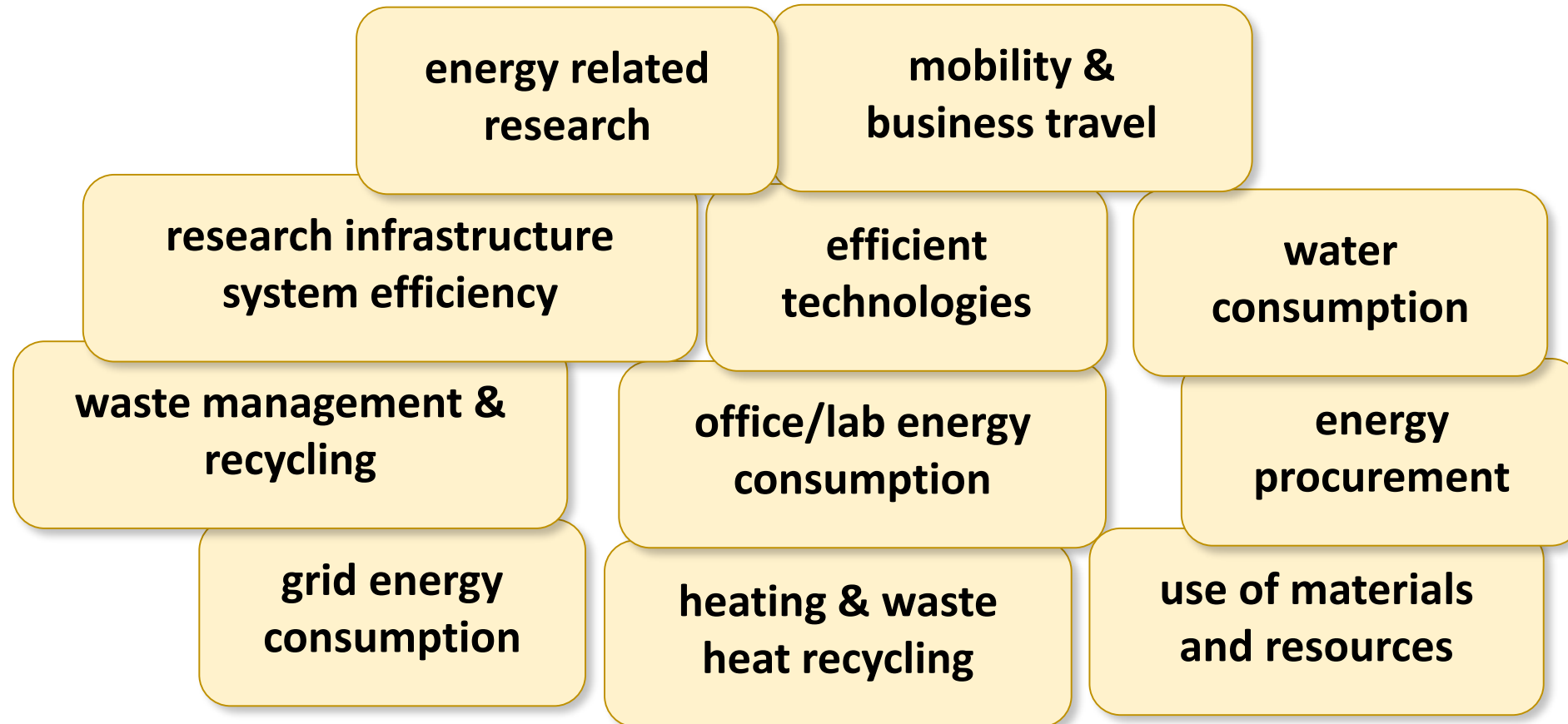
Grid Energy Consumption of RI's

European RI	per year
CERN	1300 GWh
ESS (S)	280 GWh
DESY (D)	175 GWh
PSI (CH)	140 GWh
ISIS (UK)	70 GWh

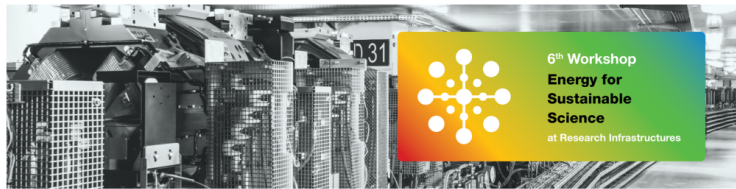


PSI peak power: 22.5 MW

Categories of Sustainability for RI's



Energy for sustainable science – workshop at ESRF Sep 2022



history of workshops:

- 2011: ESS/Lund
- 2013: CERN Switzerland
- 2015: DESY Germany
- 2017: ELI-NP, Romania
- 2019: PSI, Switzerland
- 2022: ESRF, Grenoble

Sep 29 – 30, 2022
ESRF, Grenoble
Europe/Paris timezone

REGISTRATION OPEN

Enter your search term

Overview

Committees

Timetable

Registration Instructions
PLEASE READ!

ESRF Registration Form

Fees & Payment information

Facility Tours

Practical Information

Participant List

Contact

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Dwindling resources together with rising energy costs and climate change are all challenges faced by the next generation of large-scale research infrastructures. Indeed, the enhanced performance of proposed new facilities often comes with anticipated increased power consumption. Sustainable developments at research infrastructures will rely on mid- and long-term strategies for reliable, affordable and carbon-neutral energy supplies.

The ESRF (European Synchrotron Radiation Facility) is pleased to host the **Sixth Workshop on Energy for Sustainable Science at Research Infrastructures on 29th and 30th September 2022** in Grenoble, France in collaboration with:

- CERN (European Organisation for Nuclear Research)
- ESS (European Spallation Source)
- DESY (Deutsches Elektronen-Synchrotron)
- PSI (Paul Scherrer Institut)
- ERF (European Association of National Research Facilities)

The workshop is supported by I.FAST (Innovation Fostering in Accelerator Science and Technology). It will be held in person on the EPS Campus site (sanitary crisis permitting).

ESSRI 2022 will bring together international sustainability experts, stakeholders and representatives from research facilities and future research infrastructure projects worldwide, with the purpose of identifying the challenges, best practices and policies to develop and implement sustainable solutions at research infrastructures. This includes the increase of energy efficiencies, energy system optimizations, storage and savings, implementation and management issues as well as the review of challenges represented by potential future technological solutions and the tools for effective collaboration.

The workshop series 'Energy for Sustainable Science at Research Infrastructures' is a biannual event organised by CERN, ERF and ESS in various locations. Exceptionally, the sixth edition of the series has been selected as one of the key events of 'Grenoble: European Green Capital 2022' to enhance Grenoble's engagement in sustainability.

The first ESSRI workshop was held at ESS, Sweden on 13-14 October 2011, the second at CERN, Switzerland on 23-25 October 2013, the third at DESY, Germany on 29-30 October 2015, the fourth at ELI-NP, Romania on 23-24 November 2017 and the fifth one at PSI, Switzerland on 28-29 November 2019.

Starts Sep 29, 2022, 8:00 AM
Ends Sep 30, 2022, 5:00 PM
Europe/Paris

ESRF, Grenoble
Auditorium
71 Avenue des Martyrs
Grenoble, France
Go to map

EPN Campus map
Hotels_Grenoble.pdf
Travelling to EPN Campus

Registration
Registration for this event is currently open.

Register now



<https://indico.esrf.fr/event/2/>

101 participants, 32 presentations

Community Activities on Sustainability

2014-17: EUCARD-2, WP Energy Efficient Accelerator Technologies

<https://www.psi.ch/enefficient>

2017-21: ARIES, Work Package Efficient Energy Management

<https://www.psi.ch/aries-eem>

2021-25: I.FAST, Work Package Sustainable Concepts

<https://www.psi.ch/scat>



Enhanced European Coordination for Accelerator
Research & Development

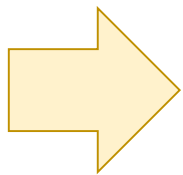


ACCELERATOR RESEARCH AND
INNOVATION FOR EUROPEAN
SCIENCE AND SOCIETY



Innovation Fostering in Accelerator Science
and Technology

→ consult websites for link collection to workshops and documentation



- ICFA panel on sustainable accelerators, chair: Thomas Roser (BNL)
- <https://icfa.hep.net/icfa-panel-on-sustainable-accelerators-and-colliders/>

Workshop on Critical Materials and Life Cycle Management

DESY, Hamburg, February 6-8

organized by D.Völker, A.Klumpp et al

Enjoy the program, use the opportunities for networking and exchange.
It is meant to be a workshop, not a conference!