



# CERN efforts towards Sustainable Accelerators

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# Environmental protection : integral part of CERN Objectives

One of the main objectives of the CERN Directorate for the years 2021-2025.

*CERN aims to establish itself as a model for a transparent and **environmentally responsible research organisation***

*-> strong and proactive commitment to environmental protection, along 3 lines:*

- ***Minimise the Laboratory's impact on the environment***
- *Pursue actions and technologies aiming at **energy saving and reuse***
- ***Identify and develop CERN technologies** that may contribute to mitigate the impact of society on the environment.*

**Environment and sustainability** are crucial aspects of projects and activities in the HEP field.

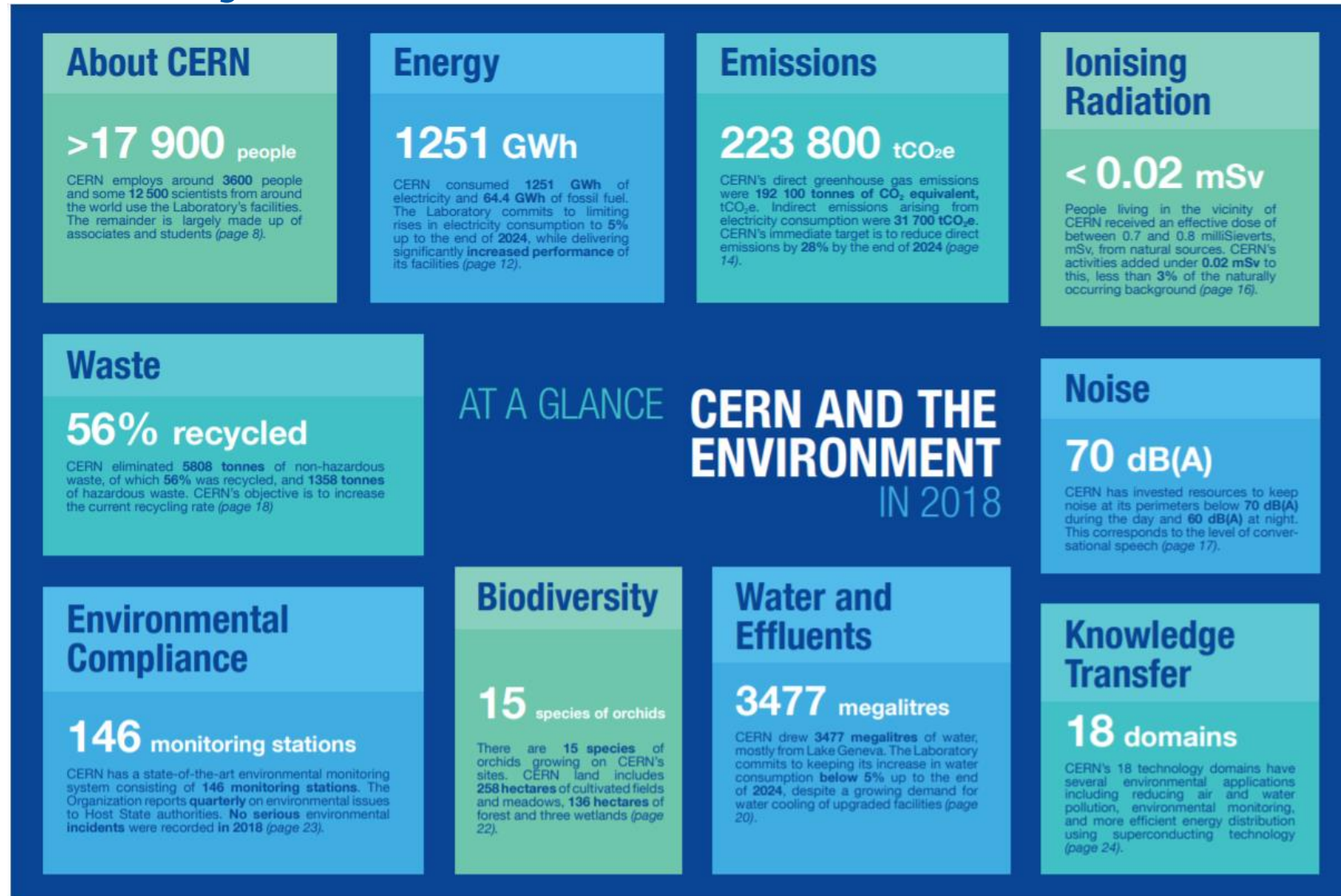


# Current environmental objectives

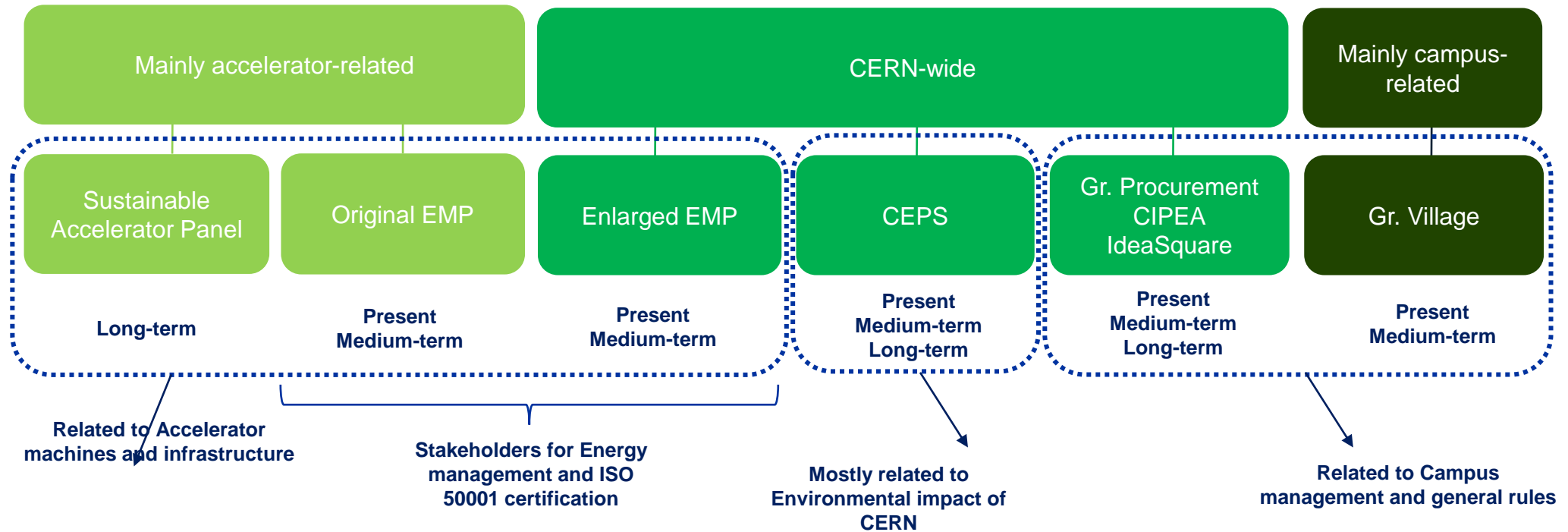
Priorities are defined taking into account the 17 UN Sustainable development goals.

Most relevant in progress are:

- reducing emissions of fluorinated gases from Large Experiments
- limiting the electrical power consumption
- limiting the water consumption
- reducing the impact of effluent water on receiving watercourses

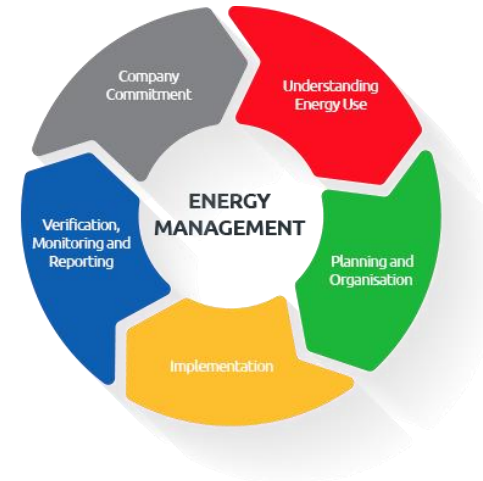


# CERN panels acting on various aspects of sustainability:



# Main Activities

- **Energy management:**
  - weekly follow-up of consumption and forecasts
  - Long term planning of CERN Energy procurement strategy
  - Follow-up of ISO 50001 KPIs
  - Identification of opportunities for optimisation
- **CEPS (Environment)**
  - Management of effluents from site (water, gas...)
  - Mobility, procurement and food
  - Local environmental impact
    - hazardous substances
    - Biodiversity
    - Noise
    - Conventional and Radioactive waste
  - Sponsoring of new projects to take up on opportunities (e.g. waste heat recovery)
  - Coordination of the editing of the CERN Environmental report (evolving towards a sustainability report in 2025).



# Main Activities

- **Green Village**
  - CERN campus as a testbed for new ideas:
    - Smart energy management
    - Improved waste management
    - Improved mobility (green & smart)
    - <https://sce-dep.web.cern.ch/cern-green-village>
- **CIPEA**
  - Leverage CERN's Innovation potential to society
  - Identifies and funds CERN technologies towards an application towards non-accelerator uses
  - <https://kt.cern/environment/CIPEA>
- **Environmentally Responsible Procurement Policy**
  - Setting up a new policy for responsible procurement based on ISO20400:2017
  - Expected to be released progressively (pilot projects first)
  - Will encourage CERN suppliers to improve their products/processes, CERN people to think in advance.

# • Sustainable Accelerators Panel

- Liaise with **future accelerator projects** to develop full lifecycle sustainability as a key consideration at the project inception phase.
  - This should include high-level energy management scenarios.
  - Consider the issue of waste management along the lifecycle at future accelerators; also consider end-of-life dismantling.
  - Identify and quantify the potential of **energy efficient accelerator technology** for use in present and future accelerators.
  - Evaluate the potential impact of **accelerator design and novel accelerator concepts** in present and future machines and initiate studies where appropriate.
  - Explore the use of sustainable materials and components in accelerator construction and evaluate the impact of adhering to international standards in sustainable procurement.

# • Sustainable Accelerators Panel

- **Applications**

- Identify innovative accelerator technology with the potential for use in such applications as power/energy distribution and energy storage.
- Where appropriate, support exchange with external partners to leverage use of in-house technology in a sustainability context.

- **Disseminate**

- Collate and publicize CERN's efforts in the sustainable accelerator technology domain; publicize CERN's efforts and track developments at sustainability related conferences and workshops.



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- **Collaborate**
  - Monitor and support exchange with partners engaged in alternative forms of energy generation (e.g. ITER, MYRRHA).
  - Explore and exploit where appropriate links into external programmes such as Horizon.
- Overall, act as **forum and focal point** for the diverse efforts in accelerator sustainability at CERN and provide a contact point for interaction with external partners.

The work of the panel is parallel with the ongoing efforts of EMP and Energy Coordination, close communication should be ensured by membership. Given the domains of interest indicated above, the panel is ATS centric and reports to the ATS director.

# GOALS FOR 2023

- **Understand the needs of Studies for future projects**
  - **What is required to prepare an input for the next European Strategy**
  - What topics to be studied in common, taking into account the different level of maturity.
  - Is there work necessary that is not being done by any of them?
- **Make an inventory of efforts ongoing in the ATS sector**
  - Known are High efficiency Klystrons, HTS and permanent magnets
  - Consolidation projects
  - Energy management strategy
  - Lifecycle assessment of equipment

# GOALS FOR 2023

- **Identify other technologies to be supported**
  - Energy Storage
  - ...
- **It is not forbidden to look at what else we can do today**
  - Will remain open to bottom-up ideas

# Medium-Long term goals

- **Help Studies to critically review and harmonise their input to the next European Strategy**
  - Eventually also for other processes, such as Snowmass
- **Prepare a communication strategy to communicate at technical level (conferences, events...) CERN's effort**
- **Participate to communicate to the public (with HSE and IR) .**
  - Participate to the sustainability report in 2025
- **Coordinate collaborations in sustainability with other laboratories.**

# Resources and Organisation

- **The panel has no other resources than your commitment**
  - Resources for projects are in Studies, operation etc...
  - We will support the decision process at ATS management level, but the decision is with the studies and the management.
  - We will push for funds to R&D projects if we are convinced they are promising
- **Meetings every month for the time being**
  - One slot for Studies: expectations and reports on ongoing activities
  - One slot for equipment groups
  - One slot for bottom-up ideas
- **Personal initiatives and proposals are welcome!**



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