



**CIPEA**

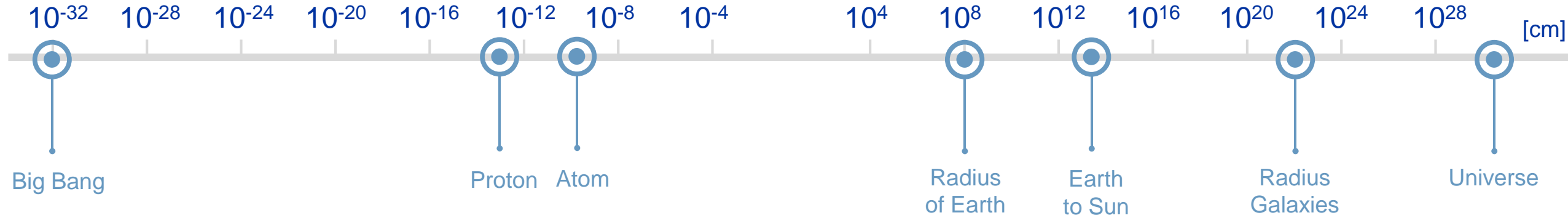
CERN Innovation Programme  
*on Environmental Applications*

# CERN Innovation Programme on Environmental Applications

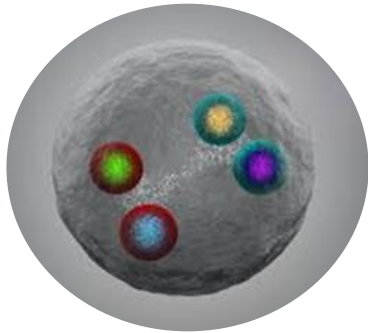
Enrico Chesta

08/03/2022

# The Question



CERN can help to explore the secrets of matter



CERN can help to understand the mysteries of the universe

Can CERN help to tackle climate and environmental issues on a global scale?

# The Answer



**CIPEA**

CERN Innovation Programme  
on Environmental Applications

## **Harnessing CERN's unique skillset to help preserve the planet**

- Initiative endorsed by the Director General and the Enlarged Directorate in January 2022
- Supported by HSE in the frame of CERN's Year of Environmental Awareness
- Coordinated by the Knowledge Transfer group to maximise positive impact on society

**Entirely based on the ingenuity and expertise of CERN technical departments and community**

# Environment: a clear priority at international level

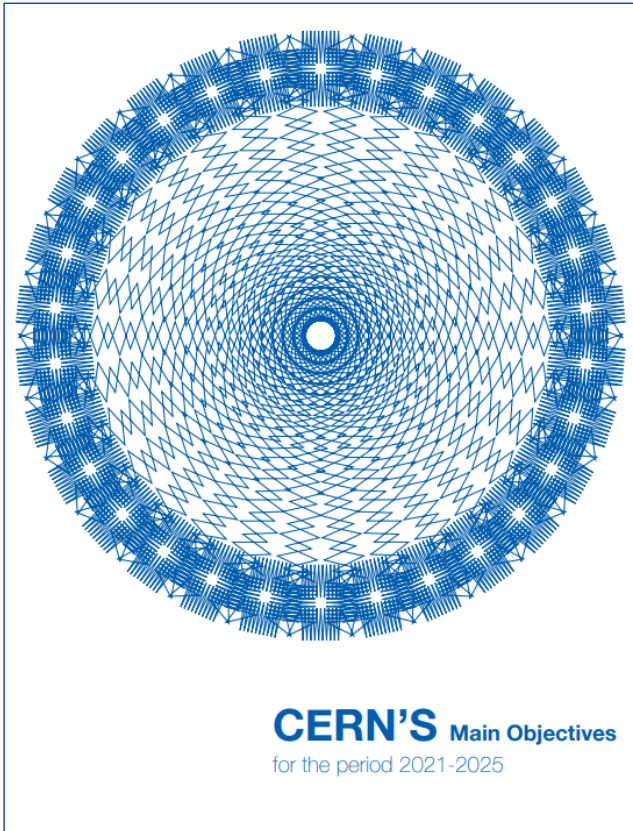
- The latest UN reports are very worrying: climate change threat cannot be ignored
- Important resources are being invested at every level to support the ecological transition
- New disruptive technologies for the environment are being developed at a fast pace



Source: <https://euinasean.eu/eu-green-deal/>

# Environment: a clear priority for CERN

Three main development directions have been identified for environment and sustainability:



Minimise the Laboratory's impact on the environment by implementing CEPS (CERN Environmental Protection Steering) recommendations and defining a Green Procurement strategy

Identify and develop CERN's technologies that may contribute to mitigating the impact of society on the environment



Pursue actions and technologies aiming at energy saving and reuse, under the supervision of CERN's Energy Management Panel

# Environmental Applications: Key Areas for CERN

## RENEWABLE AND LOW-CARBON ENERGY

Production  
Transformation  
Distribution  
Storage



## CLEAN TRANSPORTATION AND FUTURE MOBILITY

Aviation  
Shipping  
Rail  
Automotive



### CERN KNOWHOW

Superconductivity  
High Field Magnets  
High Vacuum  
Cryogenics  
Materials  
Artificial Intelligence  
Advanced Sensors  
Rad-Tol Systems  
Thermal Control  
Radioprotection  
...

## SUSTAINABILITY AND GREEN SCIENCE

Power Management  
Heat Management  
Industrial Processes

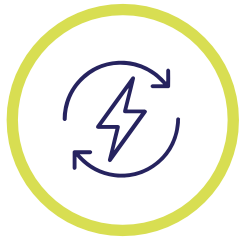


## CLIMATE CHANGE AND POLLUTION CONTROL

Monitoring  
Modelling  
Mitigation



# CERN Environmental Applications: Examples



## RENEWABLE AND LOW-CARBON ENERGY

- Technologies for green hydrogen production, transport and storage
- High performance solar thermal or photovoltaic panels
- Superconducting links for high current transmission with minimal losses
- Compact nuclear reactors or fusion systems based on HFM



## CLEAN TRANSPORTATION AND FUTURE MOBILITY

- Advanced power distribution systems for future electric/hybrid planes
- Decarbonized or low emission maritime vessels
- Hydrogen tanks and fuel cells for long-haul trucks or small planes
- High speed levitating rail systems in partly evacuated tubes



## CLIMATE CHANGE AND POLLUTION CONTROL

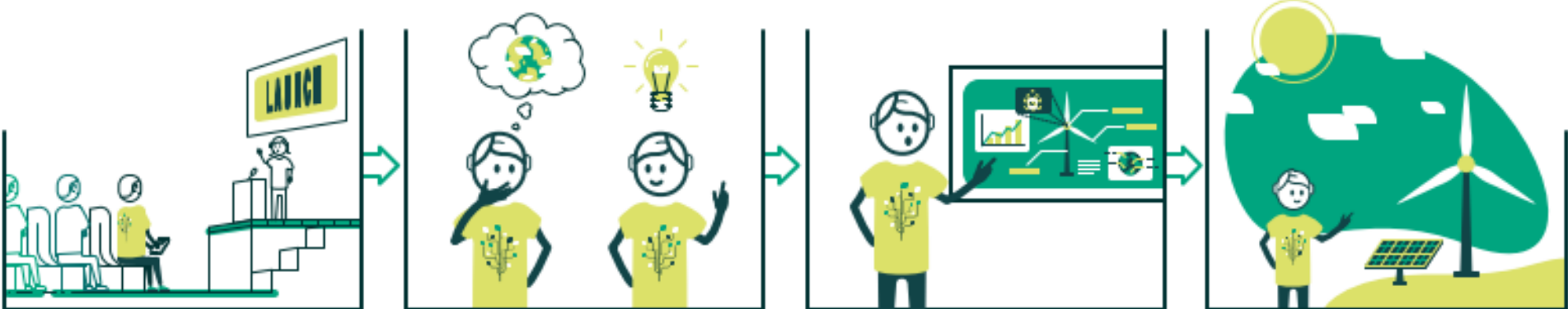
- Distributed sensors for ground/air monitoring of physical parameters
- Instruments and technologies for remote sensing and Earth observation
- Artificial Intelligence and big data expertise for digital twin modelling
- Accelerator systems applied to exhaust gas treatments



## SUSTAINABILITY AND GREEN SCIENCE

- Advanced cooling systems based on CO<sub>2</sub> to reduce F-gases emissions
- Fast computing power saving techniques based on machine learning
- Systems to remove residuals of anti scaling and bacteria treatments
- Infrastructure operation optimisation based on motor sensors

# CIPEA: the way to achieve positive impact



**LAUNCH**  
Find out how to take part

**IDEATION**  
Imagine how your work can help the environment

**PITCHING**  
Present your idea to the CERN Management and experts in innovation

**IMPLEMENTATION**  
Get support and build a project around your idea



# CIPEA: practical information and timeline

## IDEATION

March-May 2022

- Brainstorming phase over 3 months to collect ideas for feasibility assessment
- Submit your project/idea before 27/05/2022
- Required elements:
  - Contact details of project proponent (individual or team involving CERN MPs)
  - CERN technology/facility/expertise on which the project is based
  - Target environmental area of application and key addressed challenge
  - Short project description with rough estimation of required resources

## PITCHING

June 2022

CERN Innovation Day on Environmental Applications - sharing, discussing and prioritising collected ideas/projects

## IMPLEMENTATION

Starts in July 2022

- Support strategies will be defined for the most promising projects
- Options include:
  - Use of internal instruments like the KT Fund or the Impact Fund
  - Establishment of bilateral partnerships with external organisations
  - Coordination or participation to EU or national projects
- A KT Fund session with focus on environmental projects will be organised in September

**KT team will be available during every phase to advise and support!**



**Please get involved: your contribution makes the difference!**

<https://kt.cern/environment/CIPEA>