Towards a pan-European Research Infrastructure
as a multinational venture

SEEIIST

South East European International Institute for Sustainable Technologies

https://seeiist.eu

Dr. Sanja Damjanovic
Minister of Science of Montenegro
Chairperson of the SEEIIST Steering Committee

Upcoming opportunities for cancer therapy and research with ion beams

indico.cern.ch
Special event
6 November
2020

South East European International Institute for Sustainable Technologies (SEEIIST) in the spirit of ‘Science for Peace’

Former DG of CERN, Prof. Herwig Schopper

Initiative for such an institute originally taken by Prof. Herwig Schopper, a former Director General of CERN, at a Meeting of the World Academy of Arts and Sciences in Dubrovnik at the end of 2016

First official support of such an initiative by the Government of Montenegro in March 2017
Open Letter by the Prime Minister Duško Marković

Prime Minister of Montenegro, Duško Marković

fast positive reception by a number of organizations and institutions

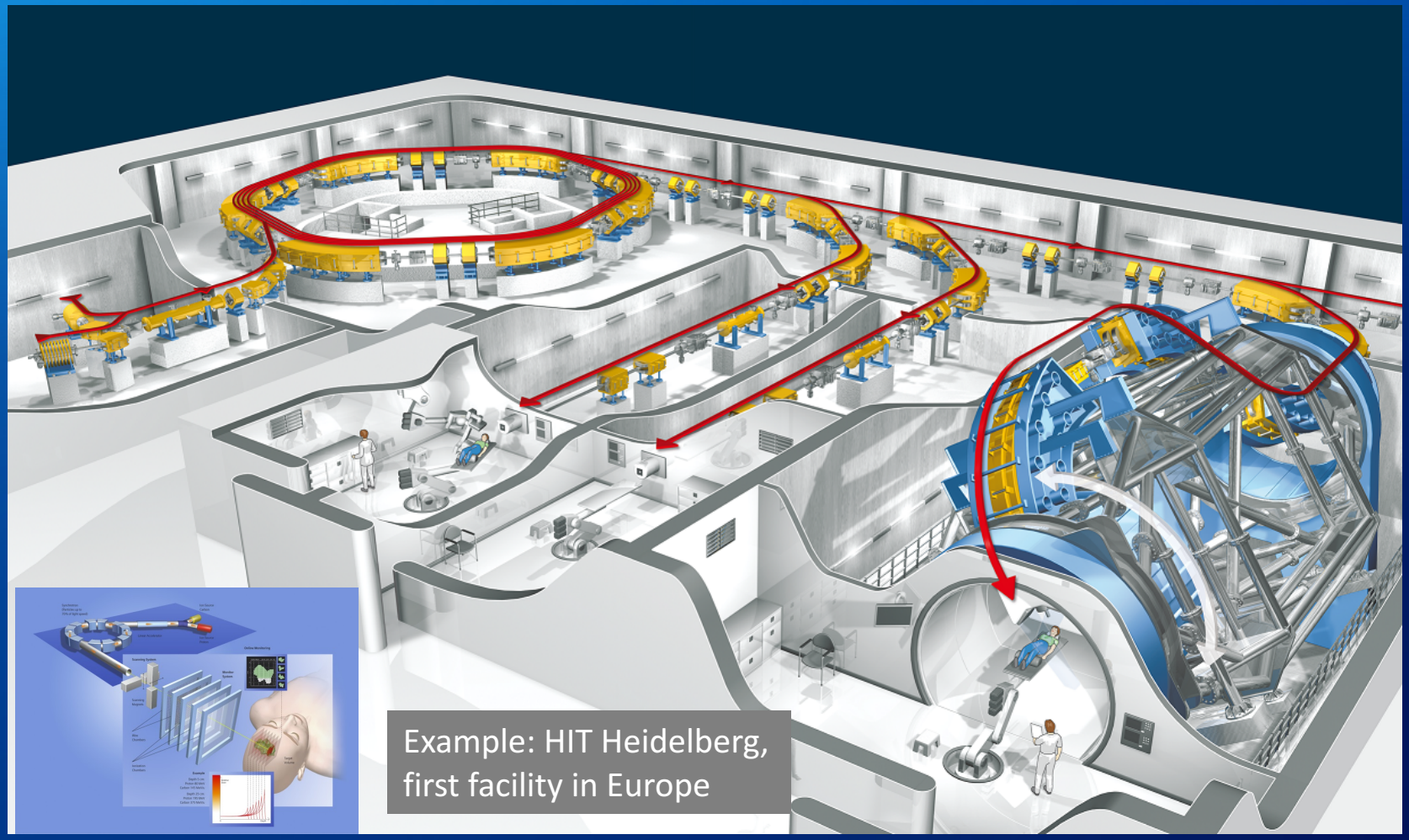
The Mission of the SEEIIST Project

Create Regional Center of Scientific Excellence with 'first class research'

- To promote collaboration between science, technology and industry
  (technology transfer)
- To provide platform for improved education of young scientists and engineers
  (knowledge transfer)
- To slow down brain drain or even to revert it
- Recover the great tradition in technology which SEE had in the past
- Foster cooperation between countries in the region

These goals can only be achieved with a Large Scale Facility based on the latest technologies

SEEIIST: Facility for Tumour Therapy and Biomedical Research with protons and heavier ions



Example: HIT Heidelberg, first facility in Europe

About 500 patients per year to be treated as needed for a population of 20M.

In parallel, 50% of the beam time dedicated to biomedical research with multi-ion sources from H to Ne, making the SEEIIST project unique in the world

Capacity for about 1000 researchers, including a major number from Western Europe.

The Pan-European Dimensions: SEEIIST Cancer Therapy Research Infrastructure Brings an Added Value for Europe

Fighting against cancer

Nuclear medicine as crucial component of future personalised cancer care

Develop advanced cancer therapy with ion beams and isotopes

Two Strategic Objectives – One initiative

Building international cooperation and scientific capacity in South East Europe

Advance European integration, reverse brain drain, connect to Europe

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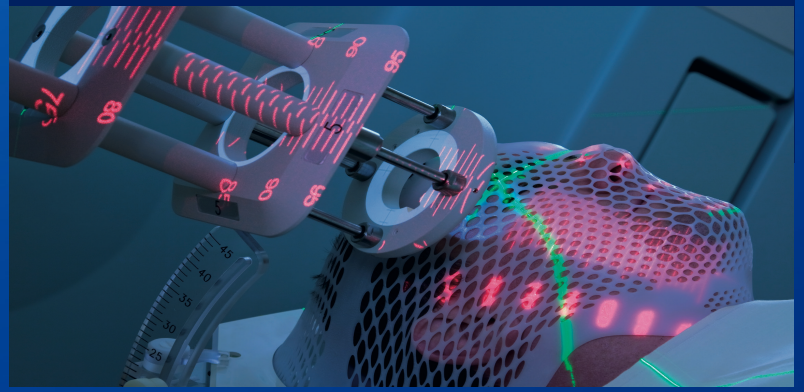
Comprehensive Dimension: both Cancer Therapy and Research Center with 50% of the beam time dedicated to research – other Unique Selling Points

MULTI-DISCIPLINARY RESEARCH WITH HEAVY IONS

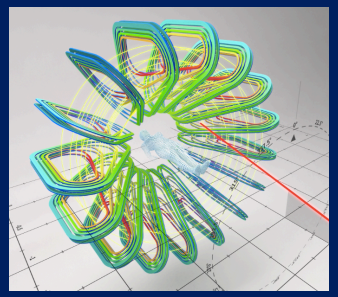
- Pre-clinical (medical, radiobiology)
- Clinical, including clinical trials
- Industrial research (microelectronics)
- Material research
- Ultra-high dose rates (FLASH)

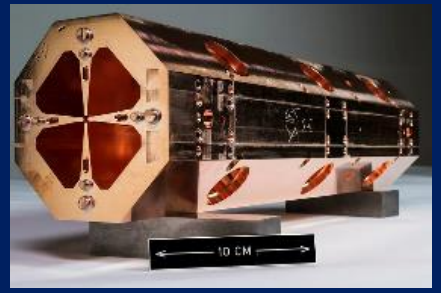


Cutting-edge innovative and novel research in any of these topics driven by novel technological opportunities
Complementary to all existing facilities

BREAKTHROUGH IN TECHNOLOGY

- Multi-ion synchrotron (beyond presently used p and C-ions)
- More compact and much cheaper Superconducting synchrotron
- Superconducting gantry
- Higher beam intensity, faster extraction; Real time imaging





Will make cancer treatment with ions accessible to a large fraction of the European population and bring back Europe the lead position in this field

SCIENCE DIPLOMACY

- Declaration of Intent signed at CERN in October 2017 by 8 SEE countries
- MoC signed by 6 Prime Ministers of the SEE Region in July 2019, at the Summit of Berlin Process, Poznan
- Political support by the Swiss Government to establish SD roadmap

With the strong supporting consortium of 18 European research centers and clinics the SEE region is trying to revive its technological tradition

Political steps taken so far

Declaration of Intent signed at CERN on October 25, 2017

Ministers of Science/corresponding Ministers or their representatives from the SEE Region

Memorandum of Cooperation signed by six Prime Ministers of the SEE Region

Signature of Memorandum on 5 July 2019 in Poznan, Poland at the occasion of the 6th Summit of the Berlin Process

Prime Ministers of the SEE Region

Candidate Members for the South-East European International Institute for Sustainable Technologies

Republic of Albania

Bosnia and Herzegovina

Republic of Bulgaria

Republic of Croatia

Hellenic Republic

Kosovo*

Montenegro

North Macedonia

Republic of Serbia

Republic of Slovenia

Signed a Declaration of Intent

Agreed 'ad referendum'

Observer

* This designation is without prejudice to positions on status and is in line with UNSC 1244/1999 and the ICJ option on the Kosovo Declaration of Independence

Important political and scientific support for SEEIIST

❖ European Commission – Directorate General for Research and Innovation (EC DG-RTD)

- Strong recognition of the Project by the European Commission (DG RTD)
- First direct financial support of 1 MEUR for the 1st stage of Design Phase
- Additional 5 MEUR via a competitive Call EU-H2020 INFRAIA

❖ CERN – European Organization for Nuclear Research

- Hosts the Working Group on the Accelerator Design
- Great benefit from long experience in the design of medical accelerators

❖ GSI-FAIR – Facility for Antiproton and Ion Research

- Hosts the Working Group on R&D and Scientific Aspects
- Great benefit from long experience in Bio- and Medical Physics

❖ IAEA – International Atomic Energy Agency

- Support by the IAEA for the Capacity building program (0.5 MEUR)

Important political and scientific support for SEEIIST

European Commission – Directorate General for Research and Innovation (DG-RTD) and Directorate General for Neighbourhood and Enlargement Negotiations (DG NEAR)

- SEEIIST is part of the Economic Investment Plan for Western Balkans
- SEEIIST is the only Research Infrastructure part of the Economic Investment Plan for Western Balkans via the Innovation Agenda

Swiss Federal Department of Foreign Affairs (FDFA)

- The Swiss Government has offered political support to develop a Science Diplomacy Roadmap for SEEIIST
- The FDFA will support SEEIIST to develop a long-term legal entity for SEEIIST and will also patronize the process of the final site selection for the Institute

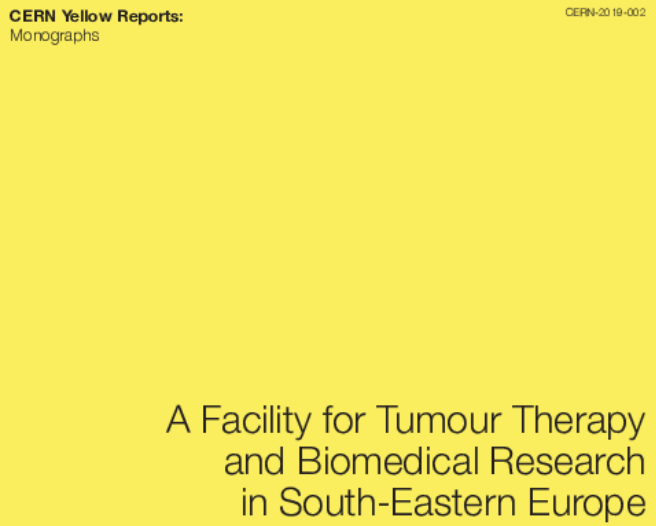
Concept Study of the SEEIIST worked out over the year 2017

Forum held at the ICTP/Trieste on 25-26 January 2018

Scientific Concept Studies presented for the first time to the public

More that 100 participants including 40 Users from the Region

Representatives from the EC, ESFRI, IAEA, EPS, RCC, CERN, FAIR-GSI, HIT, CNAO, DESY, SESAME….



The SEEIIST Concept Study is available in the form of a CERN Yellow Report

DOI: https://doi.org/10.23731/CYRM-2019-002

SEEIIST@ESFRI Roadmap – application submitted

SEEIIST: New Research Infrastructure on Health
Single-sited with many satellite Hubs

SEEIIST application to enter the ESFRI Roadmap of future Research Infrastructure of European relevance based on 350 pages document

ESFRI

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Pan-European dimension of the **SEEIIST** Research Infrastructure and its alignment with the **EC Policy:** Green Deal & Horizon Europe Cancer Research Mission

PART A:
GENERAL INFORMATION

PART B:
SCIENTIFIC CASE

PART C:
IMPLEMENTATION CASE

Political support - Lead country/entity

Country/Entity Type: MS/AC Countries
Country/Entity: Montenegro
National Ministry/Council of the Entity: Ministry of Science

Political support: prospective member country/entity

Country/Entity Type: MS/AC Countries
Country/Entity: Albania
National Ministry/Council of the Entity: Ministry of Education, Sports and Youth

Country/Entity Type: MS/AC Countries
Country/Entity: Bosnia and Herzegovina
National Ministry/Council of the Entity: Ministry of Civil Affairs

Country/Entity Type: MS/AC Countries
Country/Entity: Bulgaria
National Ministry/Council of the Entity: Ministry of Education and Science

Country/Entity Type: EIRO Forum
Country/Entity: CERN – European Organization for Nuclear Research
National Ministry/Council of the Entity: Director General of CERN

Country/Entity Type: MS/AC Countries
Country/Entity: Croatia
National Ministry/Council of the Entity: Ministry of Science and Education

Country/Entity Type: Other Entity
Country Entity: Hungary
National Ministry/Council of the Entity: Nuclear Research Development and Innovation Office – NRDIO

Country/Entity Type: Third Countries
Country/Entity: Kosovo
National Ministry: Ministry of Education and Science

Country/Entity Type: MS/AC Countries
Country/Entity: North Macedonia
National Ministry/Council of the Entity: Ministry of Healt

Country/Entity Type: MS/AC Countries
Country/Entity: Switzerland
National Ministry/Council of the Entity: State Secretary for Education, Research and Innovation – SERI

Country/Entity Type: Other Entity
Country/Entity: Test Infrastructures and Accelerator Research Area (TIARA)
National Ministry/Council of the Entity TIARA Council

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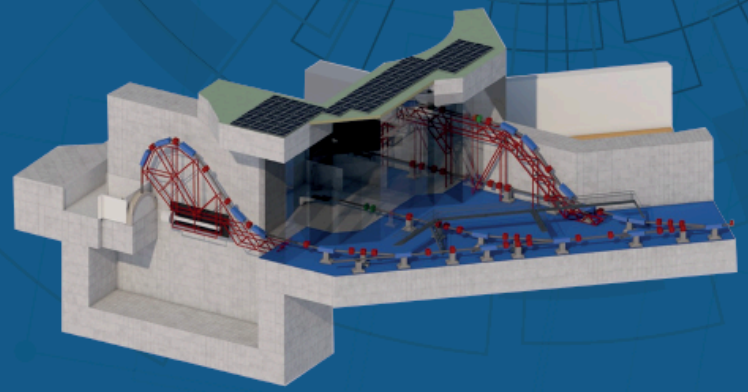

ANNEX 3

pre-TECHNICAL DESIGN REPORT
(pre-TDR)

An Accelerator-based Research Infrastructure for Cancer Therapy and Biomedical Sciences with Ion Beams

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ANNEX 4

BUSINESS PLAN

Time line for the SEEIIST Project

2017-2018:
Concept Studies

2019:
- Design Study Phase Started

2020/21:
- Applied for H2020-INFRAIA
- Applied for the ESFRI Roadmap
- Selection of the site

2023:
Start construction of the Facility

2028:
First patient treatments

Green concept for the SEEIIST project

SEEIIST
First Green Particle Cancer Therapy and Research

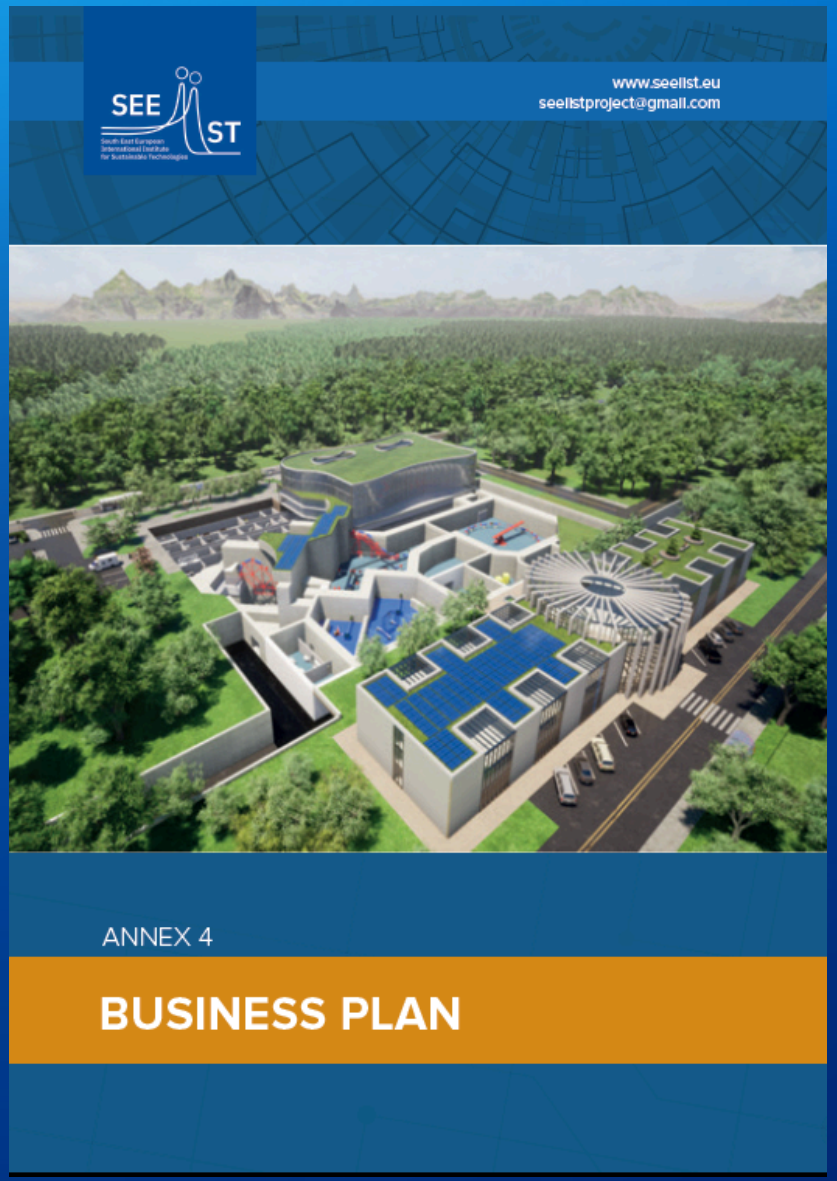
First Green Infrastructure in-line with #HorizonEurope Cancer Mission

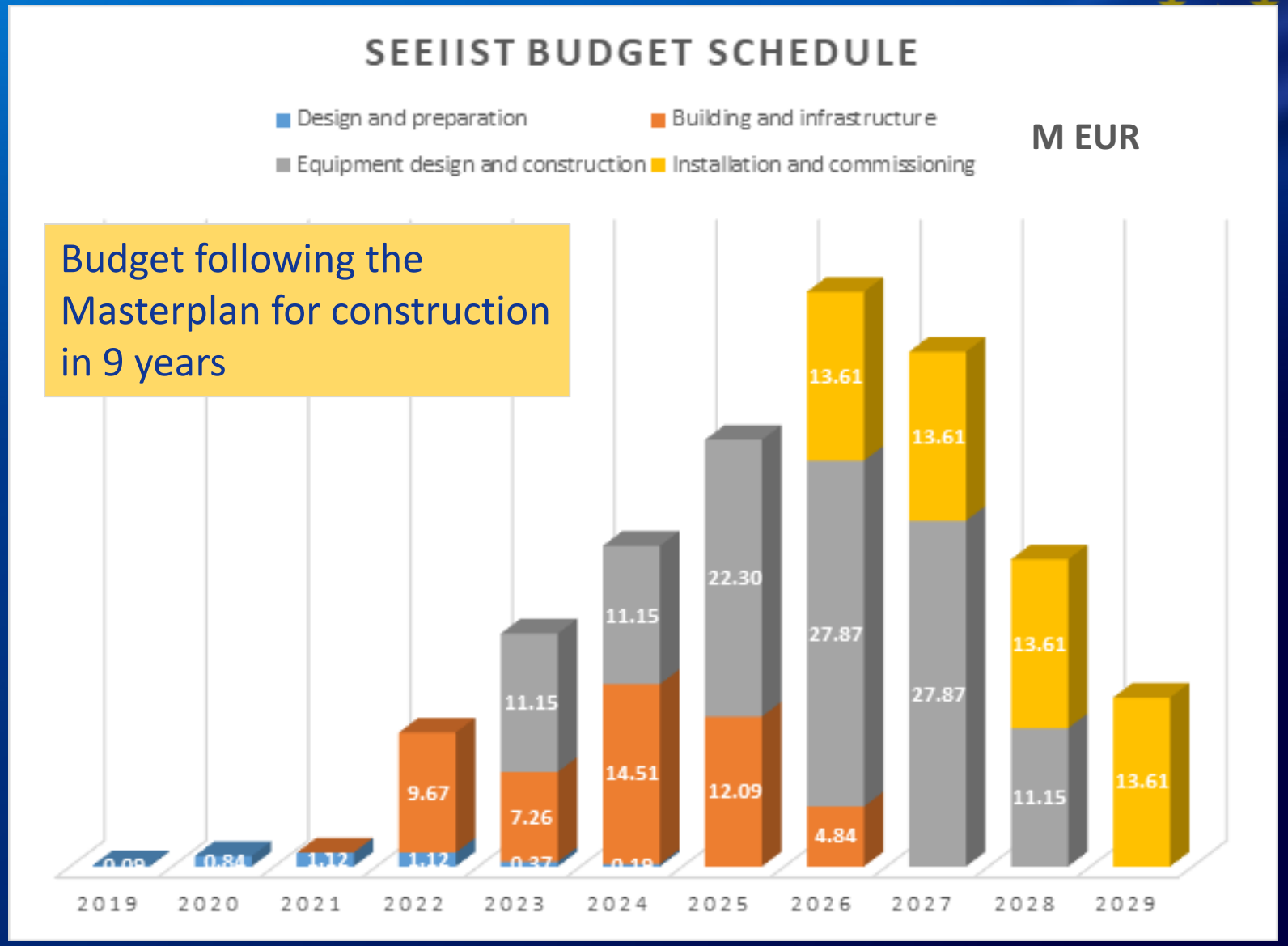
SEEIIST virtual center

For SEEIIST up to 240 MEUR required, guaranteeing competitivity in Europe. Multiple sources of financing necessary: EU Structural and cohesion funds, IPA funds, some contributions from member-states, other investment funds

SEEIIST plans and costs

ESFRI





SEEIIST – First Green Infrastructure in line with the Horizon Europe Cancer Mission