

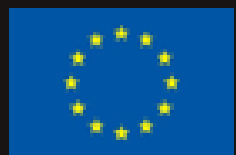
EUROPEAN
PLASMA RESEARCH
ACCELERATOR WITH
EXCELLENCE IN
APPLICATIONS



WP.4 Legal Framework, Financial Model & Socio-Economic Impact

Antonio Falone | INFN-LNF

EuPRAXIA General Meeting 22/09/2026



Funded by
the European Union

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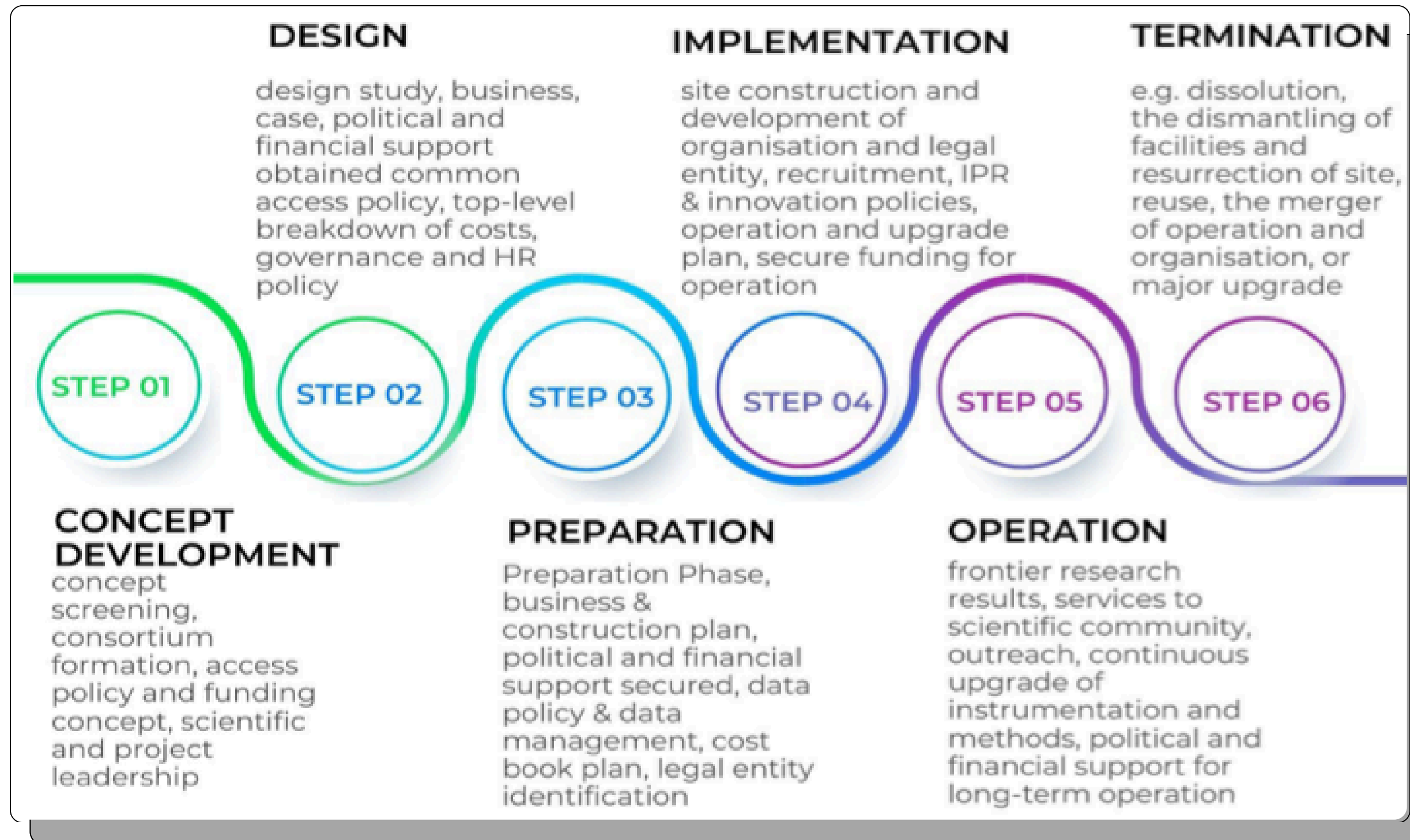
- EuPRAXIA – general perspective
 - EuPRAXIA Program evolution.
 - Roadmap to user facility

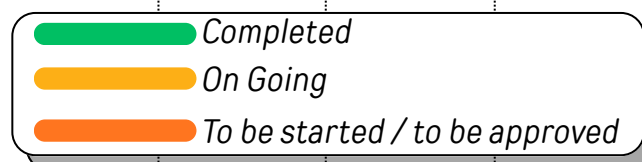
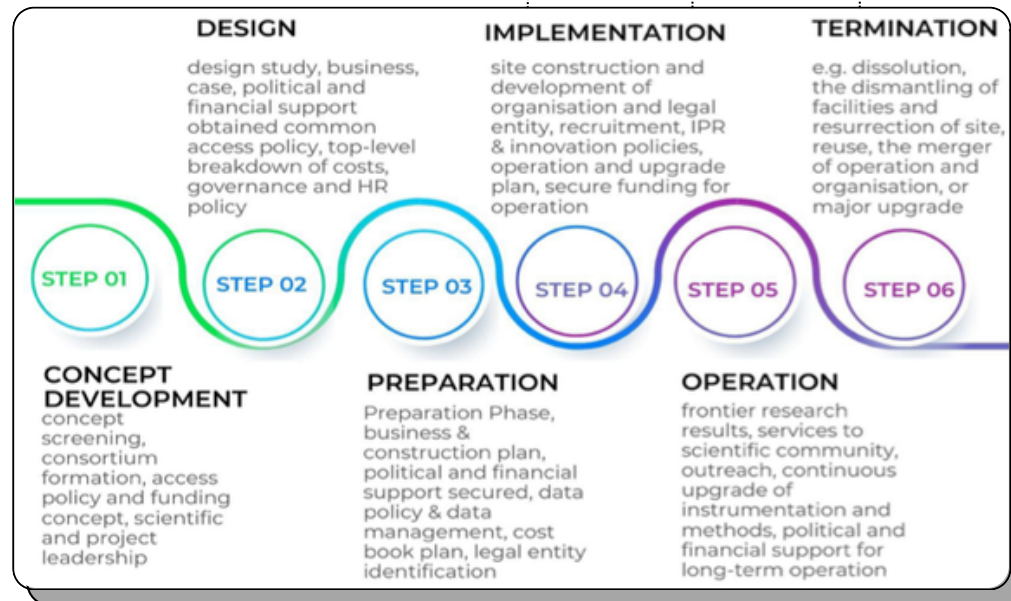
- WP.4 – Final summary
 - Legal Framework
 - Financial Model
 - Socio-Economic Impact

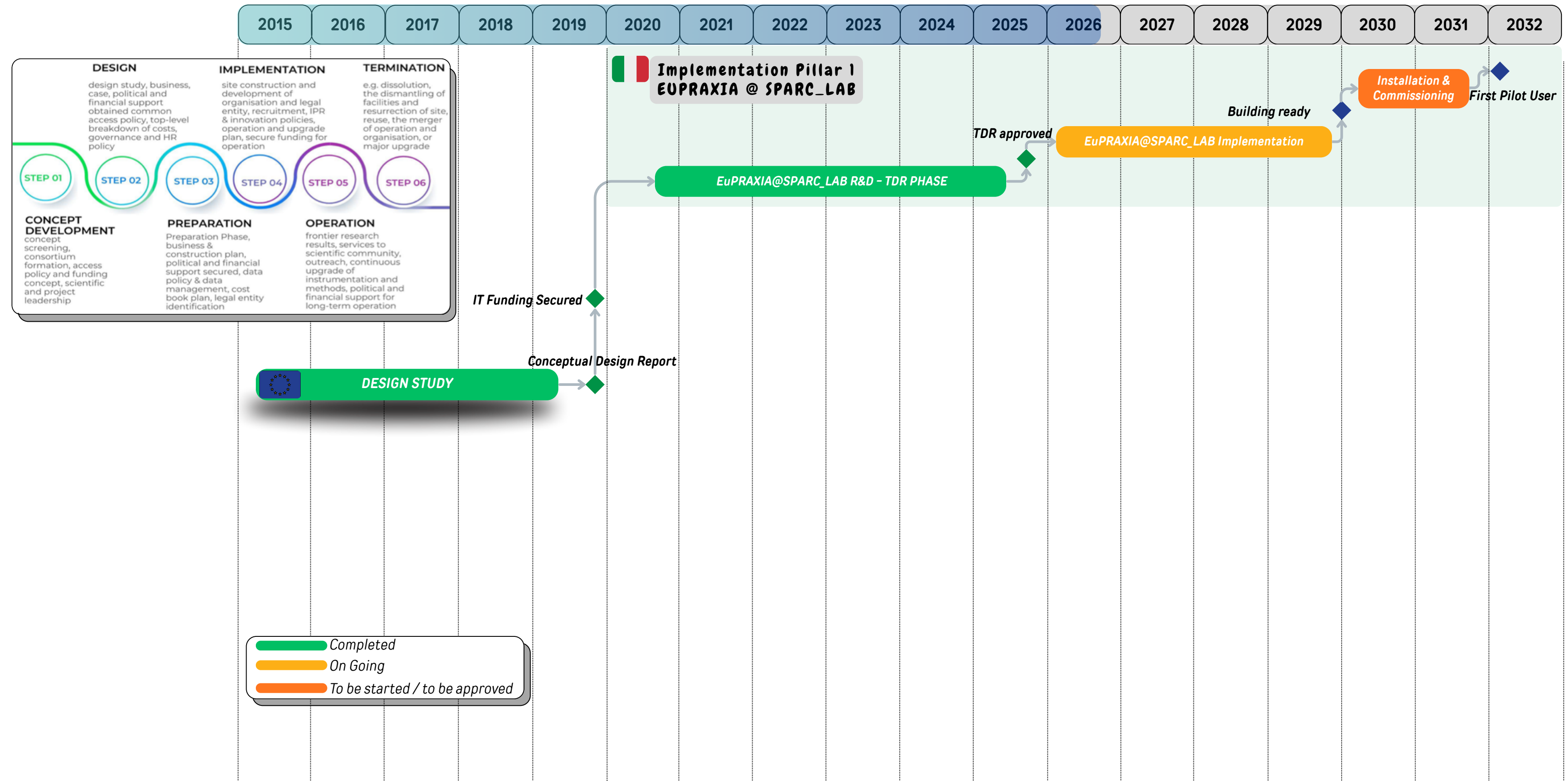
Accelerator with eXcellence In Applications

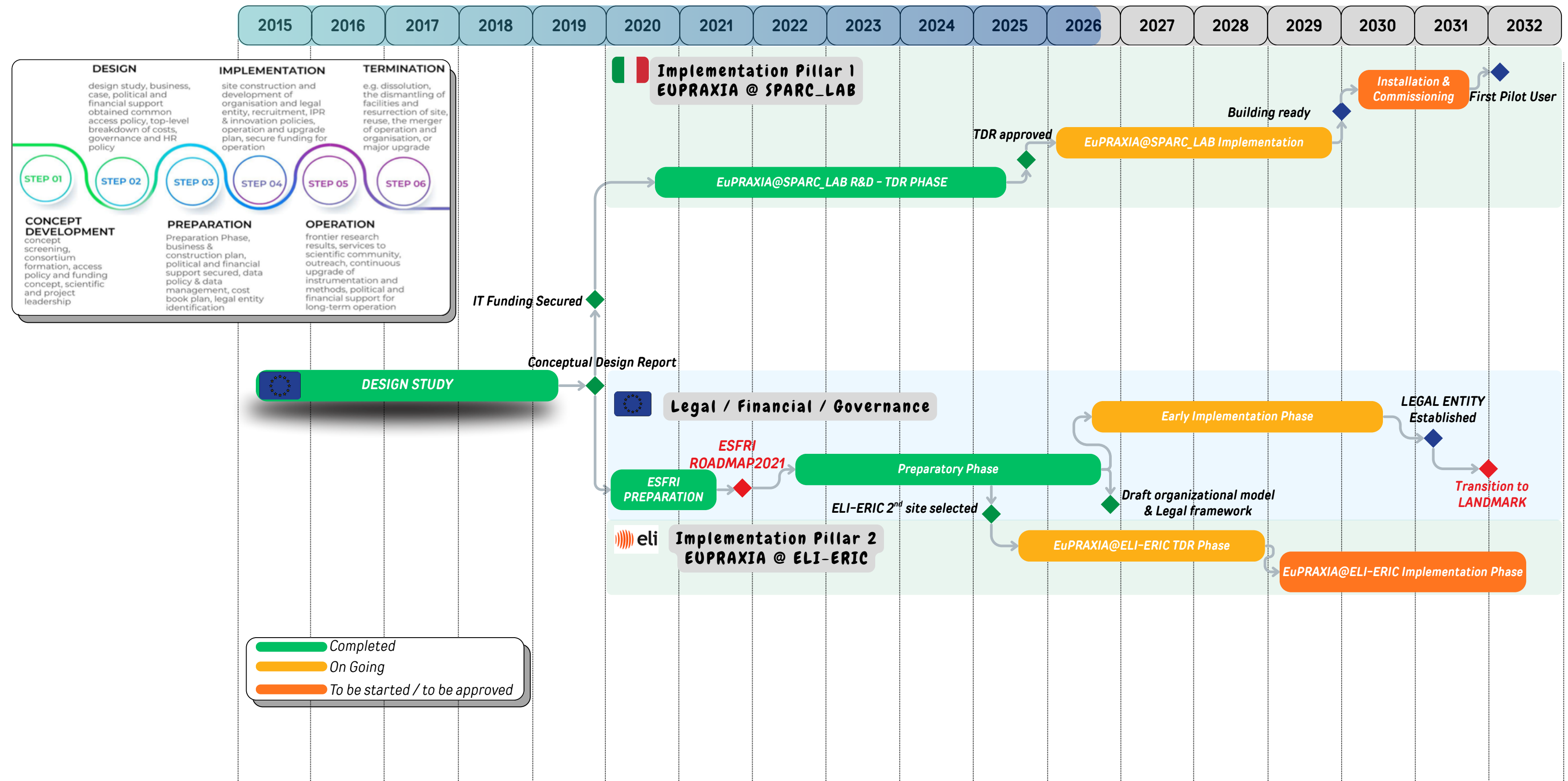
A reminder from ESFRI Application:

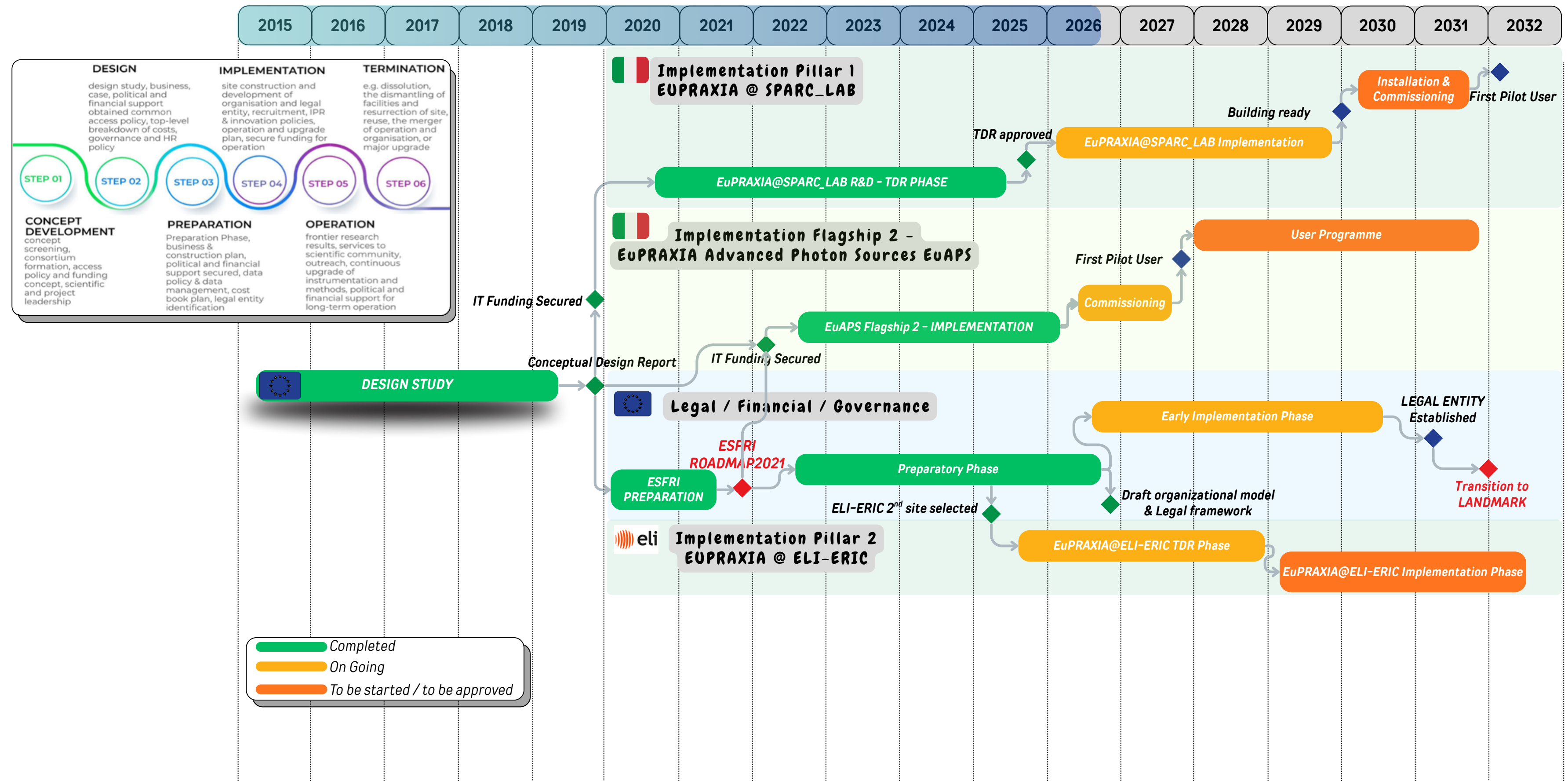
The **EuPRAXIA project** envisions a **distributed European user facility** offering open access to advanced **plasma-based accelerators and beamlines**. Beyond serving the **scientific community**, it acts as a **hub for innovation**, fostering collaboration between academia, industry, and technology developers. A key feature is its commitment to **open innovation**, driving the joint development and application of **next-generation accelerator concepts**.

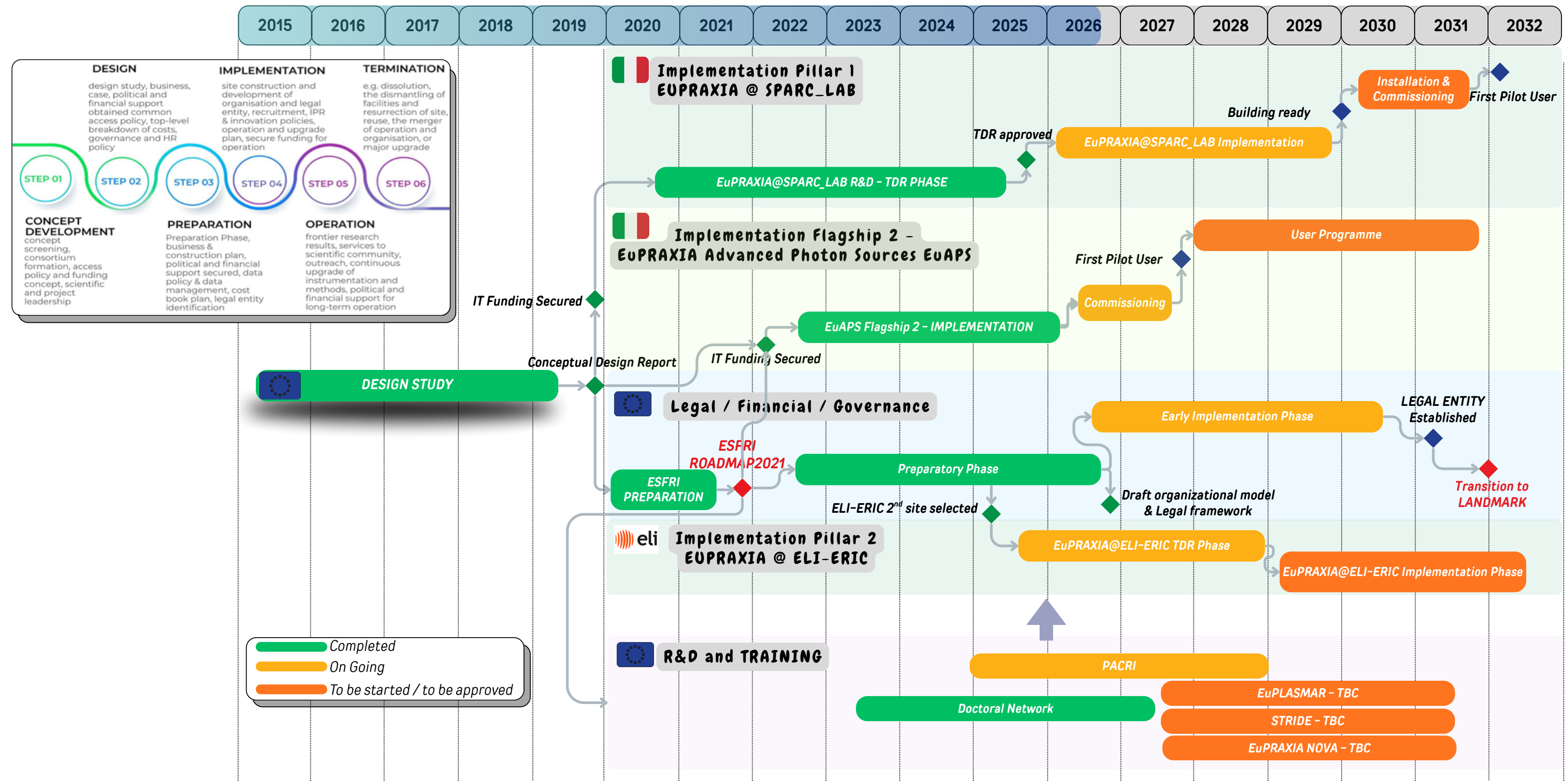


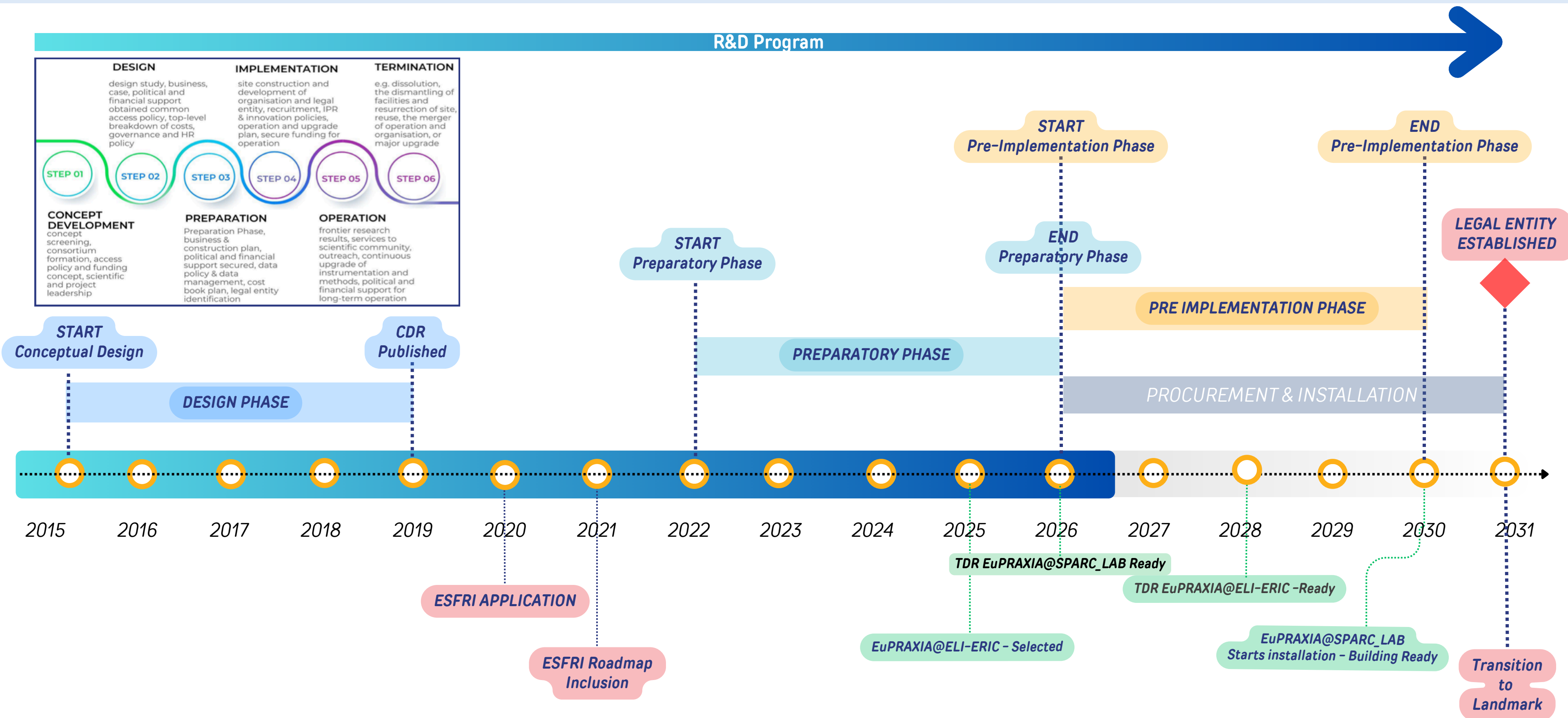




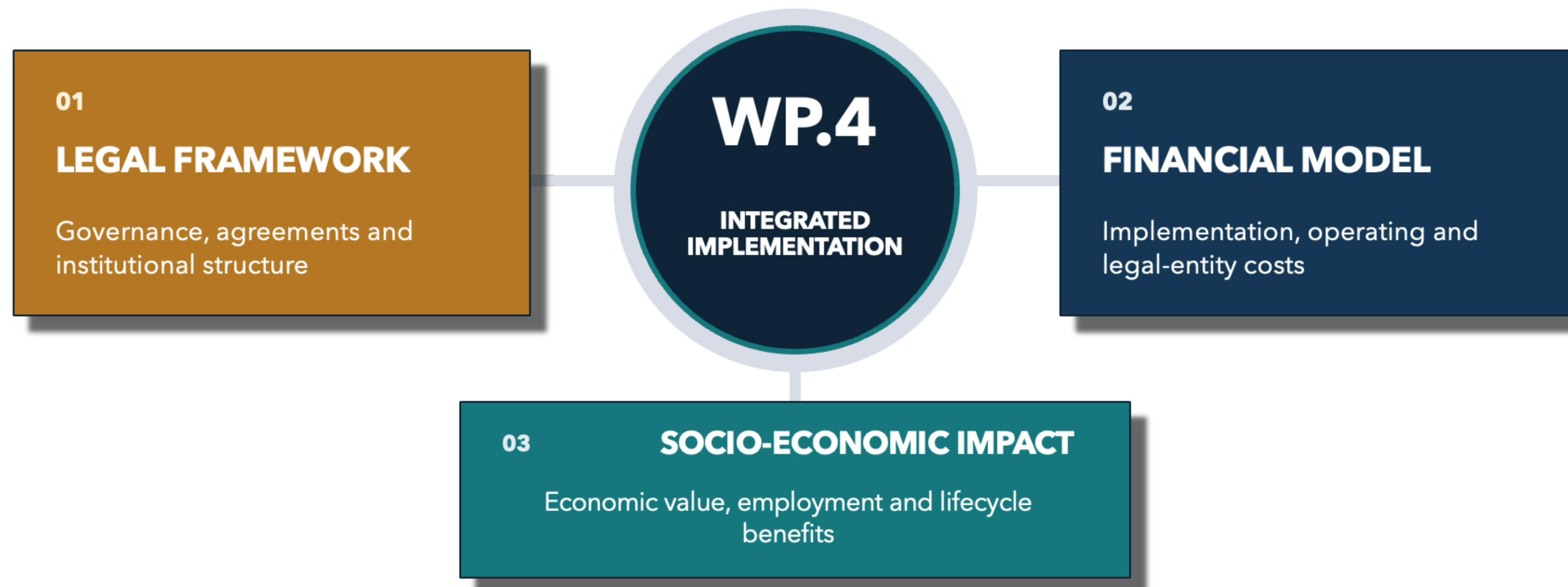




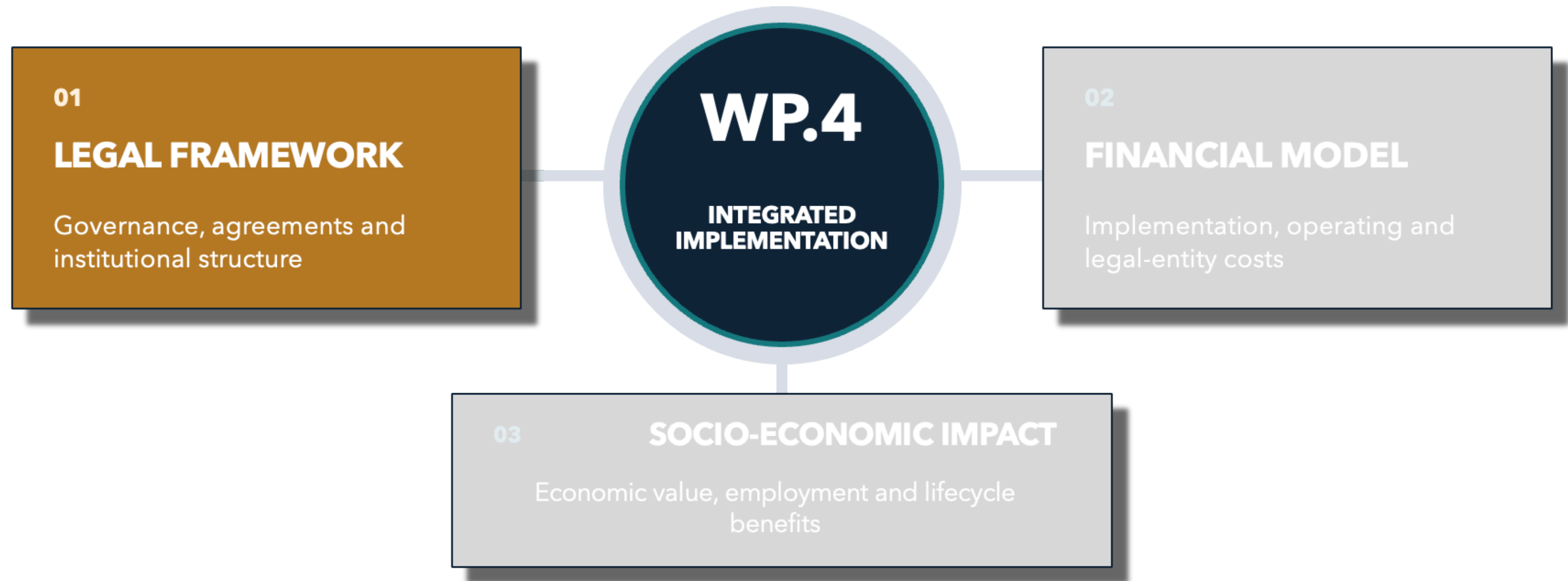




WP.4 brings legal structure, financial planning and socio-economic evidence into one coordinated model.



Together, the three domains support implementation decisions and long-term sustainability.



Why a legal framework?

- Requirement to become a landmark
- Provide a common framework & governance for the whole collaboration
- Provide unity and strategic scientific vision
- Ability to attract funds (and eventually hiring personnel)

Boundary Conditions

- Facilities hosted in already existing solid Research Infrastructures
- Host institution autonomous in managing their own assets
- Necessity to have a light/agile (and possibly cheap) Legal Framework – consensus based

AISBL – **A**ssociation **I**nternationale **S**ans **B**ut **L**ucratif | International non profit association

- **International Legal Personality**

Provides a single legal entity recognized under Belgian law, capable of operating internationally.

Can enter into contracts, own assets, hire personnel, and participate in legal proceedings.

- **Non-Profit Character**

Must pursue a non-profit objective.

Any surplus generated must be reinvested in the organization's activities and cannot be distributed to members.

- **Suitable for Multinational Collaboration**

Specifically designed for organizations involving members from different countries. Well suited to research infrastructures, scientific collaborations, and international networks.

- **Flexible Membership Structure**

Can accommodate different categories of members (countries, research organizations, universities, laboratories, observers, industrial partners).

Membership rights and obligations can be tailored through the statutes.

- **Governance Flexibility**

Allows the establishment of governance bodies adapted to the needs of the infrastructure, such as:

General Assembly

Board of Directors

Scientific Advisory Committee

Funding or Stakeholder Boards

Voting rights and decision-making mechanisms can be customized.

- **Ability to Manage Funds and recruiting**

Can receive membership contributions, grants, donations, and project funding.

Can manage common budgets and financial resources on behalf of the collaboration.

Can directly recruit and employ staff and establish a permanent management structure

- **Long-Term Stability**

Provides a durable legal framework beyond the lifetime of individual projects or grants. Facilitates continuity during the transition from preparatory phases to implementation and operation.

- **Contractual and Procurement Capability**

Can sign collaboration agreements, service contracts, procurement contracts, and intellectual property agreements.

Can act as a single counterpart towards suppliers and funding agencies.

Support for Distributed Research Infrastructures

- **Centralized governance**

Allows centralized governance while preserving local ownership of facilities.

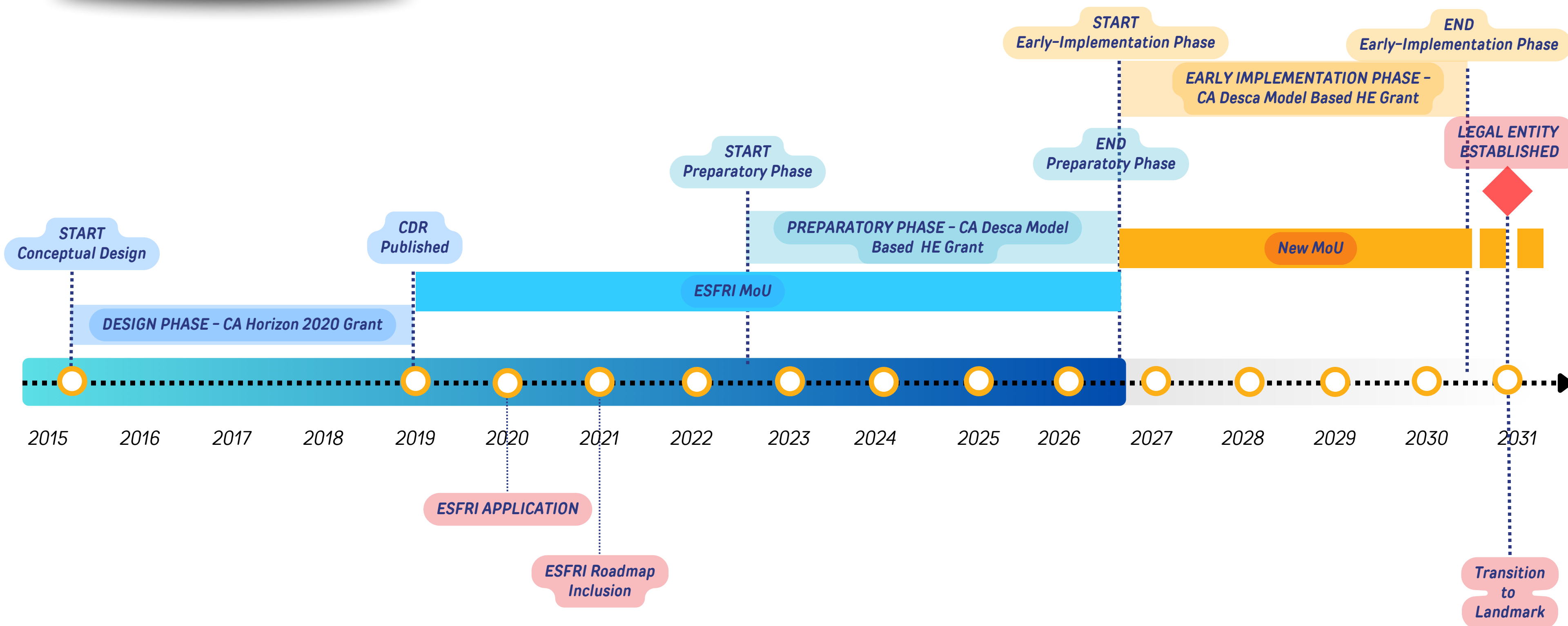
Particularly suitable for infrastructures composed of multiple facilities located in different countries

- **Moderate Administrative Burden**

Generally easier and faster to establish than an intergovernmental organization or an ERIC.

Governance arrangements can be adapted through amendments to the statutes.

Roadmap to legal entity



Roadmap to legal entity

Although the CAs under the Horizon Europe grants provide some sort of common governance, they are not suitable for establish a long term collaboraiton agreement:

- Project scope oriented.
- Fixed time frame (project start-end)
- Only a subset of the EuPRAXIA community joining.

A new MoU is therefore necessary to provide a common framework and a governance model for the entire EuPRAXIA community, serving as backbone and founding layer of the future AISBL (or any other legal model).

Roadmap to legal entity

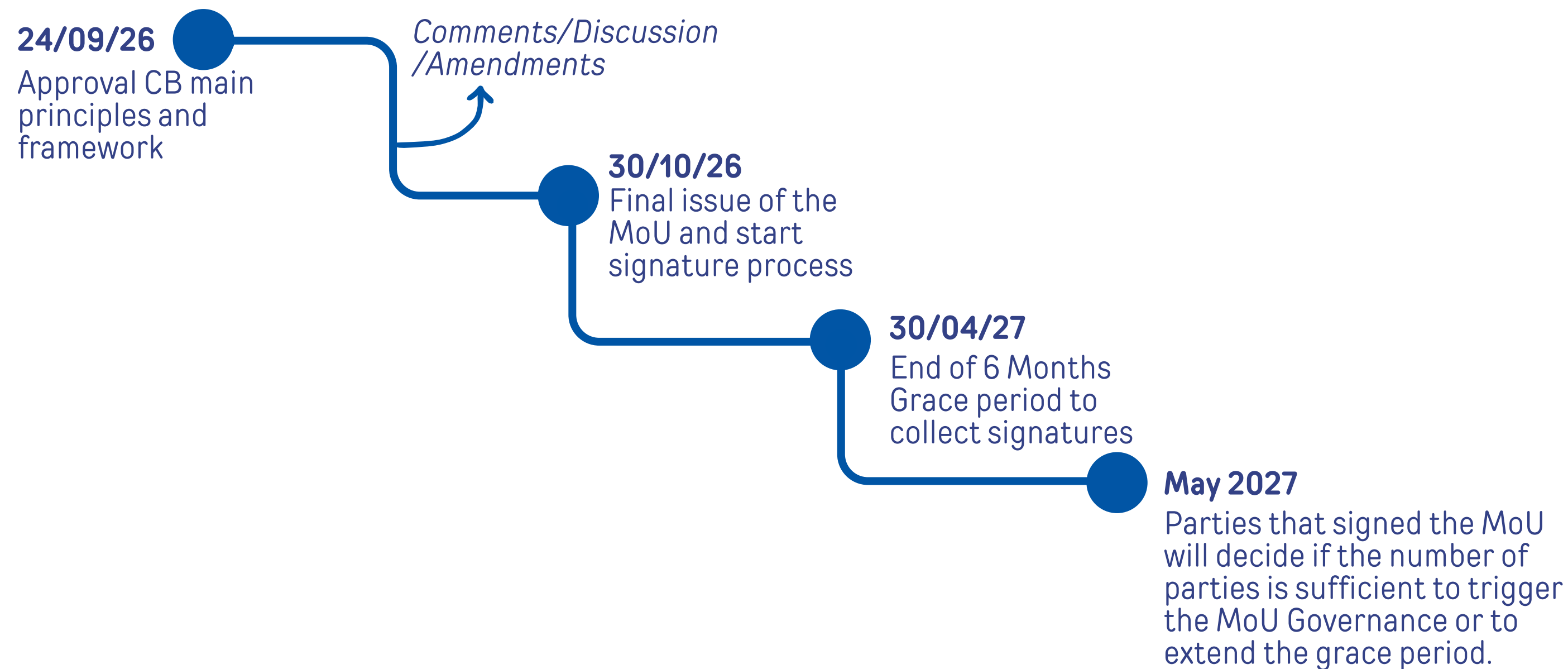
This intermediate step was approved by the Collaboration Board on October 2025 (General Meeting @ ELI-ERIC premises).

First draft already circulated among Collaboration Board.

Main Principles

- Best effort basis – no legally binding / no resource commitments
- Governance framework described.
- Advisory board
- Open term

MoU – Proposed Time Line



Board of Financial Sponsor

STAB
Scientific & Technical
Advisory Board

**OPEN INNOVATION
FORUM (to be defined)**

Collaboration Board

Project Coordinator

Project Manager Office

Project Support Office

Steering Committee

Implementation Pillar 1

Implementation Pillar 2

*National Nodes
Representatives*

*Eu Grant Project
Coordinators*

Thematic Working Group

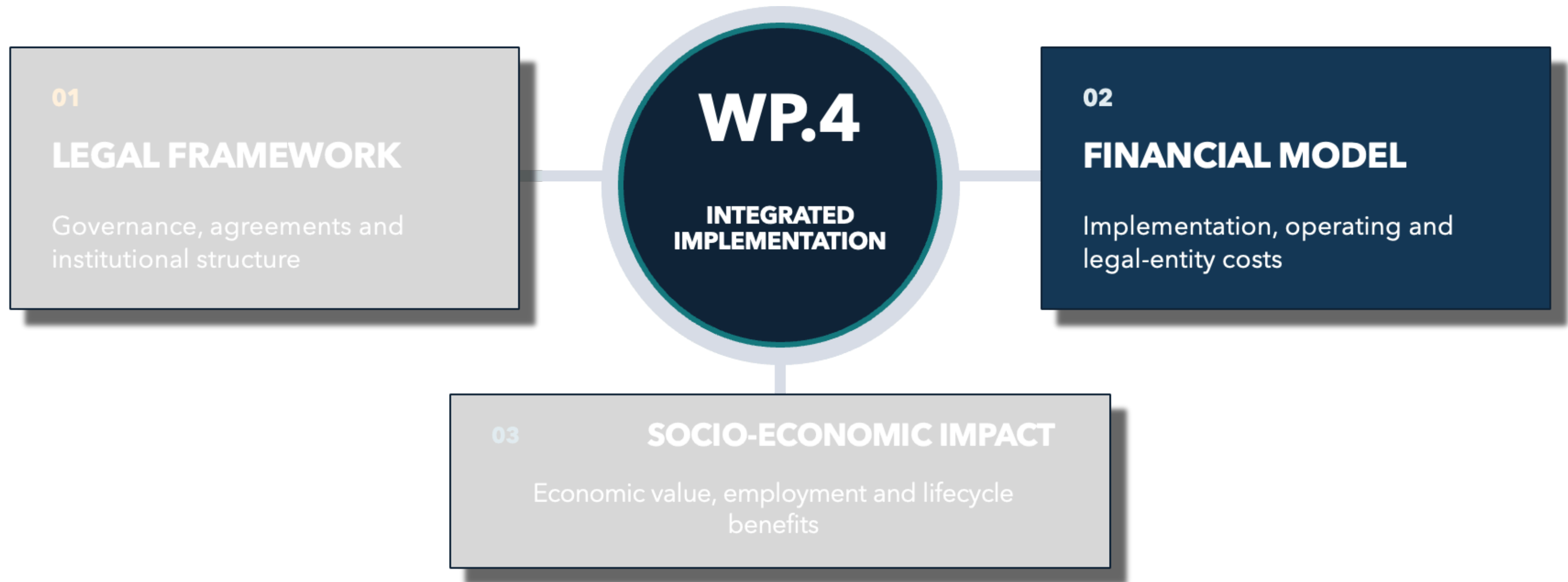
Legal Framework Summary

Identification of AISBL as most suitable framework for EuPRAXIA as distributed RI.

MoU as intermediate step and as collector of the whole EuPRAXIA community

Next Steps (that will be covered in the Early Implementation Phase Project):

- Prepare and discuss all the legal documents (bylaws, statute, SLA, IKC, IPR)
- Prepare a financial plan for the AISBL (modest fee to ensure a minimum financial capacity and operativity).



After the inclusion in the ESFRI Roadmap EuPRAXIA Community gained a remarkable funding attractiveness.

Several HE grants successfully approved.

Two submitted in June (1 Infradev and 1 Infratech).

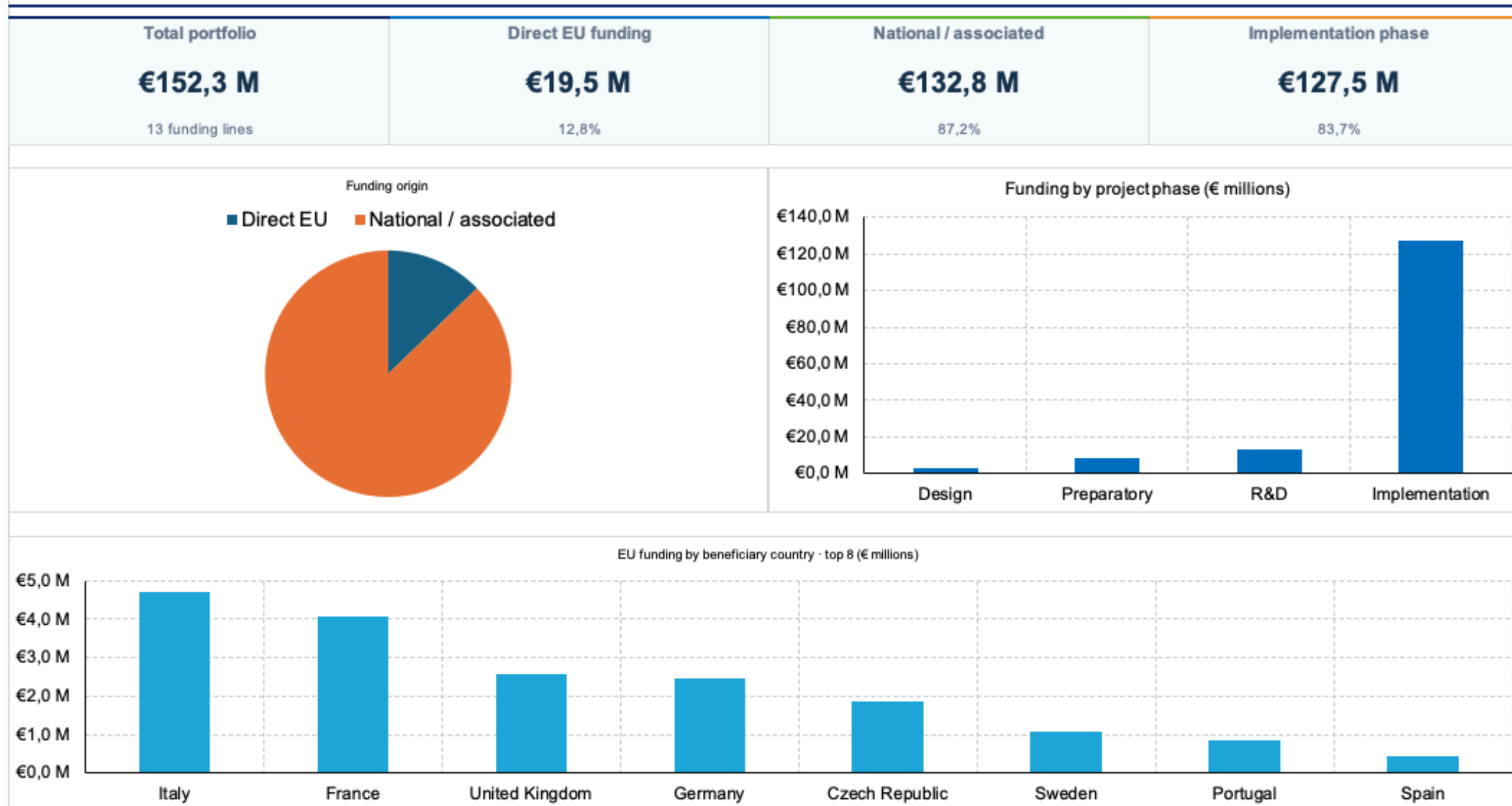
And (hopefully) more to come

While the R&D and Training seem well backed up by Europe and substantial funding have been secured there is still a missing gap for the construction. Also considering that the money already allocated (already 7 years ago) is rapidly devaluating due to cumulative inflation.

Be prepared: apparently the next EU framework program should in principle include funding lines dedicated for the construction of Research Infrastructures (up to 20% rumors said). If this happens could be a potential opportunity to be closely monitored.

Around 150 M€ raised so far.

Funding Data - commitments recorded from 2015 to 2030



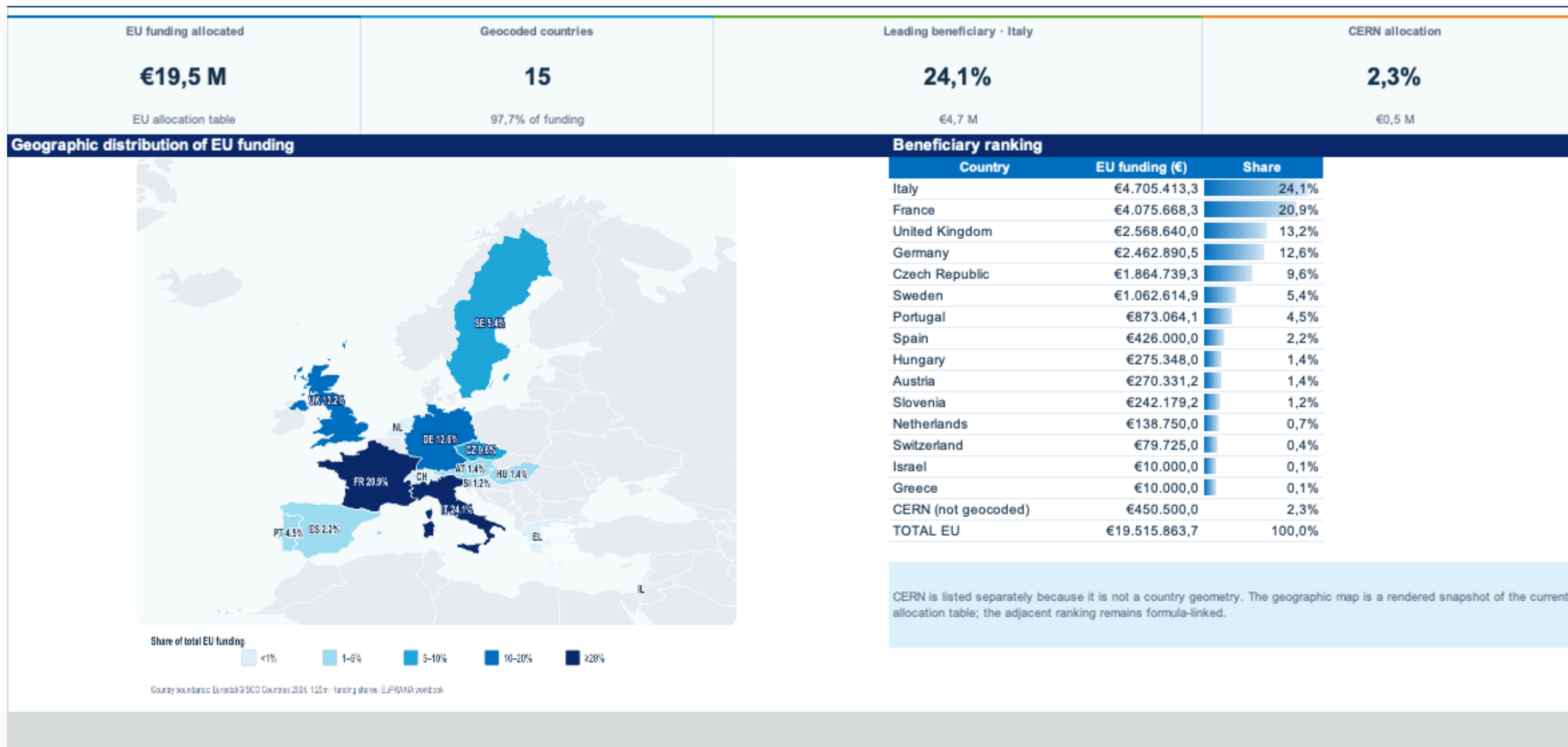
Overview

- Resources distributed along the whole life-cycle
- EU mainly R&D and Preparatory Phase
- Does not include own in-kind contribution

National Fundings

- Mainly from IT (also indirectly from EU funds)
- Implementation phase (although marginally used for R&D)





EU Fundings

- Design, R&D, Training
- Preparatory phase
- 46 Beneficiaries in total
- 9 Industries (20%)
- 15 Countries

EuPRAXIA Financial Plan is being constructed on **three main dimensions**: Implementation cost (Both Sites), Operational Cost (Both Sites), Legal entity cost (Marginal).

Implementation cost and schedule are in final consolidation after several revision cycles.

FINANCIAL PLAN: THREE DIMENSIONS

01 IMPLEMENTATION COST BOTH SITES Final estimate and schedule under consolidation	02 OPERATIONAL COST BOTH SITES Under evaluation Full analysis after systems engineering	03 LEGAL ENTITY COST EXPECTED TO BE MARGINAL Scope and estimate still to be defined
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OPERATING COST DEPENDENCY

Preliminary magnitude: several M€/year

The completed systems engineering process will enable the full assessment and provide a key input to environmental and financial sustainability analysis.

EuPRAXIA@ELI-ERIC

**The same planning process
is expected for
EuPRAXIA@ELI-ERIC.**

IMPLEMENTATION READINESS

01

TDR COMPLETE

DESIGN MILESTONE

Successful completion closes the design phase

02

PROJECT TEAM

ORGANIZATION ACTIVE

Project leadership under D. Alesini

03

KEY PROCUREMENT

PACKAGES UNDER WAY

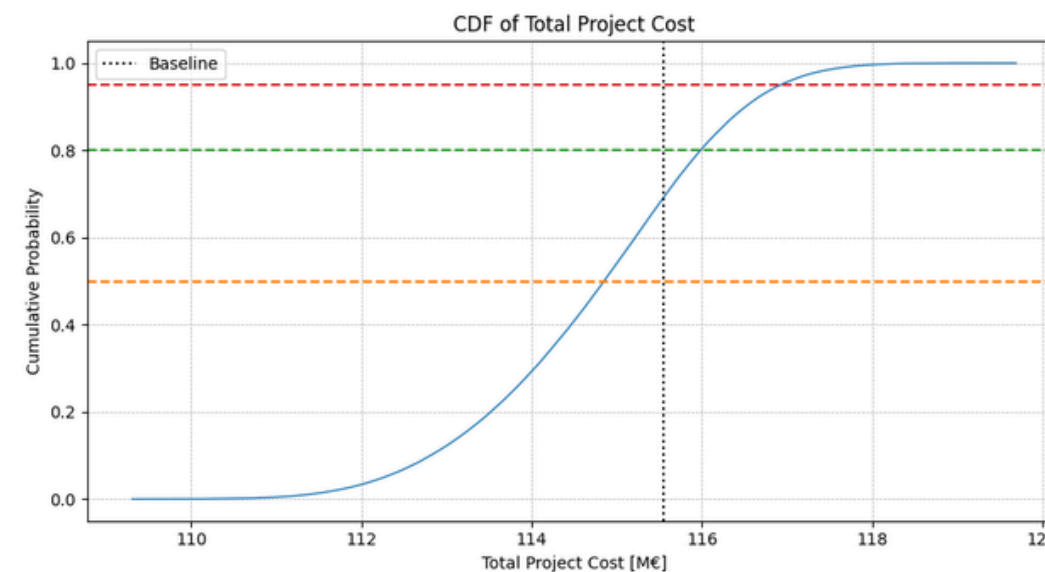
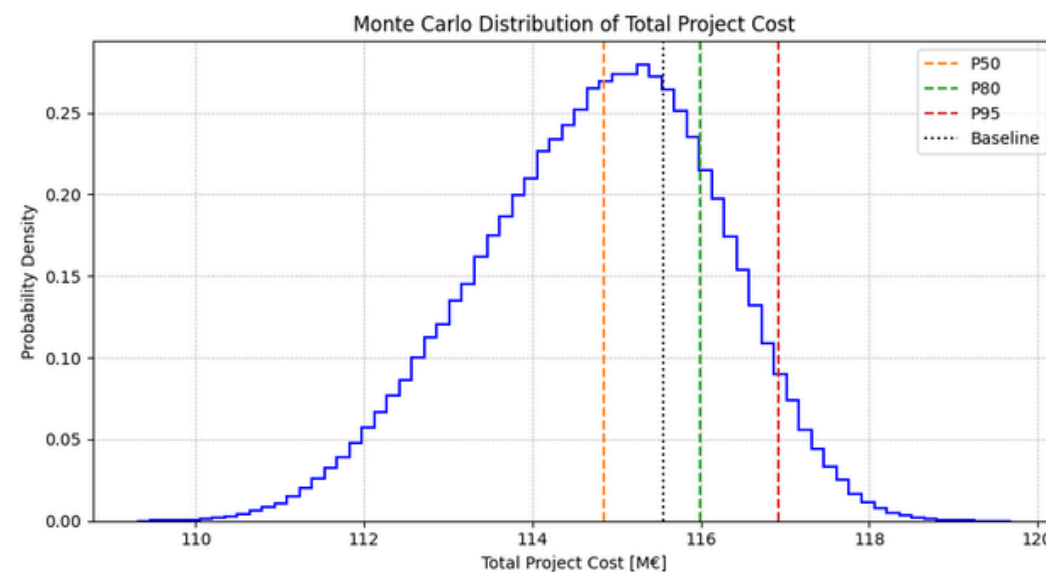
S-band modulators, LLRF and undulators

04

BUILDING WORKS

PROCUREMENT NEAR FINAL

Construction expected January 2027



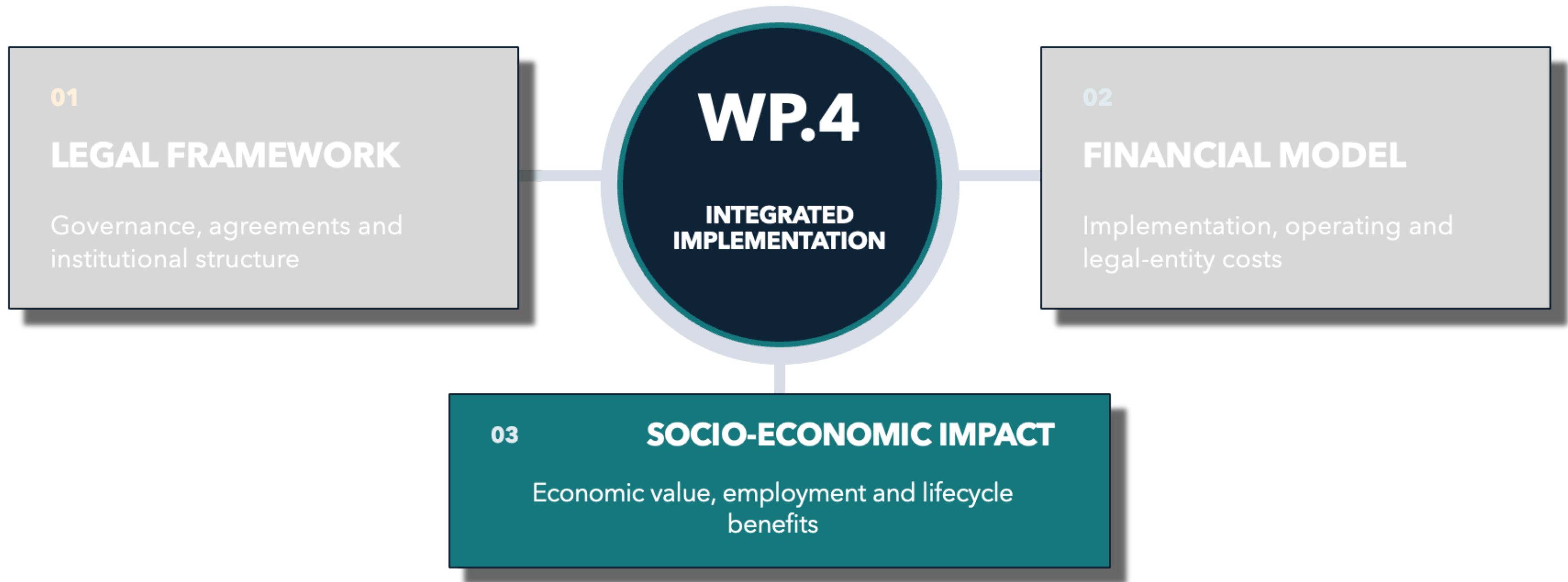
TOTAL IMPLEMENTATION BASELINE

€115.6M

Stated total: €115,554,917

Cost analysis and the cash-flow-aligned schedule remain in final review.

AACE accuracy varies by system from -5%/+5% to -10%/+25%.



Socio-Economic impact scenario

Crucially important: Prove that our initiative provides a tangible benefit to the whole society.

Maybe trivial for us, but requires a remarkable effort and skills to prove to others in quantitative terms.
(especially policymakers / general public / institutional stakeholders).

Specific Methodology, data and knowledge required. Specialized consultant company.

2 main studies:

- Socio-Economic Impact of EuPRAXIA @SPARC_LAB within the European context (focus on Regional and National impact).
- CBA (Cost Benefit Analysis) for the construction of EuPRAXIA@SPARC_LAB

Florio methodology.

- Evaluates whether the social benefits generated by a research infrastructure exceed its lifecycle costs (construction, operation, upgrades, and decommissioning).
- Quantifies benefits accruing to different stakeholders, including:
 - Scientists (value of new knowledge and publications),
 - Students and young researchers (human capital formation),
 - Firms and suppliers (technological spillovers and innovation),
 - Users and society (applications and services enabled by the infrastructure),
 - The general public (cultural, educational, and existence value of scientific discoveries).
- Uses probabilistic methods (Monte Carlo simulations) to account for uncertainty in future costs and benefits.
- Produces measurable indicators

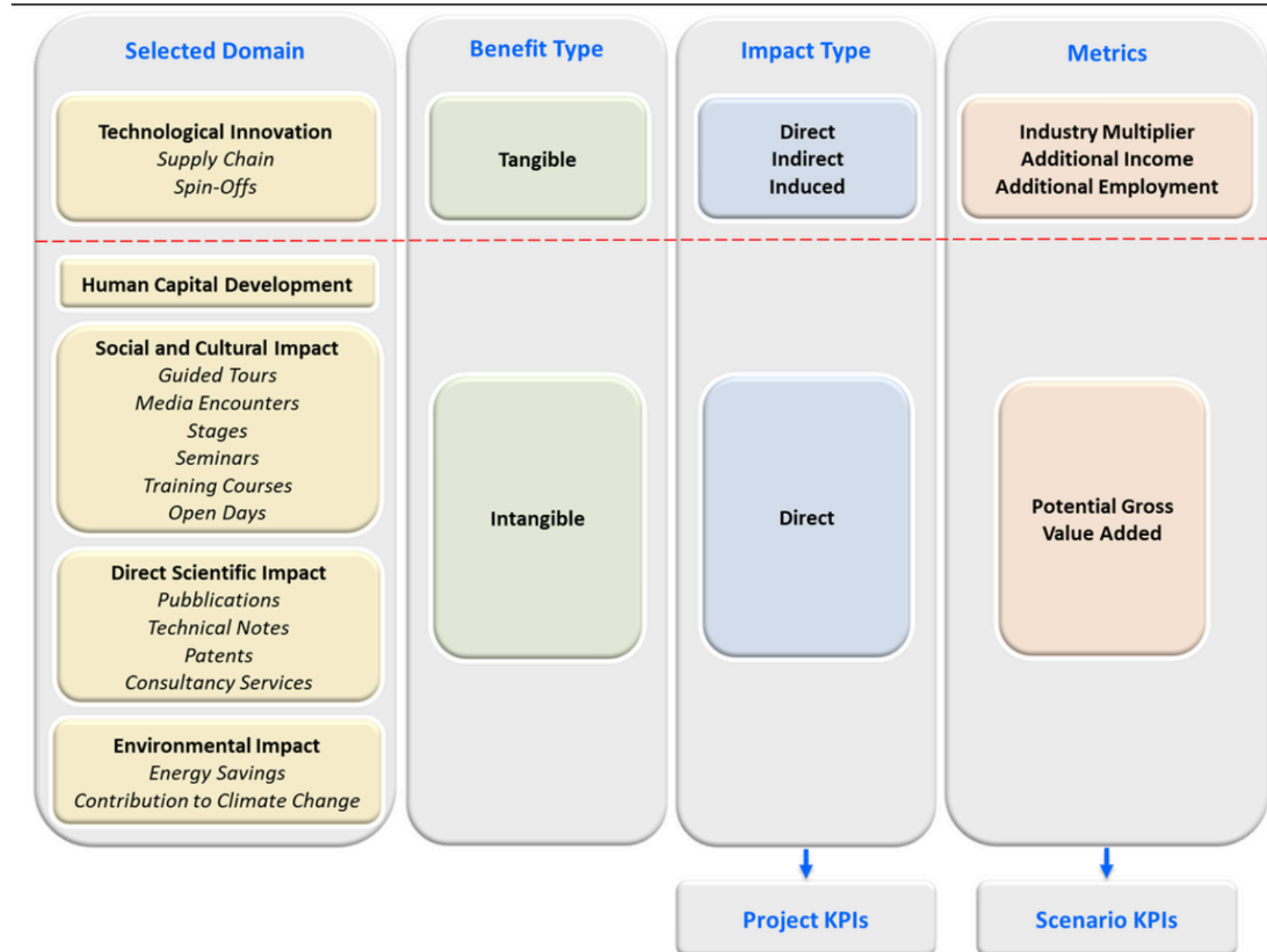
A distinctive feature of Florio's approach is that it attempts to **monetize** not only direct economic impacts but also the **broader societal value of scientific knowledge and discovery, including benefits that may not have immediate commercial applications.**

Note that **Socio-Economic Impact $\neq$ Cost Benefit Analysis**

Main Findings

Several KPIs analysed and projected over 40 years with a monte carlo based analysis, proved the robust socio-economic return of the investment on several domains:

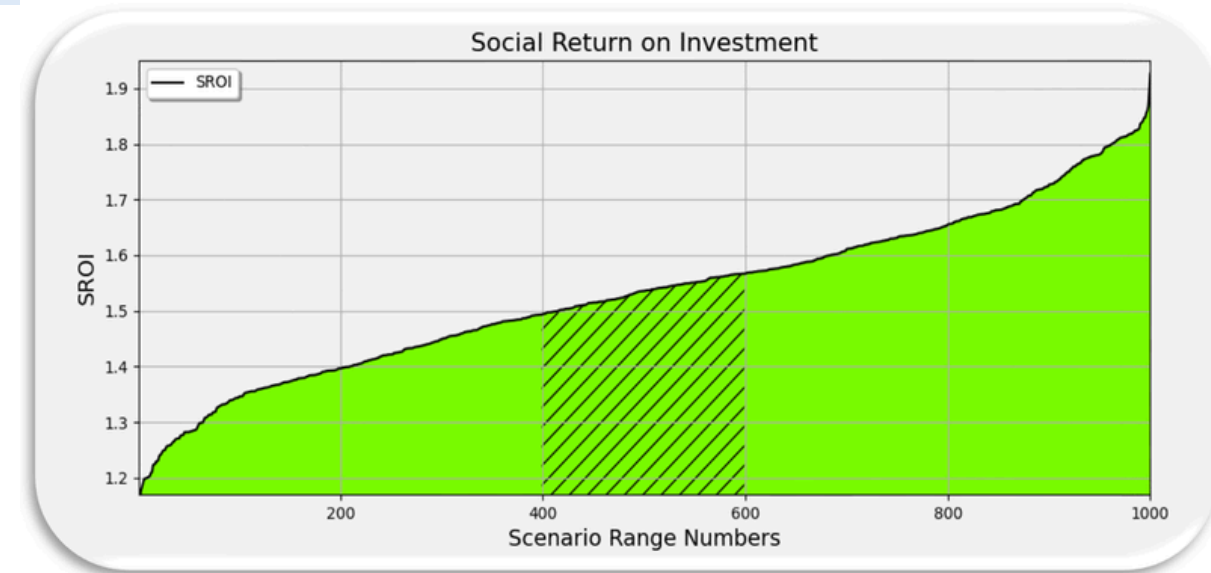
- Direct scientific impact (number of publications / users)
- Human Capital development
- Socio-Cultural impact
- Innovation and technology transfer
- Tangible and Intangible benefits considered.



Main Findings

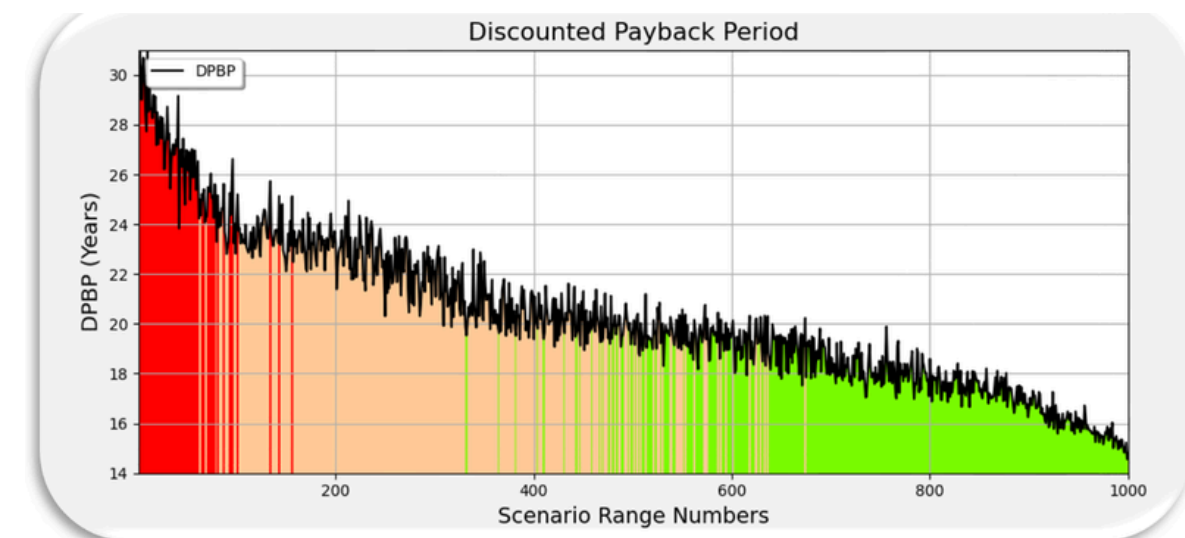
SROI

Social Return on Investment (SROI) can be regarded as a synthetic and integrative indicator of how effectively a research infrastructure (RI) contributes to achieving its intended socio-economic objectives throughout its lifetime.



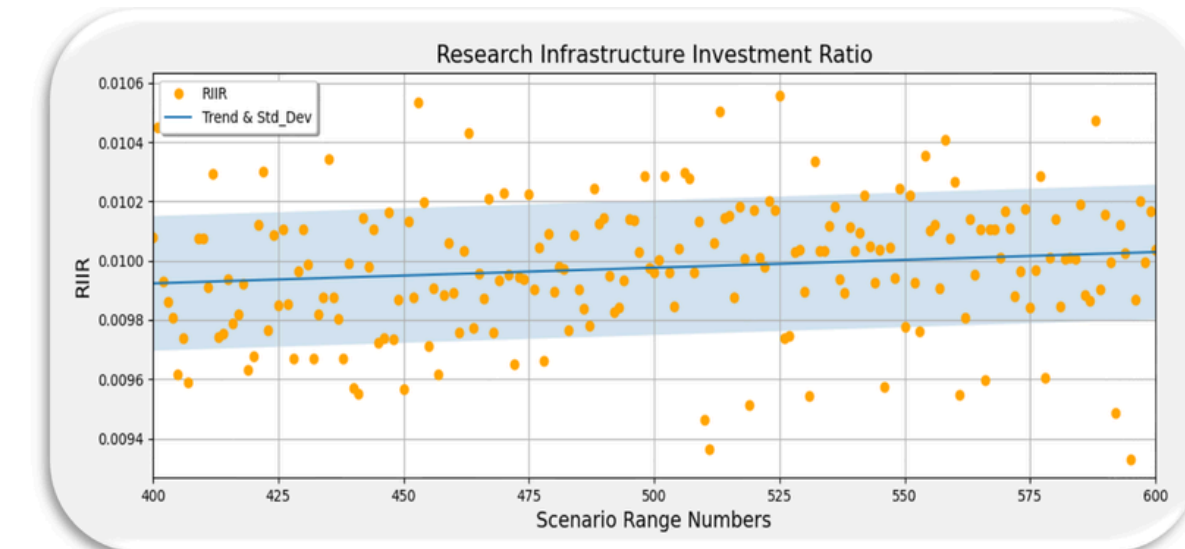
DPBP

The Discounted Payback Period (DPBP) provides a complementary perspective to the SROI by introducing a temporal dimension to the assessment of socio-economic returns. It measures the time required for the cumulative discounted benefits generated by the research infrastructure (RI) to equal the present value of the initial investment.



RIIR

The RIIR compares the residual value of the initial investment, together with the total socio-economic benefits generated by the infrastructure, against the overall scale of national R&D gross value added.



Operational lifecycle: base-case returns

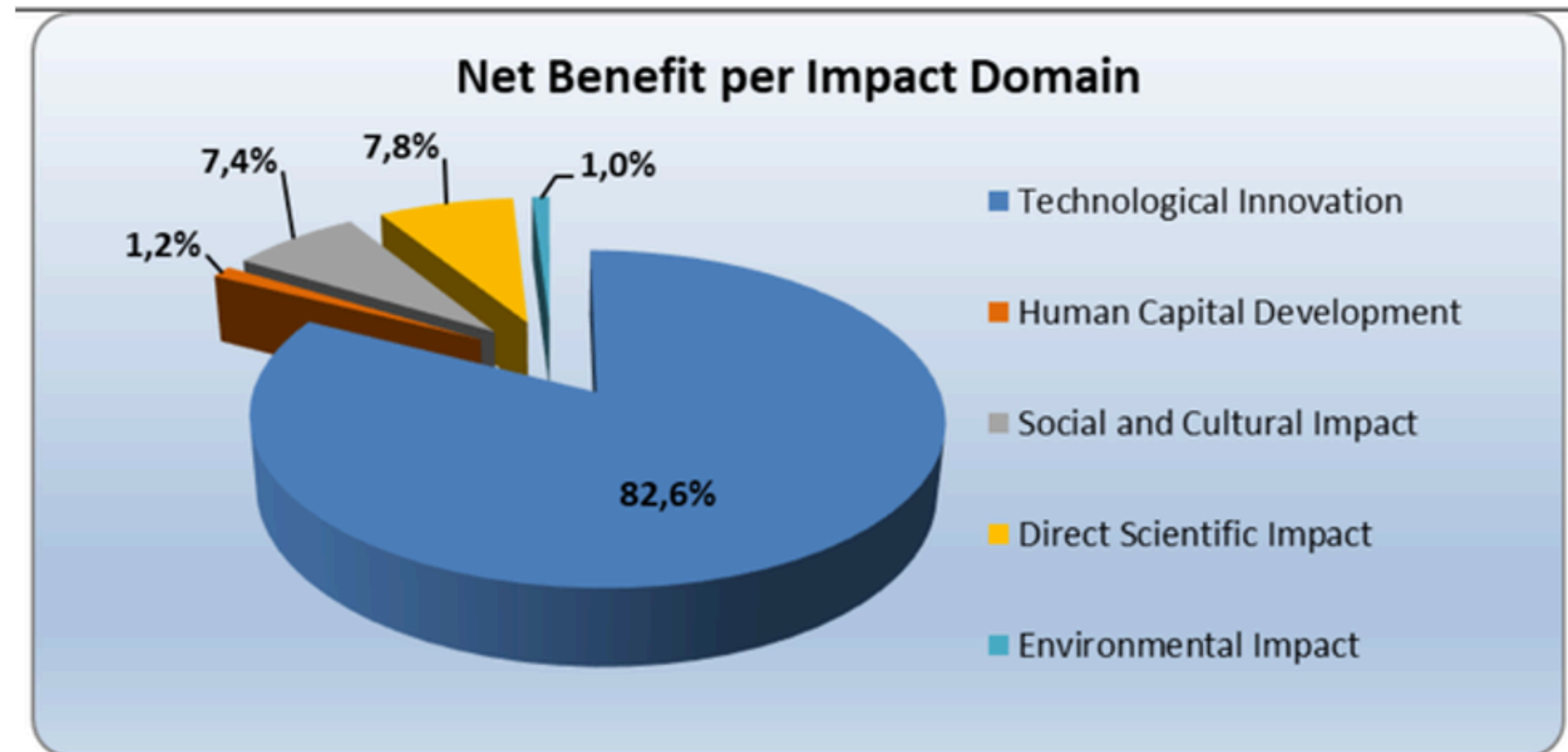
The base-case scenario indicates positive socio-economic returns over the facility lifecycle.

BASE-CASE MACRO-ECONOMIC KPIs

Indicator	Base case
SROI	1.54
DPBP	19 years
RIIR	>1%
Net benefit	€174M

The source analysis describes this scenario as highly probable based on the expected volume and nature of operational activities.

NET BENEFIT BY IMPACT DOMAIN



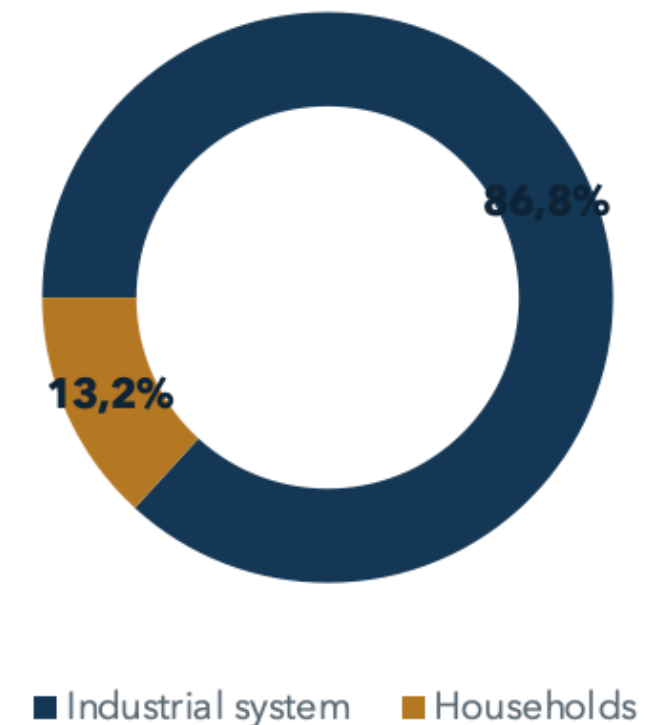
Construction investment and economic contribution

A €133.65M construction investment is expected to generate €360.52M in total added value.

CONSTRUCTION PHASE: ESTIMATED IMPACT

Indicator	Estimated value
Total investment	€133.65M
Investment within national territory	€107.37M
Total added value generated	€360.52M
Value added to industrial system	€312.84M (86.8%)
Value added to households	€47.70M (13.2%)
Industrial multiplier	2.91
Total additional income	€147.70M
Total employment increase	1,728 FTE

DISTRIBUTION OF ADDED VALUE



Most of the added value accrues to the industrial system, while the estimated employment impact reaches 1,728 FTE.

Construction of EuPRAXIA@SPARC_LAB will **stimulate** significantly the local economy (Focus on Italy) with an expected industrial multiplier of 2.91 and >1700 FTE integrated in the whole supply chain.

The expected **Socio-Economic Impact** proves that the investment will have a SROI of 1.54 in 19 years with a **net benefit** of >170M€ in the most probable scenario. More profitable scenarios are also possible.

Overall initiative seems to be aligned with similar facilities across Europe and it shows a **positive return** along its lifecycle (without considering upgrades).

State-of-the-art **methodology** and replicable **framework** have been adopted.

Next steps:

- Extend this approach to the 2nd pillar
- Monitoring & consolidate the expected KPI.

All the documents are available here:

- <https://www.openaccessrepository.it/doi/10.15161/oar.it/3kz2g-pdq75>
- <https://www.openaccessrepository.it/doi/10.15161/oar.it/fs6d0-ycd17>



EuPRAXIA Progress and the path ahead from WP.4 (legal&financial) perspective

Four years of scientific and technological progress have strengthened the collaboration and confirmed the value of investment to date. Remarkable progress in the scientific & technical domain, approaching the implementation phase, consolidation and strengthen of the community.

PROGRESS OVER THE PAST FOUR YEARS



NEXT Milestones

