ERA LEARN

Funded by the European Union

ERA-LEARN Networking Event 2026

Bridging European Partnerships:

Connecting, Sharing, Growing

Tech Gate | Vienna

18 Nov. 2026

Parallel Workshops

B1 From Projects to Impacts

How Partnerships help funded projects achieve more together

Workshop Focus

How Partnerships and programmes steer their research portfolios, use data across projects and help people put research results to use.

Three practical examples, followed by an open discussion.

Speakers







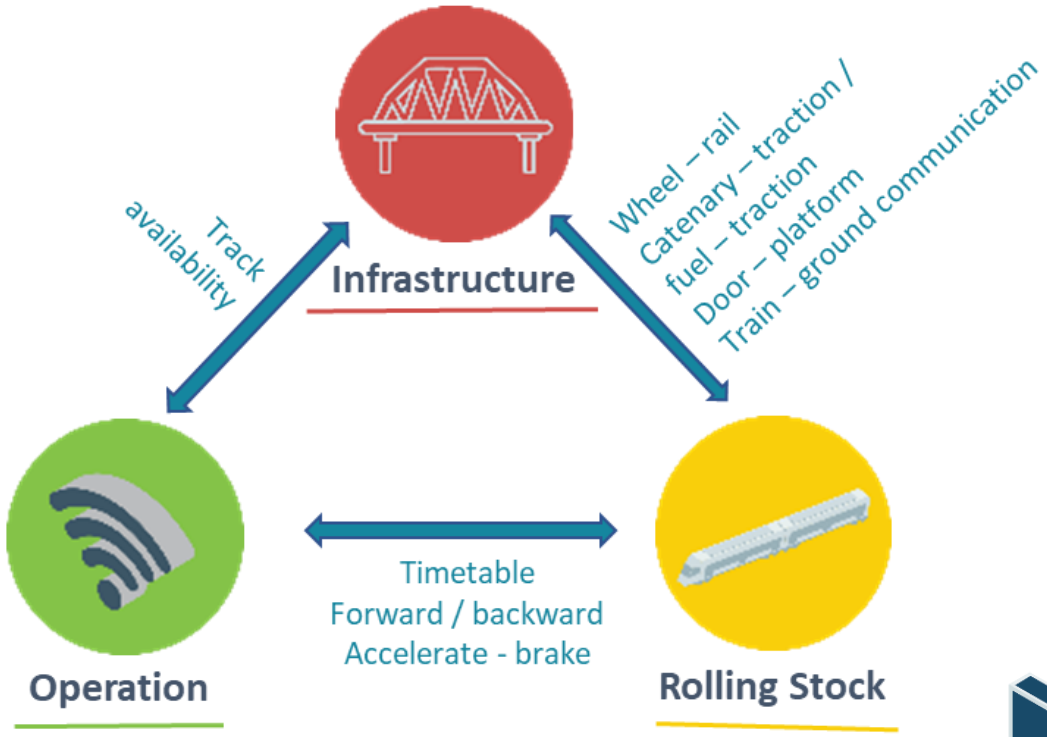
- **Giorgio Travaini** is Executive Director of Europe's Rail Joint Undertaking and has overseen its €1.2 billion integrated research and innovation programme since 2021. He previously led research and innovation at Shift2Rail, bringing experience of steering large portfolios of projects towards shared objectives for the rail sector

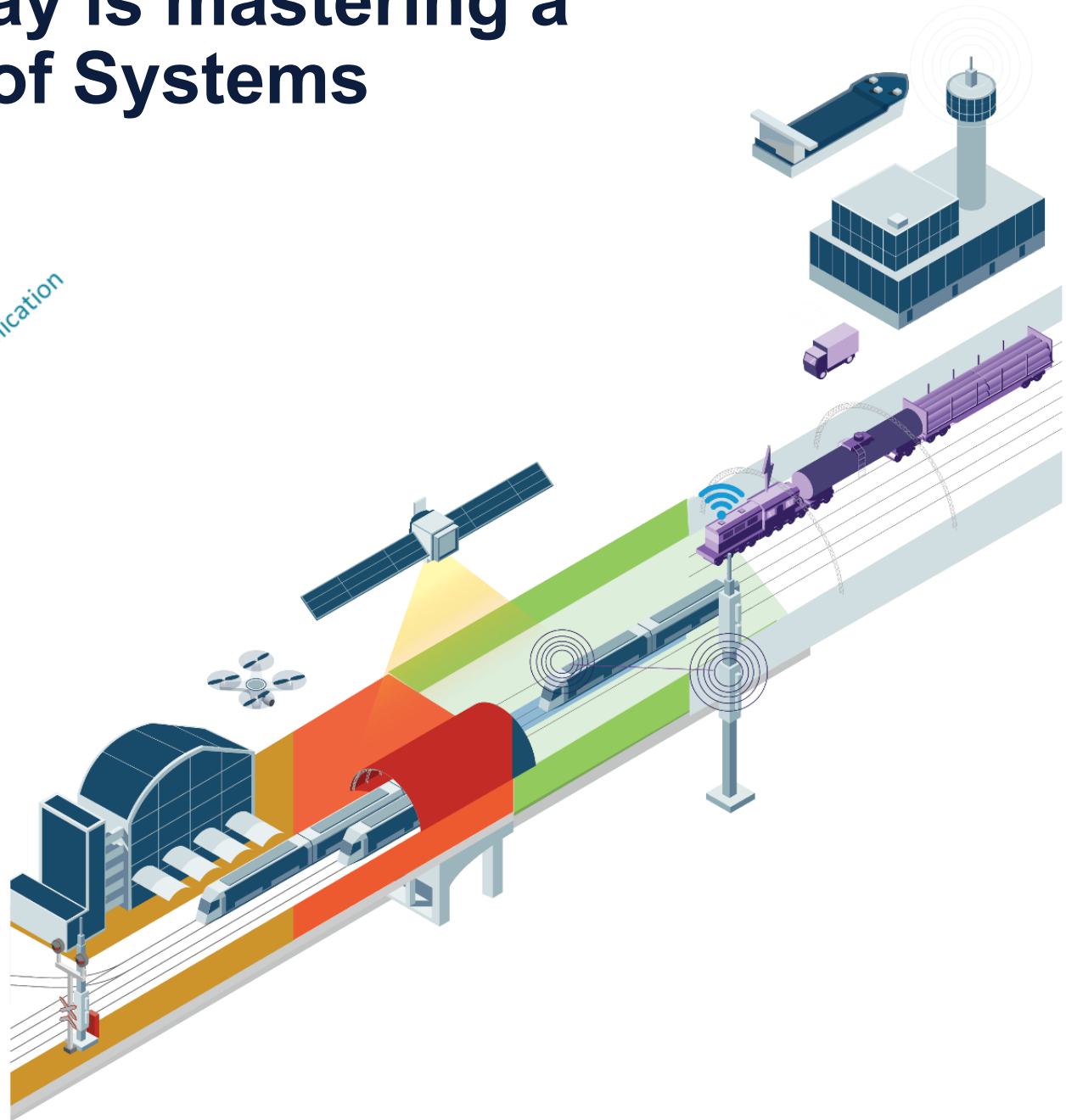
- **Michael Strömgren** - Programme Director of Smart Built Environment, a Swedish innovation programme with 300+ R&D projects on digitalisation in the built environment, run by IQ Samhällsbyggnad. He leads the Smart Built Toolbox, which connects the whole portfolio in one quality-assured knowledge graph, powered by European AI – used to steer the programme today and to keep its knowledge alive after it ends

- **Isabel Caballero Risco** leads the Communication and Outreach work for the Sustainable Blue Economy Partnership, the European Partnership pooling national and EU research funding to advance a climate-neutral, sustainable and competitive ocean economy

Europe’s Rail Joint Undertaking

Innovate in Railway is mastering a complex System of Systems





About Europe's Rail

Established
November **2021**
(*Council Regulation EU 2021/2085*)
as a Joint Undertaking – a body of the EU

Governance
Governing Board with
Main advisory groups: **State Representatives** Group, **Scientific Steering** Group

Public Partner
European Union, represented by **European Commission**

Private Members
29 members representing full **rail value chain**

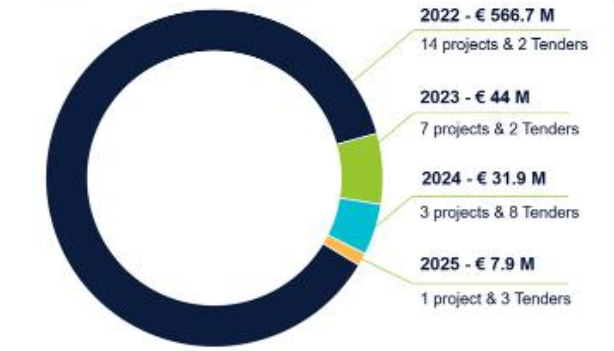
29 MEMBERS

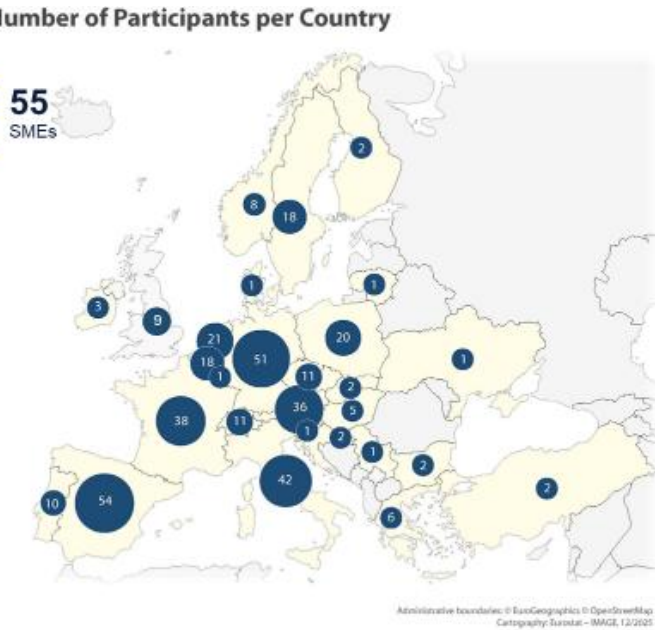
377 / 801 PARTICIPANT(s)/ION(s)

55 SMEs

28 COUNTRIES

106 RESEARCH CENTERS & UNIVERSITIES



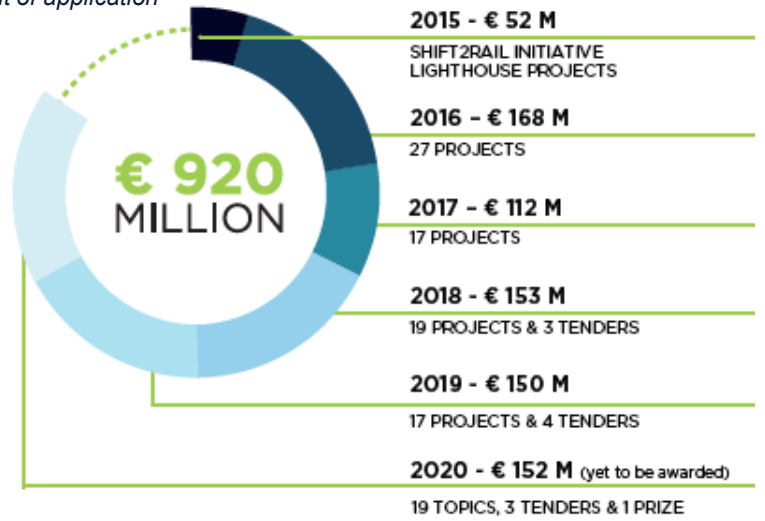


On what EU-Rail is built upon



- Shift2Rail Programme finalized, with main results (achieving higher TRLs 6-7) disseminated in S2R Catalogue of Solutions.
- The work performed in Shift2Rail increased the TRL of the innovations needed to create a SERA in a harmonised way across countries.
  - ✓ 695 prototype testing activities with an average TRL of 5/6
  - ✓ 72 new solutions launched into the market
  - ✓ 20-41%* reduction in LCC
  - ✓ 58-96%* increase in capacity
  - ✓ 39-57%* improvement in reliability and punctuality

** depending on the rail segment of application*

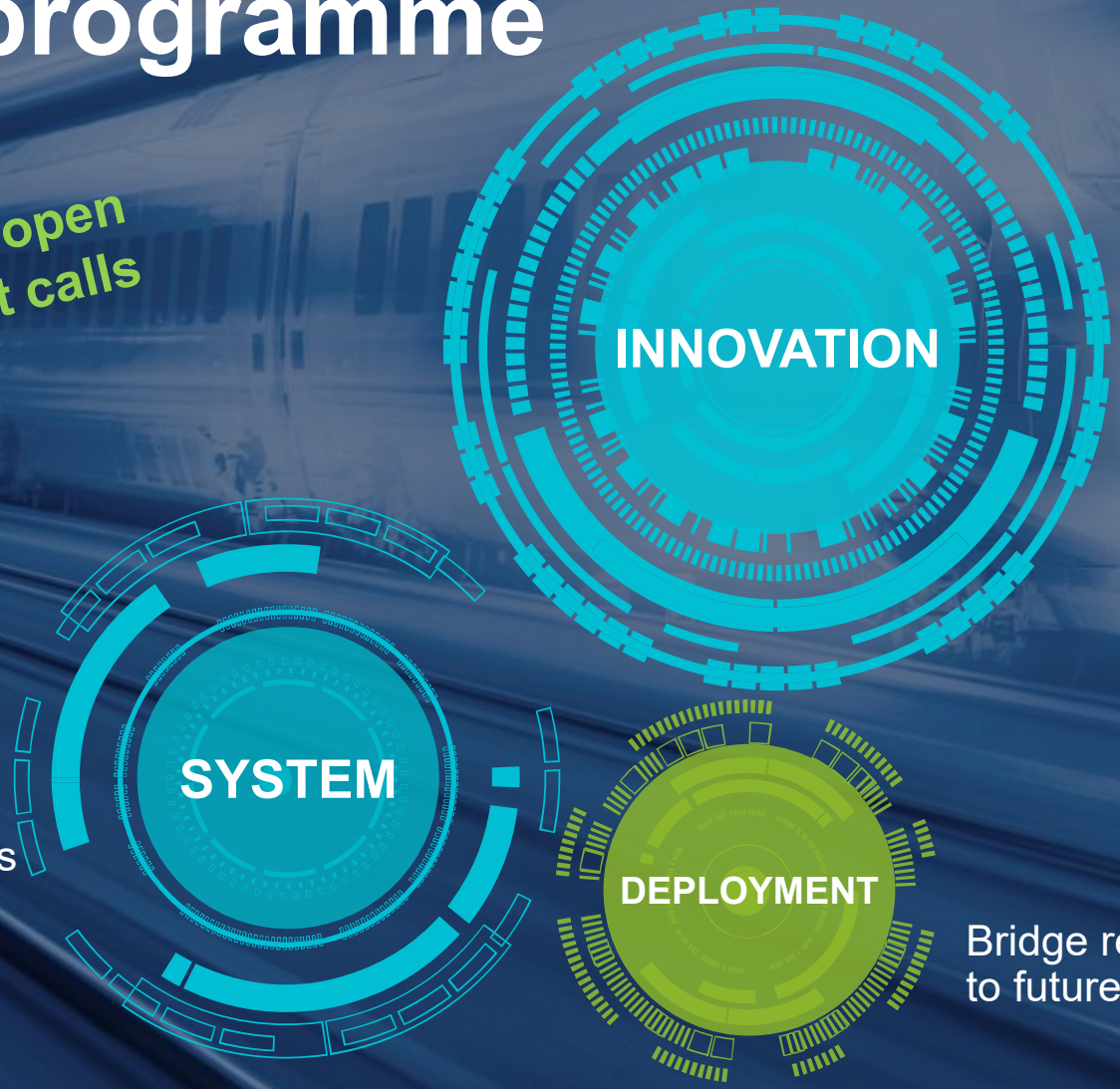


One integrated R&I programme

Private Members contribution, at least **€615 million**

EU contribution, up to **€615 million**

Implemented in open and transparent calls



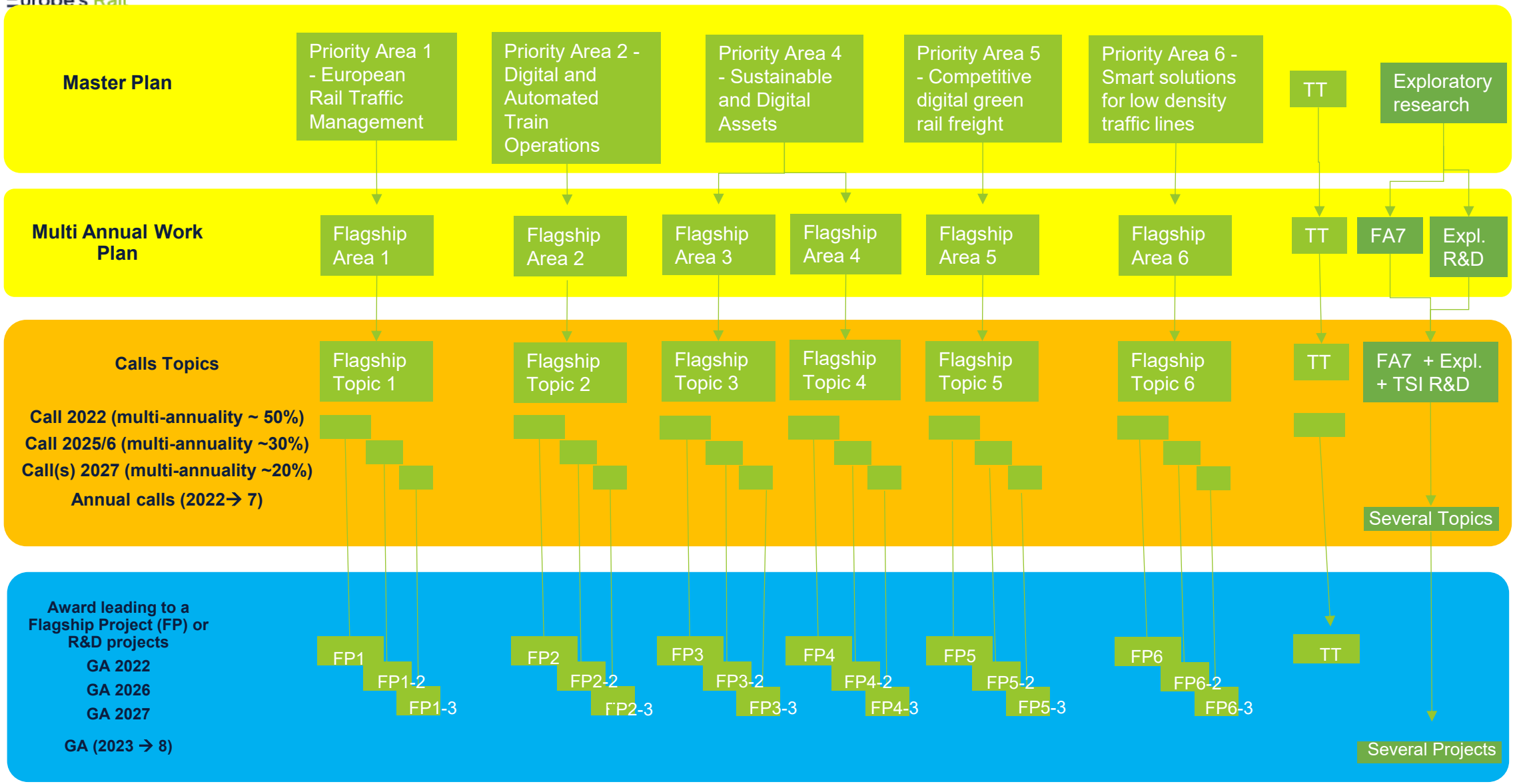
Flagship Areas :

- Traffic Management
- Automation and digitalization
- Integrated assets management
- Sustainable technologies
- Competitive freight
- Cost-effective regional services
- Innovation on guided transport

+ Launching **Exploratory calls**

- Ensure the functional system architecture
- Input to standards and regulations
- migration considerations

Bridge research and innovation to future coordinated deployment


Master Plan
Priority Area 1 - European Rail Traffic Management
Priority Area 2 - Digital and Automated Train Operations
Priority Area 4 - Sustainable and Digital Assets
Priority Area 5 - Competitive digital green rail freight
Priority Area 6 - Smart solutions for low density traffic lines
TT
Exploratory research
Multi Annual Work Plan
Flagship Area 1
Flagship Area 2
Flagship Area 3
Flagship Area 4
Flagship Area 5
Flagship Area 6
TT
FA7
Expl. R&D
Calls Topics
Call 2022 (multi-annuality ~ 50%)
Call 2025/6 (multi-annuality ~30%)
Call(s) 2027 (multi-annuality ~20%)
Annual calls (2022→ 7)
Flagship Topic 1
Flagship Topic 2
Flagship Topic 3
Flagship Topic 4
Flagship Topic 5
Flagship Topic 6
TT
FA7 + Expl. + TSI R&D
Several Topics
Award leading to a Flagship Project (FP) or R&D projects
GA 2022
GA 2026
GA 2027
GA (2023 → 8)
FP1
FP1-2
FP1-3
FP2
FP2-2
FP2-3
FP3
FP3-2
FP3-3
FP4
FP4-2
FP4-3
FP5
FP5-2
FP5-3
FP6
FP6-2
FP6-3
TT
Several Projects

Solutions delivered for rolling stock and on-board systems

26 of the 80 solutions in the Europe's Rail Solutions Catalogue, linked to the train subsystem they improve

Shift2Rail result
Europe's Rail result
◆ TRL ≥ 7 reached or in operational use

Bogie health diagnostics
Condition diagnostics of bogie components for predictive maintenance

Modular interiors & driver cabins
47% fewer parts, 43% faster layout change, +3.5–7% passenger capacity

Particulate microsensor & air-quality index
On-board particle sensing with dashboard and air-quality index

Lighter carbodies & running gear
Composites: ≥20% lighter carbody, 60–70% lighter running gear

Hybrid braking & airless brake-by-wire
Electro-mechanical braking with energy storage; ~1.1 GWh/yr saving estimated · TRL 5–6

◆ **Smart maintenance scheduling**
Optimised depot planning, fewer depot entries · TRL 7

◆ **Remote train operation in depots**
Vehicle moves without staff in the cab; TRL 7 in depot and yard

On-board train integrity
Enabler for moving and virtual block operation · TRL 5–6

Energy & noise assessment methods
Energy-saving potential 10% (passenger) / 30% (freight); noise simulated within 2 dB

◆ **Air-quality filtration (PEPA-F)**
99.9% bacteria reduction; particulate filter at TRL 7

Data-driven on-board maintenance
HVAC, brakes, sanitary: up to −10% cost, −25% in-service failures (Renfe/Talgo)

◆ **Eco-friendly CO_2 HVAC**
Natural refrigerant; 7% lower annual energy use in field tests on DB trains



Standardised onboard-to-cloud architecture
IP-based, COTS radio; up to 40% CAPEX/OPEX reduction · TRL 5

Train-to-train communication
Short-range links for shorter headways and cooperative localisation · TRL 5

On-board cybersecurity monitoring
Edge devices detect anomalous activity on train networks · TRL 6

Next-generation Train Control and Management System (TCMS)
Wireless TCMS and new train network; today >10 km of cabling per 20 m car

◆ **More efficient braking systems**
SIL4 electronic EP brake control and electro-mechanical brake at TRL 7

Innovative rail adhesion management
Braking and traction performance under low-adhesion conditions

◆ **SiC-based traction systems**
Up to 13% energy saving (regional), ~4% efficiency gain (metro); in commercial service

Radio-based relative localisation
Decimetre accuracy for automated shunting, no trackside equipment · TRL 5

◆ **New freight propulsion concepts**
SiC: +2% energy performance, −20% converter size and weight

◆ **Smart freight wagons**
+13% payload, −10% energy, −40–50% transport cost per unit

◆ **Digital Automatic Coupler (DAC)**
Automated brake test, train integrity and uncoupling · TRL 7

Optimised running gear
Condition-based maintenance: up to −12% maintenance cost, +15% reliability

Solutions delivered for rail infrastructure and assets

27 of the 80 catalogue solutions: track, switches & crossings, structures, energy supply, stations and maintenance

Shift2Rail result
Europe's Rail result
◆ TRL ≥ 7 reached or in operational use

◆ **Optimised turnout**
Optimised track stiffness: longer life, less maintenance and CO_2 · TRL 7/8

◆ **Track buckling risk model**
€15–25 m expected savings; piloted in the Netherlands · TRL 7

◆ **Station digital twin (BIM)**
Integrated in Hitachi Rail's ALVEA platform · TRL 7

Data-centric station digital twin
Reference case at Łódź Kaliska station (PL) · TRL 6

◆ **Graphene-enhanced sleeper**
TRL 8; registered in ADIF's validated product catalogue

Smart power supply & metering
Up to −30% fault-related costs; −5–15% maintenance effort

PRIME maintenance robot
Autonomous, modular inspection and maintenance robot · TRL 6 (2026)

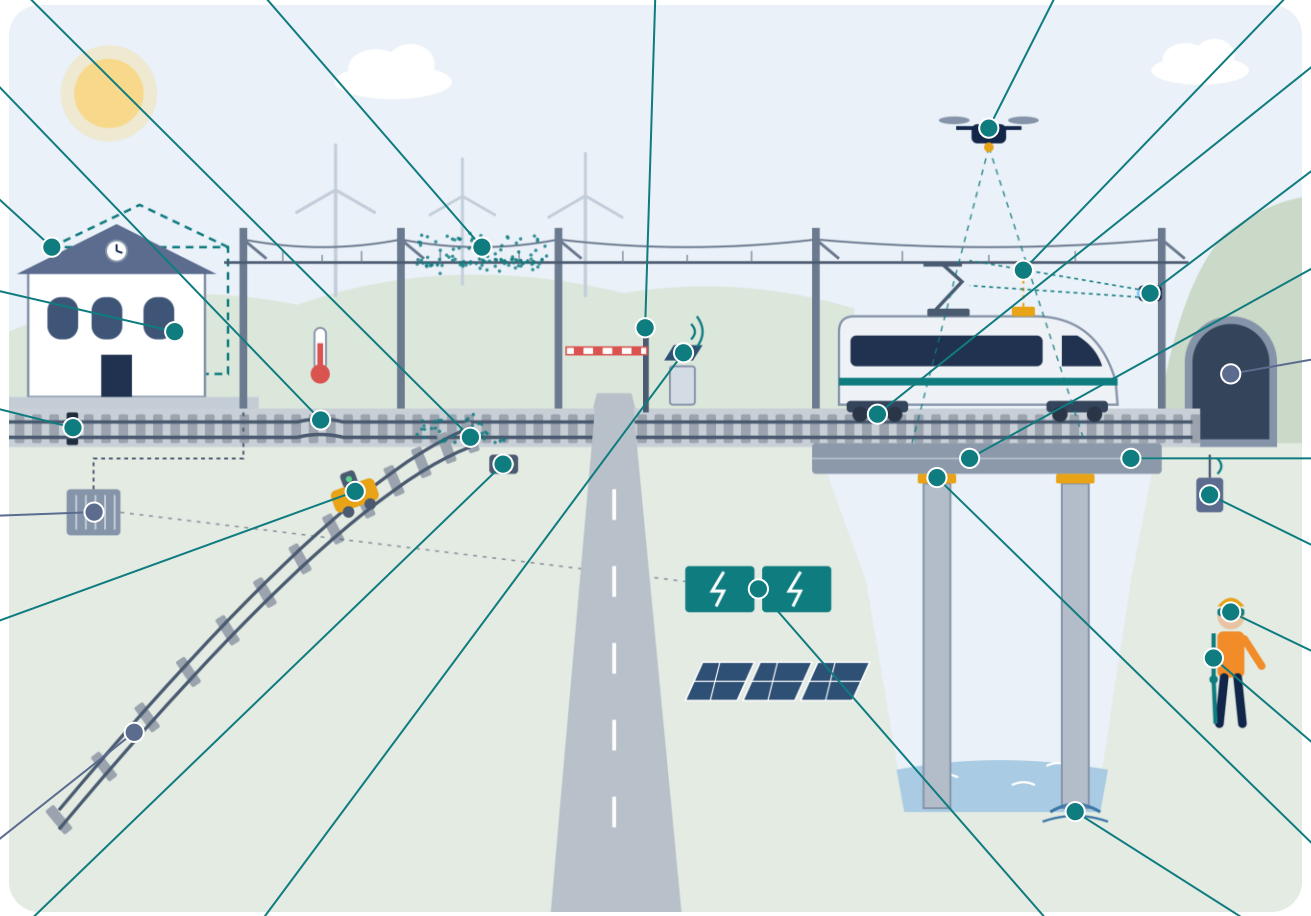
Next-generation track and S&C
10–20% life-cycle cost reduction; +20–30% capacity estimated

Smart monitoring of switches & crossings
Tested inSP, FR and NL; Madrid–Valencia high-speed line · TRL 6

Track data fusion in point clouds
Track geometry and overhead-line condition in one view · TRL 6

Self-sufficient, wireless Level Crossing & switch
Compact assets with renewable energy and wireless links · TRL 4–6

Autonomous drone inspection
AI anomaly detection and digital twin; tested on Czech lines · TRL 6



Off-grid energy module
Powers remote level crossings and switches with minimal cabling · TRL 5

◆ **The Energy Hub**
690 kWh storage; ~30% lower energy use; operating in Rotterdam · TRL 9

Automated contact-wire inspection
Non-contact monitoring of overhead-wire geometry · TRL 5–6

◆ **Rail anomaly detection from service trains**
Eddy-current sensing and machine learning for rail defects · TRL 6–7

Wayside pantograph monitoring
AI camera inspection in service; tested in ES and NL · TRL 5–6

Bridge health decision support
Fatigue analysis and modelling for steel and concrete bridges · TRL 6

Life extension of tunnels & bridges
−50% inspection frequency; bridge life extended by >10 years

◆ **European bridge & rolling-stock database**
509 bridges in 5 countries; 142,000+ train records · TRL 6–7

Dynamic maintenance planning
Holistic condition monitoring; ADIF high-speed line · TRL 6

Extended Reality maintenance support
Hands-free, step-by-step 3D guidance for field staff · TRL 6

Hybrid exoskeletons for maintenance
Combines passive (springs, dampers) and active (motors, sensors) support

◆ **Pot-bearing monitoring on HS bridges**
Multi-sensor monitoring with AI anomaly detection · TRL 7

Scour risk prediction
Machine-learning flood-scour risk for structures · TRL 6

Solutions delivered for the network, signalling & command-control

27 of the 80 catalogue solutions: CCS and communications, traffic management, freight logistics, data and multimodal services

Shift2Rail result
Europe's Rail result
◆ TRL ≥ 7 reached or in operational use

Fail-safe satellite positioning
Positioning error below 3 m; virtual balises at TRL 5

Absolute Safe Train Positioning
GNSS-based ETCS on-board positioning, less trackside equipment · TRL 5

◆ **Track condition model for ERTMS**
3D model validates ERTMS object placement before works · TRL 7

◆ **ERTMS Trackbot**
Robotic balise and axle-counter installation; NL roll-out · TRL 7–8

◆ **Digital reality model**
Measurement-train data for faster ERTMS/ETCS roll-out (NL) · TRL 7

◆ **European railway checkpoints**
Wayside gates in operation in German yards and across Europe · TRL 7

Dependable communications backbone
Adaptable communications, cybersecurity and train integrity

ATO over ETCS
GoA2 specifications; GoA3/4 demonstrator, 8 configurations integrated

Interoperable multimodal back-end
Travel Companion: plan, book, pay and track journeys across modes

Automated & cross-border traffic mgmt
Conflict detection and cross-border capacity planning · TRL 5–6

Accessibility & PRM trip planning
Piloted in Málaga, Asturias and Saarland · TRL 5–6

Satellite communication for railways
Complements FRMCS for resilience and remote lines

◆ **Multimodal hydrogen container**
H2Tainer: commercial launch scheduled for 2026 · TRL 8

Rail Data Space
Federated, sovereign data sharing across borders · TRL 5–6



Freight digitalisation & automation
−20% yard lead time; up to −50% terminal loading time

Automatic Train Operation up to GoA4
Mainline, regional, shunting and depot tests · TRL 6

◆ **FRMCS & moving block**
5G-based successor to GSM-R (TRL 7); moving block TRL 6–7

Integrated interlocking & RBC (regional)
Up to 40% CAPEX/OPEX reduction for regional lines · TRL 5

◆ **Seamless multimodal transport**
Rail–sea–road planning; ≥15% CAPEX/OPEX reduction · TRL 6–8

TMS – ATO / C-DAS integration
Plans and real-time operation aligned; energy-efficient driving · TRL 5

Automated shunting & train composition
DAC-enabled automation of flat and hump yards · TRL 5–6

Collaborative decisions in freight nodes
Digital Yard Coordination System for all actors · TRL 6

Safety & reliability management
Risk and decision-support tools; prototype addressed >60% of delay time

◆ **Disruption management**
Decision support and real-time re-planning; module at TRL 7

Asset monitoring – TMS link
Wayside condition data feeding traffic decisions · TRL 5–6

Europe’s Rail - System Pillar

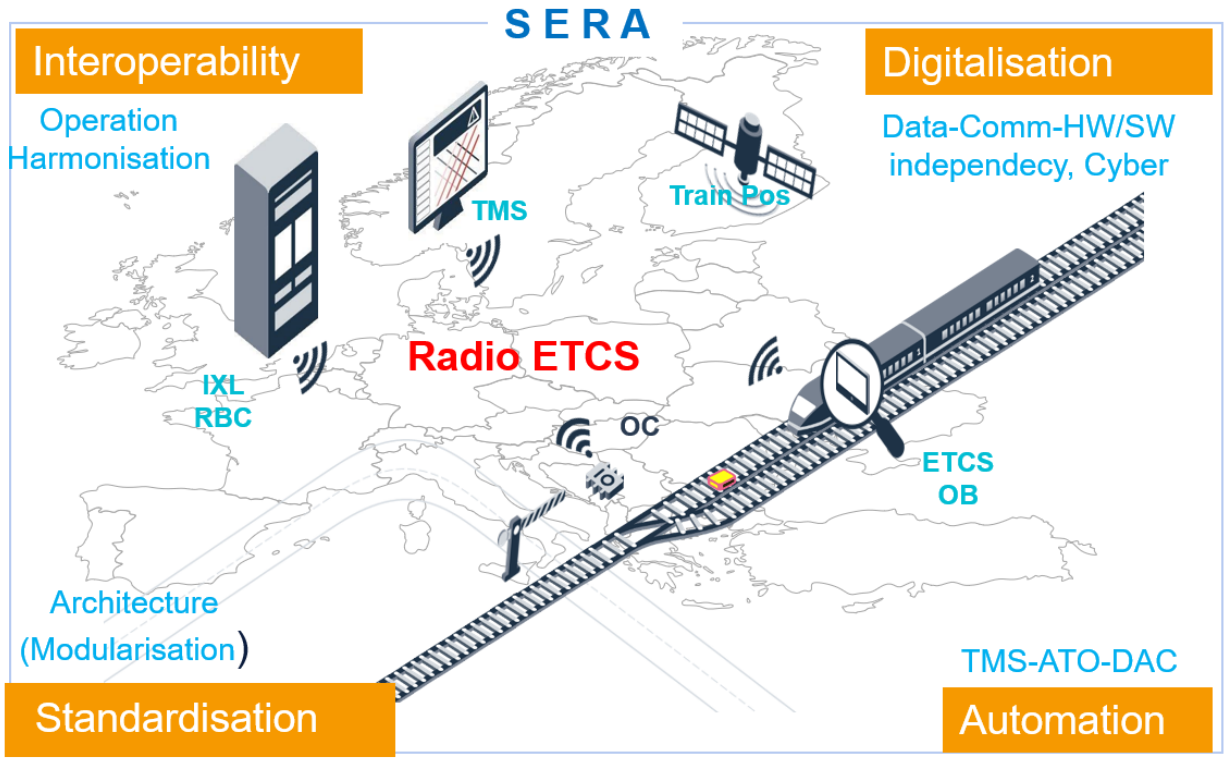
The **European Commission**, the **European Union Agency for Railways** (ERA), **Member States**, and the **rail Sector** agreed on a dedicated structure - System Pillar - to provide a unique opportunity to allow the Rail sector to Harmonize operations and products with a powerful and modular architecture for the ***Single European Rail Area*** (SERA).

System Pillar

MultiYear Programme

About 400 experts from the sector

50M€ EU funded



Reduce process effort on all sides (products, assets, production)

Accelerate product evolution by creating higher market potential per product

Healthy and affordable product and asset lifecycles.
Manage complexity and knowledge availability risks.

Improve interoperability

Deployment Group
from innovation to market

From Talking to Testing to implementing

- Bridge research and innovation to future coordinated deployment
- Support smooth, fast and cost-effective introduction of Innovations and new architecture
- Open group, contributing to whole railway sector and industry



Examines and provides recommendations on:

- Scenarios and analyses for the fast rollout of innovative solutions
- authorisation, cost-drivers, capacity and migration risks and mitigation measures

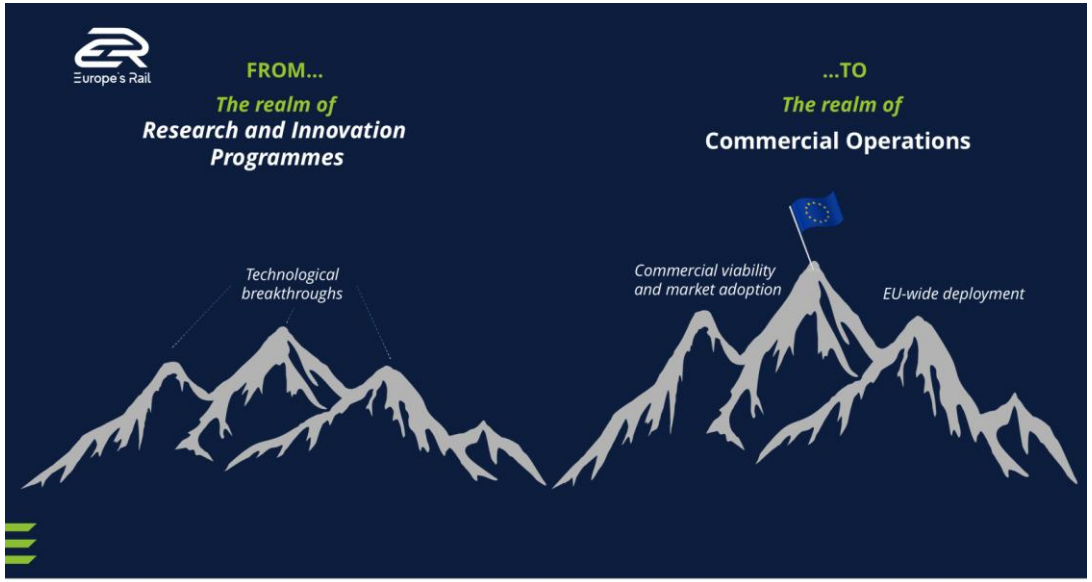
Importance to actively prepare for (pre-)deployment

Currently many ongoing development of new system requirements, design, technology and processes.

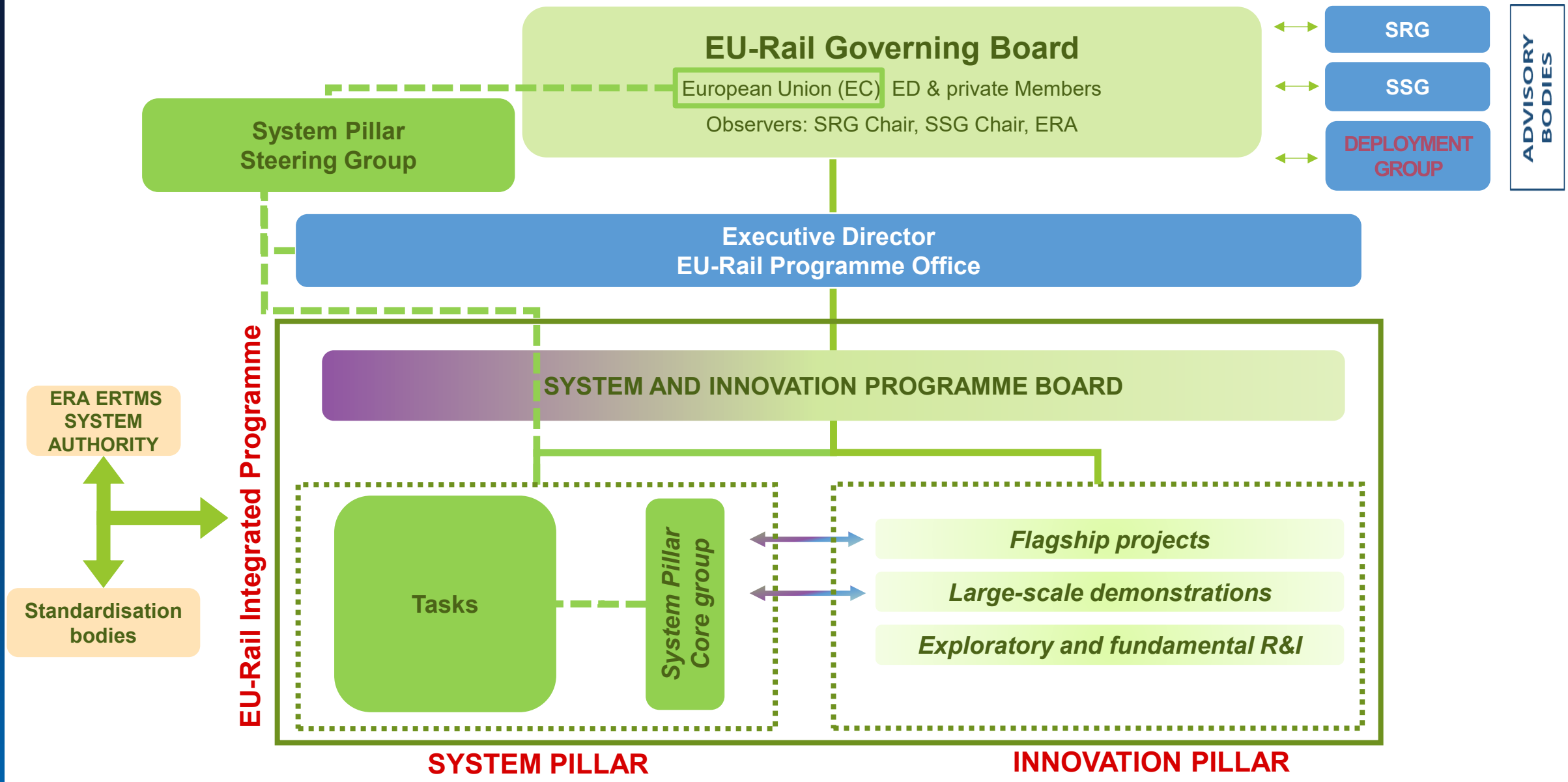
- ETCS, FRMCS, ATO, DAC, ASTP, …

Before full European (commercial) roll-out, large-scale use of new technology is needed

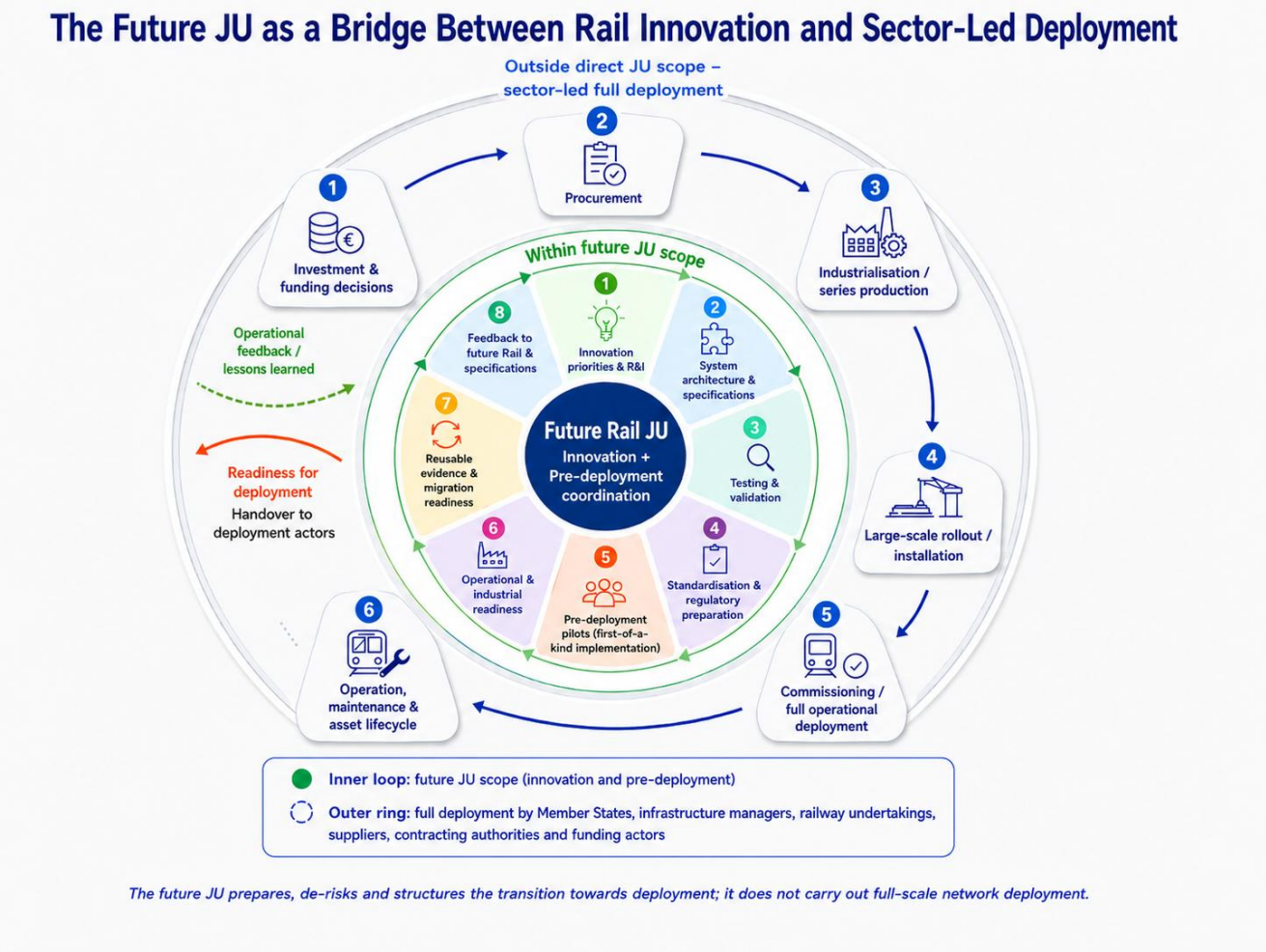
- to proof (economical) added value in real-life – commercial- operations (for MS's, owners, operators, IM's)
- To give information to stakeholders for sound and robust future investment decisions based on evidence and operational use cases
- To use and improve technology and process maturity for general deployment, production and investments
- Assess integration with other –existing- digital systems on trains, tracks and central IT systems.



Governance


EU-Rail Governing Board
European Union (EC) ED & private Members
Observers: SRG Chair, SSG Chair, ERA
SRG
SSG
DEPLOYMENT GROUP
ADVISORY BODIES
System Pillar Steering Group
Executive Director
EU-Rail Programme Office
EU-Rail Integrated Programme
SYSTEM AND INNOVATION PROGRAMME BOARD
ERA ERTMS SYSTEM AUTHORITY
Standardisation bodies
Tasks
System Pillar Core group
Flagship projects
Large-scale demonstrations
Exploratory and fundamental R&I
SYSTEM PILLAR
INNOVATION PILLAR

One EU structure to run the deployment-readiness loop in rail



The European deployment-readiness loop : common operational concept and EU rules · specification · testing & validation · authorisation preparation · migration & system integration · feedback into architecture, until deployment-ready.

Deployment is a loop, not a relay race.

Operational, technical and regulatory evidence generated by migration and system-integration work feeds back into specifications and system architecture — continuously, until an innovation is deployment-ready for full EU-scale roll-out by the market.

Continuity with programme-level correction

Across stages and years: impossible under ad-hoc consortia and annual calls.

A single system platform

One platform to research and design a truly European innovative architecture, specifications and migration for the whole European network (from existing legacy systems) governance across borders/

Institutionalised feedback

Lessons from pilots return into R&I priorities, standards and TSIs via the Joint Undertaking System Pillar–ERA interface.

Looking at the future

- [High-Level Paper on "A Future Policy-Based Public-Private Partnership for Rail"]



- [CEOs of Europe's Rail private members reaffirm their commitment to future rail Joint Undertaking in a video series]





Europe's Rail

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Smart Built Toolbox

Keeping programme knowledge alive – while the programme runs and after it ends

Michael Strömgren · Programme Director, Smart Built Environment · IQ Samhällsbyggnad

With support from
VINNOVA Sweden's Innovation Agency
Swedish Energy Agency
FORMAS
Strategic innovation programmes

IQ Samhällsbyggnad

SMART BUILT ENVIRONMENT

TWO PROGRAMMES, SHARED CHALLENGES

Every programme produces knowledge. Where does it go?

Driving Urban Transitions · 173 projects

Smart Built Environment · 330+ projects

SHARED CHALLENGE · DURING THE PROGRAMME

Data to steer with

An overview of portfolio, calls and impact goals – without piecing it together by hand.

SHARED CHALLENGE · AFTER THE PROGRAMME

Knowledge that lasts

Results that stay findable and usable when the programme ends – not lost in PDFs.

> **“ Different programmes, shared challenges. We started early – and want to share what we have learned.”**

SMART BUILT ENVIRONMENT

FROM REPORTS TO STRUCTURED DATA

A treasure chest that ~~was~~ hard to open

330

+

PROJECTS



NOW

Shared data management

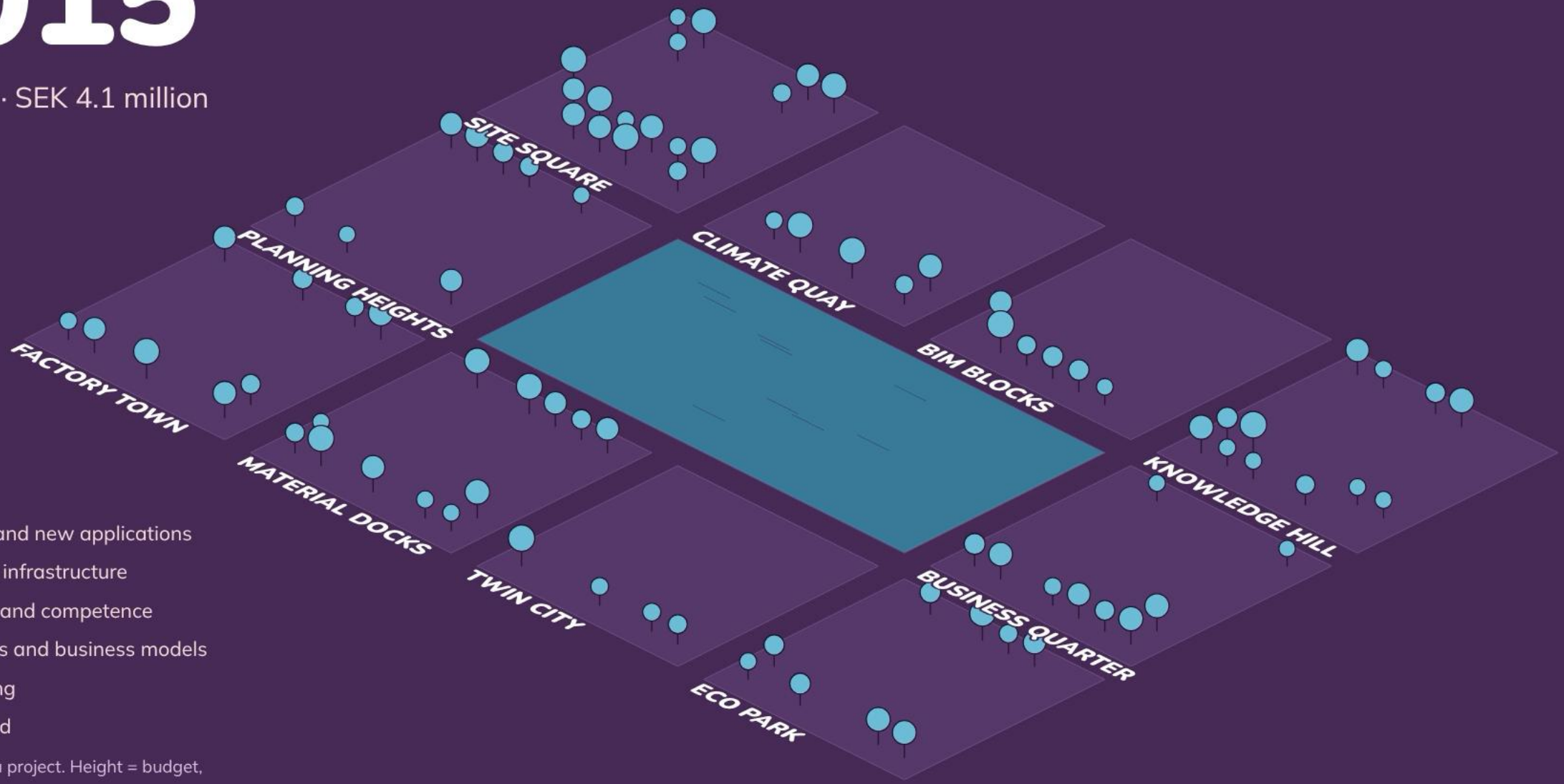
- Connected
- Searchable
- Updated automatically
- Data in the EU · European AI

SMART BUILT ENVIRONMENT

SMART BUILT ENVIRONMENT

2015

4 projects · SEK 4.1 million

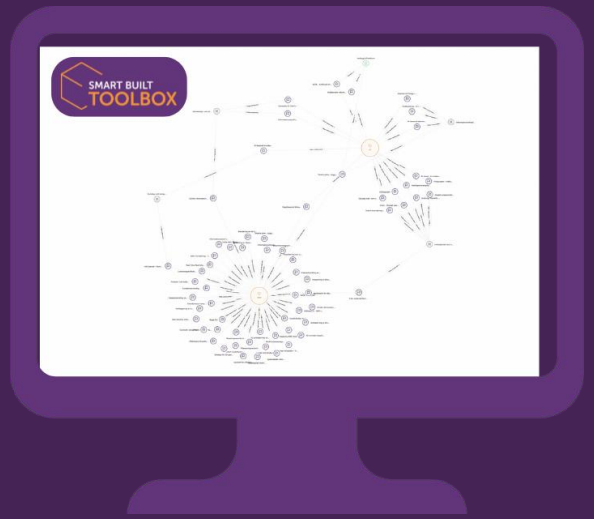


- Innovation and new applications
- Information infrastructure
- Knowledge and competence
- Value chains and business models
- Cross-cutting
- Not specified

Each building is a project. Height = budget, crane = ongoing.

THE PLATFORM

What is Smart Built Toolbox?



Graph database

Projects, actors, funding and results in one connected model.

Web visualisation

Explore the whole portfolio as an interactive network.

AI categorisation

Projects tagged by technology, impact goal, thematic area and result type.

AI chatbot Smartie

Ask questions in plain language across all project material.

Next application?

Quick to vibe-code on the same foundation

SMART BUILT ENVIRONMENT

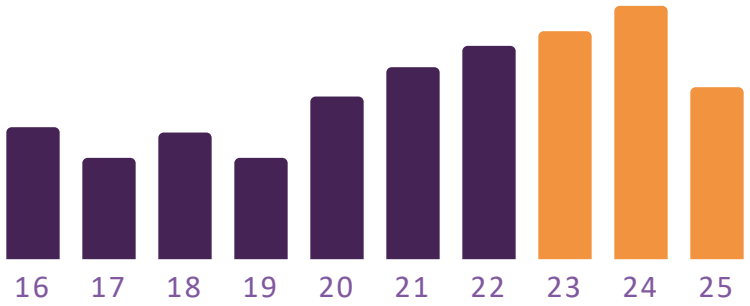
EXAMPLE 1 OF 4 · DASHBOARD

Portfolio overview at a glance

The board's programme overview

338	482	38	73 %
projects	MSEK granted	ongoing	final report

Projects per decision year



Actors

654 organisations

187 coordinators

25 countries

FOR WHOM

Board, programme office and funders

WHAT IT DOES

Key figures, themes and trends over time – and where programmes overlap.

DATA IT USES

Funder data · Web · Reports · Programme office · AI

EXAMPLE 2 OF 4 · EVENT TOOL

Matchmaking before and during events

Matchmaking via a QR form

Fire Safety Conference 2026

Biggest challenge before 2035?

“ AI: That the facts are verified vs the regulations.”

Role

Inspection, fire and rescue service

Send – get 5 projects



38 responses **190** recommendations

MOST RECOMMENDED PROJECTS

The unbroken information chain for fire safety

24

Information infrastructure for digital fire safety

24

Smart processes for planning, building, managing and using

21

FOR WHOM

Organisers and participants

WHAT IT DOES

Matches participants with projects, themes and each other – so the right people meet.

DATA IT USES

Funder data · Web · Reports · Programme office · AI

EXAMPLE 3 OF 4 · COMMUNICATION MATERIAL

From portfolio to ready-made material



FOR WHOM

Programme office and communicators – here for Sweden’s Delegation for Circular Economy

WHAT IT DOES

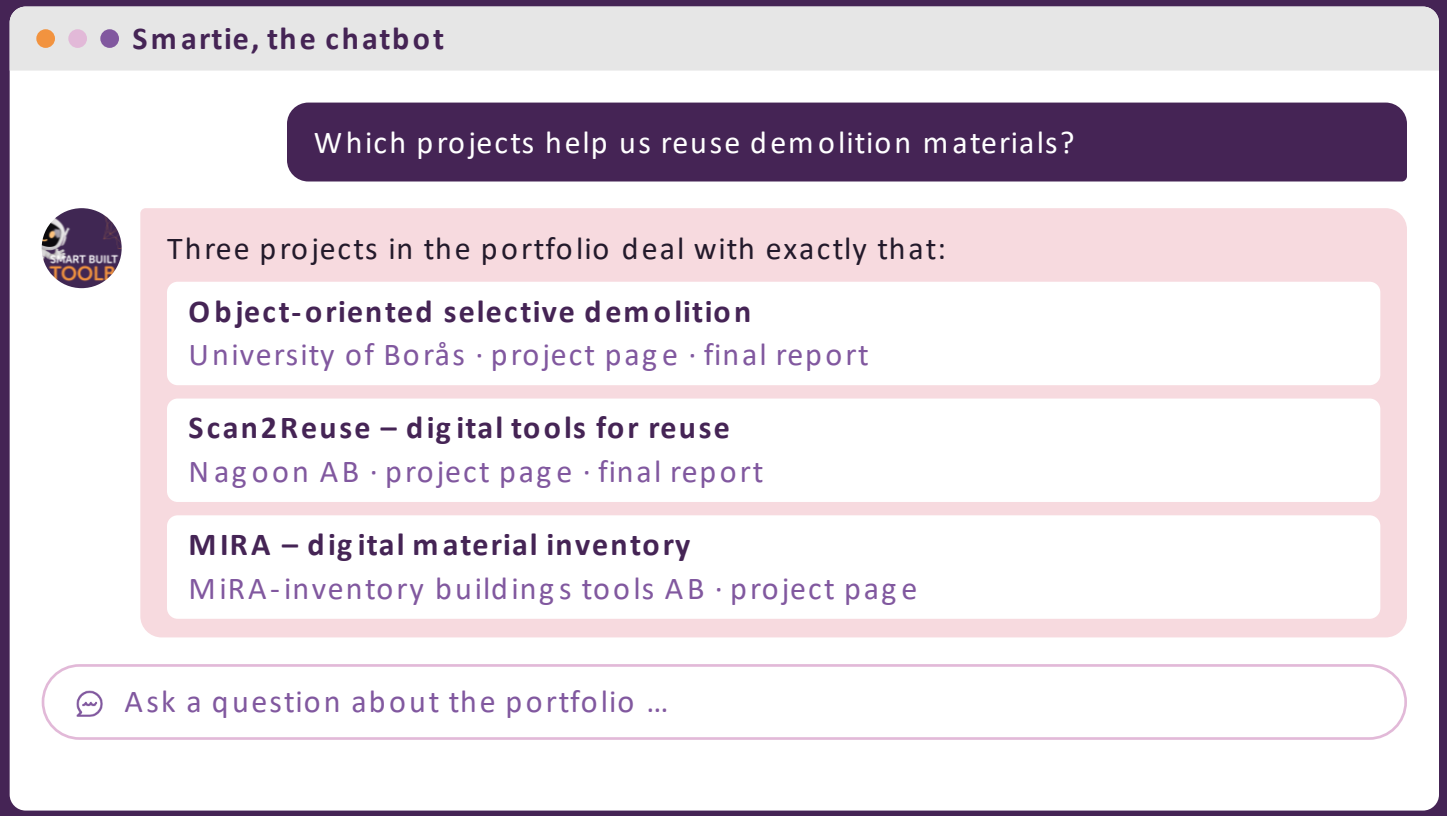
Ten good examples from Toolbox. The fact box comes from funder data, the text from project pages and final reports.

DATA IT USES

Funder data · Web · Reports · Programme office · AI

EXAMPLE 4 OF 4 · THE CHATBOT

Questions in any language – answers with sources



FOR WHOM

Industry, researchers and the public

WHAT IT DOES

Answers with a link to the source in the project material – not with guesses.

DATA IT USES

Funder data · Web · Reports · Programme office · AI

EXAMPLE · PROGRAMME STEERING

From output to impact

Impact logic vs outcomes

IMPACT GOAL	PROJECTS	SHARE 2016 → 2020 → 2023
Efficiency	223	87 → 68 → 80 %
Reduced climate impact	113	31 → 40 → 48 %
Value chains and business logic	119	62 → 34 → 28 %
Quality of the built environment	51	14 → 20 → 19 %
Circularity	47	18 → 17 → 14 %

FOR WHOM

Programme management and funders

WHAT IT DOES

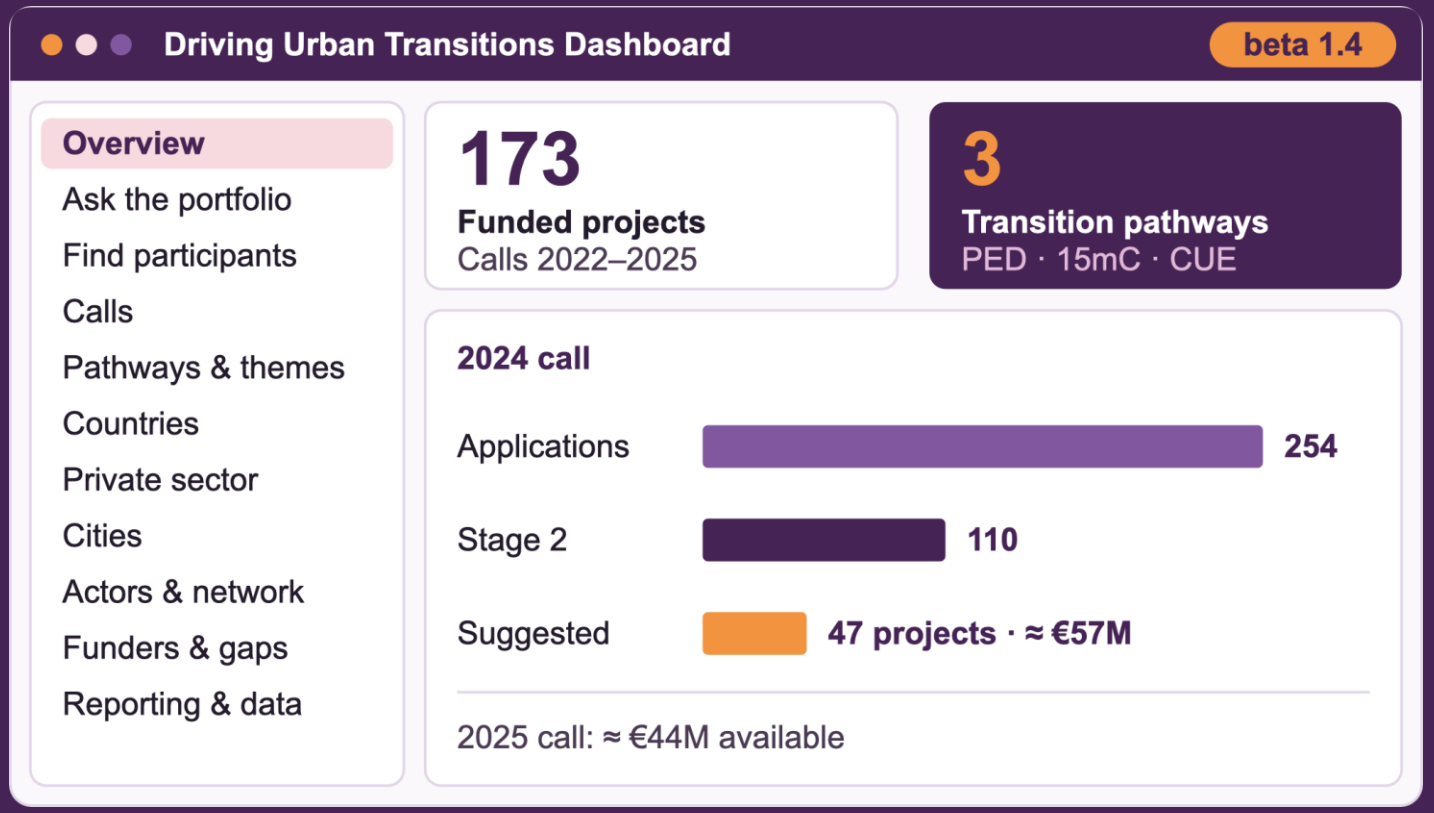
How do project results contribute to the programme's impact goals? Input for steering.

DATA IT USES

Funder data · Web · Reports · Programme office · AI

EXAMPLE · DRIVING URBAN TRANSITIONS

Rapid prototype: the DUT dashboard



offpath.eu

Beta built in the Toolbox Sandbox on DUT project partner data, 2022–2025 calls.

SMART BUILT ENVIRONMENT

WHAT COULD CARRY OVER

Potential for partnerships

Knowledge that outlives the programme

Results stay findable and usable after the programme ends.

Your data, under your control

On European servers, with European AI.

Open access via MCP

Any AI assistant can work with the data – on your terms.

ALREADY ON THE SAME FOUNDATION **Smart Built Environment · InfraSweden**

We are happy to share our experiences – and happy to explore collaboration too.

SMART BUILT ENVIRONMENT

TRY IT NOW

Scan and explore Smart Built Toolbox

- Explore the portfolio
- Describe your challenge – get matched projects

smartbuilttoolbox.se

Michael Strömgren · michael.stromgren@iqs.se

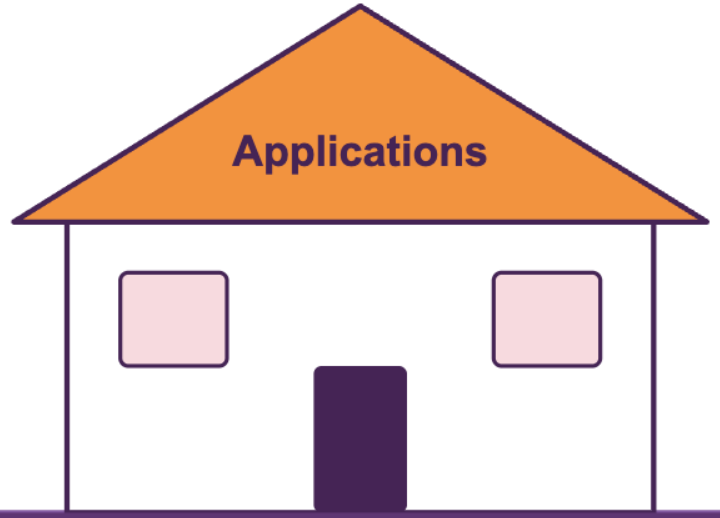
With support from
VINNOVA Sweden's Innovation Agency
Swedish Energy Agency
FORMAS
Strategic innovation programmes

IQ Samhällsbyggnad

SMART BUILT ENVIRONMENT

WHAT WE HAVE ACTUALLY BUILT

Applications stand on a solid foundation



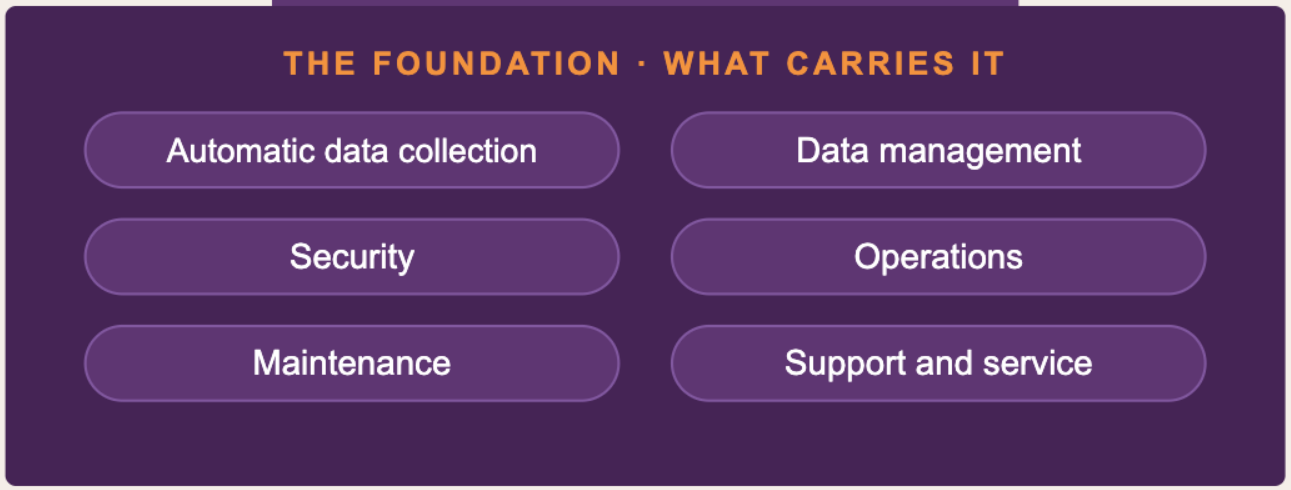
WHAT YOU SEE

Smartie (AI chat)
Portfolio visualisation
Dashboards
AI categorisation
Analysis and steering

BELOW GROUND

The foundation takes time and resources to build.

It already exists – your programme can build its own floor directly on it.



TAILORED TO RELEVANT DATA

Many sources in, many interfaces out

DATA SOURCES

- Programme web pages
- Funder APIs, e.g. Swedish GDP
- Excel sheets
- Reports and PDFs
- Your sources …

THE TOOLBOX MODEL

One shared graph

Project, actor, funding, result – with AI categorisation and source traceability

Today: Smart Built Environment and InfraSweden's SIP data – web, API, Excel, reports

INTERFACES

- Web and chatbot
- Dashboards
- External APIs
- MCP for AI assistants
- Conference tools

Flexible by design: we tailor the intake to relevant sources and build the interfaces for various application need.

SMART BUILT ENVIRONMENT

Sustainable Blue Economy Partnership

Communicating project results for lasting impact

Lessons and next steps from the Sustainable Blue Economy Partnership



Who we are

The Sustainable Blue Economy Partnership is a Horizon Europe co-funded partnership.



6 yearly co-funded calls for R&I proposals planned, with the 4th recently launched. But many additional activities, such as:

- Clusters of projects, by theme or sea basin
- Access to research infrastructures
- Pilot on corporate ocean data sharing

How our communication has evolved

First years: build the brand (2022-2025)

Now: show what projects produce

- Over 40 projects running
- First cohort (2023 call) halfway through
- Second kicked off this year

Legacy: keep results reusable and findable (from 2029)

What we have been testing

PROJECTS AS PARTNERS:
Training, listening & resharing

- Science communication training
- Q&A session to hear from them
- Resharing their content, with no previous request

VISIBILITY:
A stage for projects' work

- Digital Ocean Forum: shared booth, materials, arranged meetings
- Our biennial symposia: projects in the programme, posters
- Goal: put them in front of the right person

UNDERSTANDABLE RESULTS:
Storytelling from projects

- Blue Economy Capsules: videos explaining a keyword through a funded project
- Podcast, coming soon: one project per episode, for a specialised audience

What we want to try next

Mid-term reports as an opportunity

- First call reports already hold outputs
- Adapt them with colleagues, in simple form, to avoid double ask
- Update project pages with concrete outcomes (requested by reviewers)

An internal comms hub

- Simple board on Trello or Notion
- Resources: reusable content, hashtags, guidelines…
- Two-way channels: a simple place for projects to post news, publications, events…

Projects-only newsletter

- With opportunities and updates, tailored just for them
- A reminder that we are here and they can reach out

Principle: collect information once, early, and make it recyclable

Lasting impact and where communication fits

Output / Outcome / Impact

One does not become another by itself. Time and knowledge circulation are needed.

From our communication work, we can help create the conditions for that:

- make results understandable
- get them to the right people
- create opportunities for exchange



Legacy plan to preserve results once funding and projects have ended.
No plan yet, so the term itself is to be defined, but we will leave lessons for whoever comes next.

After 2029 is uncertain. Making results easy to find and understand today is already legacy work, and impact for tomorrow.



Sustainable Blue Economy Partnership

Thank you for your attention!

Do you have questions or suggestions? Let's talk:

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Open Discussion

Questions for the speakers?

Reflections on the presentations?

Examples from your own experience?

We would appreciate your feedback.
Please complete this short Sli.do survey.

