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HIGHSPEED

Morocco 2023

HIGH-SPEED RAIL : THE RIGHT SPEED FOR OUR PLANET

Under the High Patronage of his Majesty King Mohammed VI

Session1.3 Room Karam1

Project architecture and management



Moderator : Dr. Andrea Giuricin
CEO, TRA Consulting, Italy





Session1.3

Project architecture and management

Speaker Lists;

1



Ms.Kaoutar
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Morocco

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France

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Mr.David
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France



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11TH WORLD CONGRESS OF HIGH-SPEED RAIL

Marrakech, 7-10 MARCH 2023

MOROCCAN HIGH-SPEED TRAIN "AL BORAQ" AS A PIONEERING EXPERIENCE FOR GREEN BONDS

Kaoutar EL HAJI
Financing manager – ONCF – Morocco
Session3-1.3 Project architecture & management





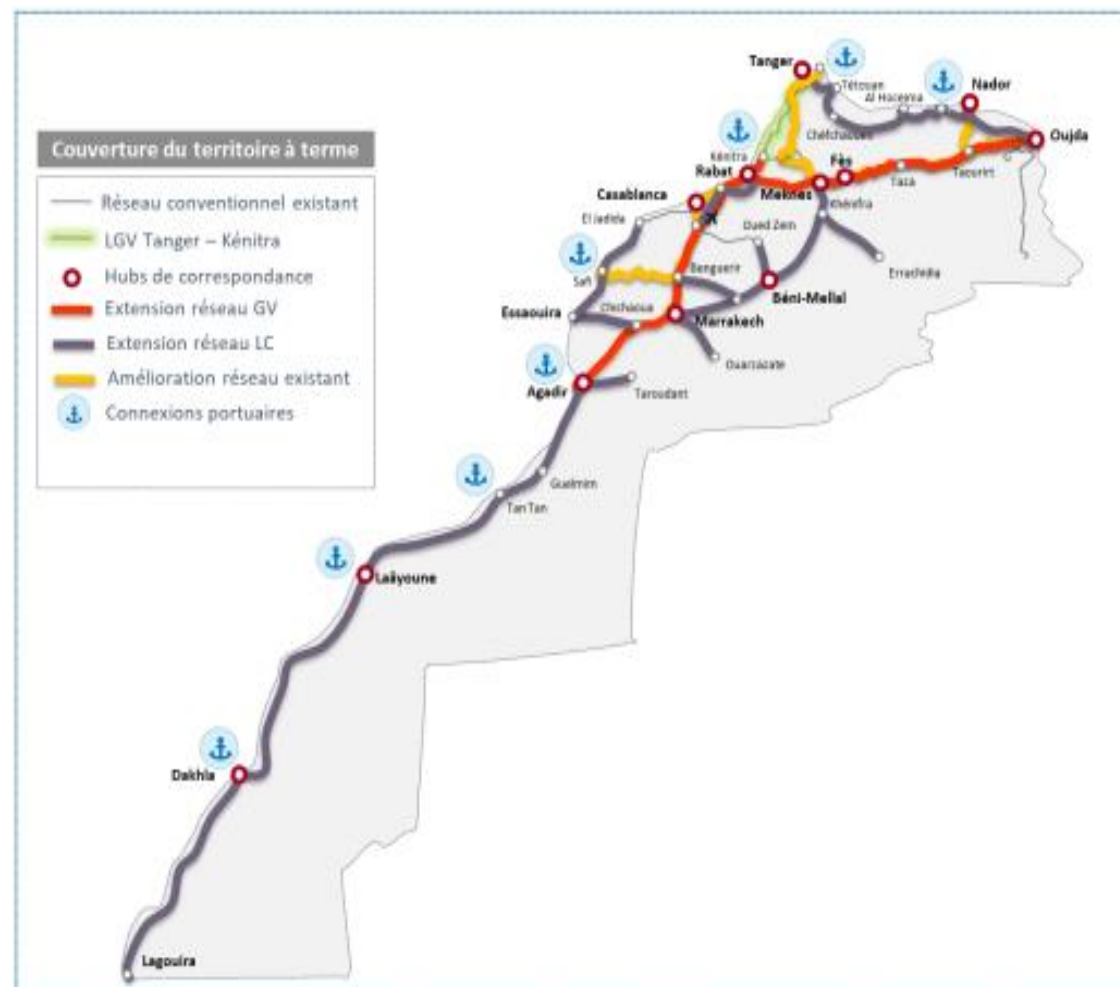
AL BORAQ – MAJOR STEPS

A master plan for High-Speed Lines in 2007, linking Tangier to Agadir in less than 4 hours, aiming a network of 1500 Km around 2 main axis:

- ❖ "Atlantic line" from Tangier to Agadir ;
- ❖ "Maghrebian line" from Casablanca to Oujda.

The 1st phase was the construction of the HSL between Tangier & Kénitra inaugurated in November 2018, which main characteristics are:

- ❖ Length : ~200 Km
- ❖ Design speed : 350 Km/h
- ❖ Operating speed : 320 Km/h
- ❖ Energy : electrified
- ❖ Traffic : passenger only
- ❖ Viaducts : 12 Units (10 Km)
- ❖ Road/ Rail bridges : 169 Units
- ❖ High-speed trains : 12 duplex trains



Railway Development Plan for Morocco
- including High Speed Lines -



AL BORAQ – IMPORTANT BENEFITS

A major asset of development

❖ Territorial Development

A new dynamic of interconnection between major economic poles of Morocco

❖ Efficient and social transport

Via offering fast, comfortable, safe, ecological and accessible transport for all

❖ Economic Attractiveness

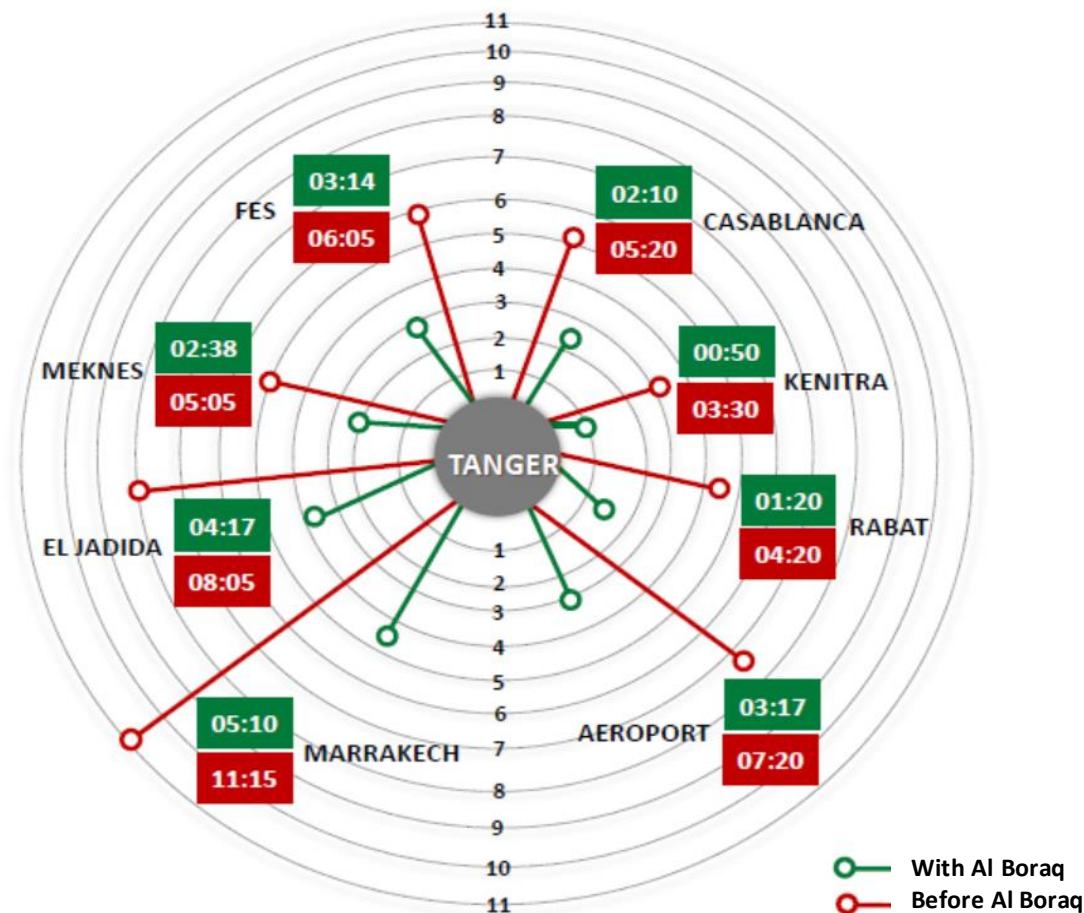
By strengthening the logistical and global competitiveness of the Kingdom

❖ Technological Leadership

A favorable climate for the emergence of a railway ecosystem

A significant reduction in travel time

- ❖ Tanger – Kénitra : **47 min. (vs. 3h15)**
- ❖ Tanger – Rabat : **1h20 (vs. 3h45)**
- ❖ Tanger – Casablanca : **2h10 (vs. 4h45)**
- ❖ & even for the whole network...





AL BORAQ – A RELEVANT MODEL

Diverse optimizations

- ❖ **Frugality of investment:** most competitive HSL in the world
- ❖ **Optimized pricing:** optimal price calculation and yield management
- ❖ **Controlled operations:** competitive operating costs

Financial results

- ❖ **A progressive ramp-up:** 4.1 M.PAX & Turnover of 554 M.MAD in 2022
- ❖ **EBITDA higher than forecast:** due to reduction of operating costs

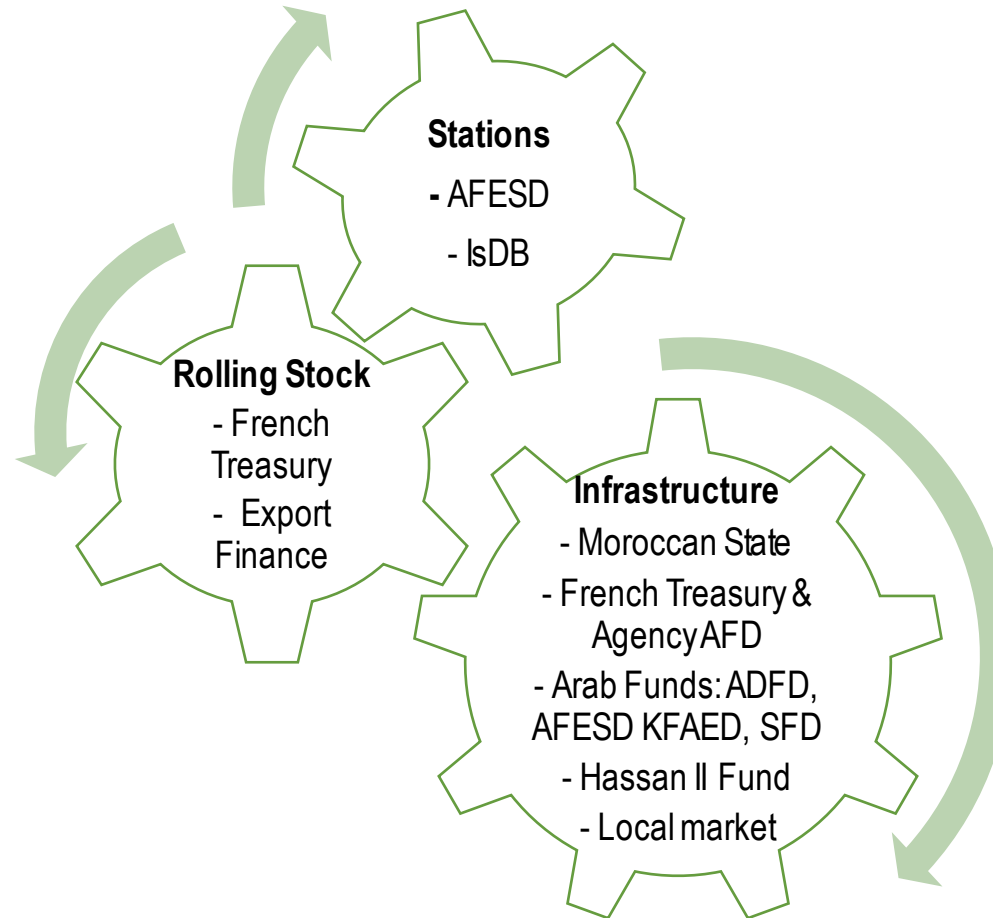
Project management

- ❖ Project led by ONCF, keeping control of infrastructure and operations
- ❖ French partnership for transfer of expertise and financial support
- ❖ ONCF carries debt through optimized financing, with State allocations...





AL BORAQ – FUNDING SCHEME



→ A diversified initial funding scheme, in addition to Green Bonds to refinance a debt for 1 Billion MAD issued in July 2022, **the first issuance of its kind in the sustainable mobility sector in Africa**



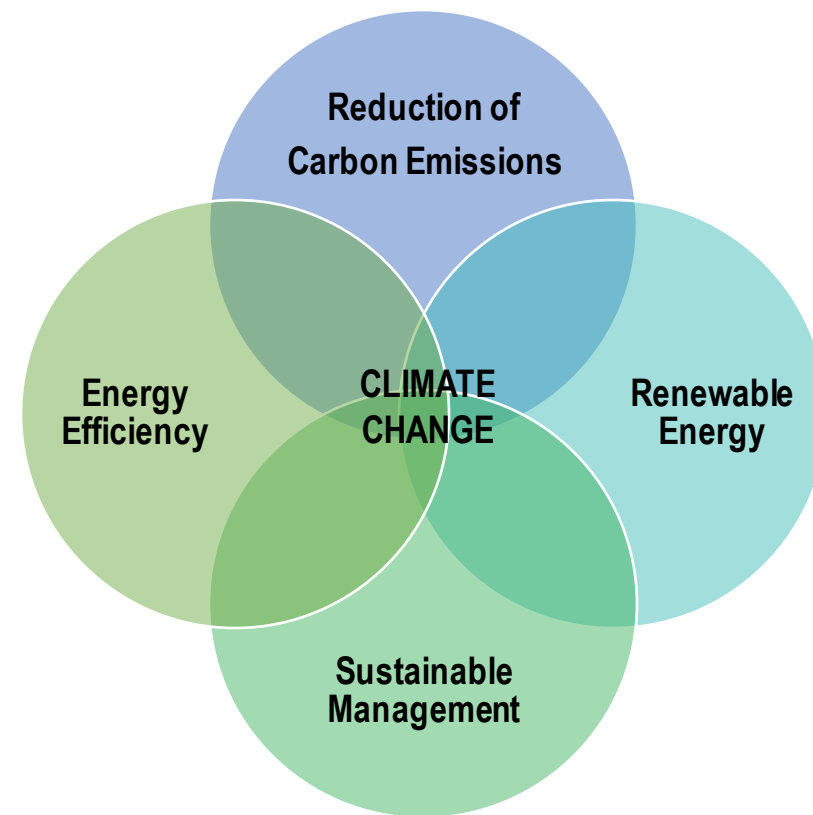
GREEN BONDS - OVERVIEW

What is a Green Bond?

- ❖ Branch of “Green Finance” or “Sustainable Finance”
- ❖ A financial instrument for raising capital from investors
- ❖ A mechanism involving the debt capital market
- ❖ Differentiated from a regular bond by its “green” label
- ❖ Designated as “green” by the issuer or another entity through a certification
- ❖ Committed to exclusively use the funds raised for special purposes
- ❖ To finance or re-finance “green” projects, assets or business activities

Emergence of Green Bond?

- ❖ 1st Green Bond issued in 2007 by European Investment Bank, followed by World Bank
 - ❖ Launched due to awareness of risks and challenges posed by climate change
 - ❖ Investors increasingly interested in making their portfolio more sustainable
 - ❖ Criteria & Guidelines promoted : Green Bond Principles, Climate Bond Standards...
- A key instrument to hedge climate change and shift to low-carbon and climate resilient investment.





GREEN BONDS – A PROVEN OPPORTUNITY

International Potential

- Sustainable Finance growing despite market volatility amid crisis worldwide
- Since its emergence, Green Bond Market hits **\$2000bn** milestone in 2022

National Orientation

- Railway considered as backbone of the “New Development Model” of Morocco
- Sustainability at the heart of ONCF’s commitments and development program

Legal & Regulatory Framework

- Local regulations aligned with the best international standards thanks to *AMMC*
- Vocation to attract local financial investors, but also foreign ones

Local & International Benchmark

- **4 Billion MAD** issued in Morocco: *MASEN, AWB, BP, BoA, Al Omrane & CFC*
- Wide range of sovereign or corporate issuers, including railway companies

Economic Situation

- High volatility for local capital market in 2022, with preference of floating rates
- Importance of the Green Bond Market, in terms of depth and characteristics

ONCF Financial Policy

- Strategy of diversifying sources of funding or financing mechanisms for ONCF
- Alternative and innovative financing options, in line with the Railway Reform



GREEN BONDS – AN ADEQUATE CONTEXT

Railway is the most environmental friendly mode of transport when compared to other urban and inter-urban modes

Trains



Planes



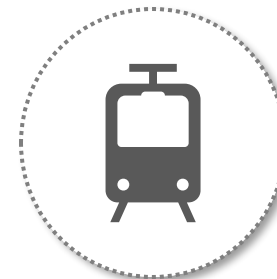
Cars



Coaches



Tramways



-25x of CO2 emissions

-7x of CO2 emissions

-6x of CO2 emissions

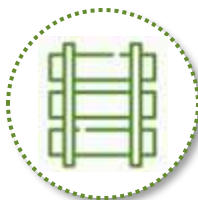
-2x of CO2 emissions

ONCF is fully committed to the principles of sustainability by putting durability at the core of its development strategy



CSR Strategy

Towards a greener and decarbonised activity



64% of network electrified

With the objective to generalize to whole lines



Electrified rolling stock

As part of its investment program



Wind energy for HSL

With the objective of using clean energy to power all trains



GREEN BONDS – A SUITABLE PROJECT

Socio-economic impacts of “Al Boraq”

Mobility benefits

- Connecting 2 major economic poles : Casablanca & Tangier
 - Satisfying a growing demand for mobility on this axis
 - Reducing travel time for the whole network

Sustainable benefits

- Reduction of road fatalities (~160 victims avoided per year)
- Reduction of GHG emissions (~2.9 million tons of CO2 equivalent over a 30-year period)
- HSL line exclusively powered by wind energy as of January 2022 (120,000 tons of CO2 avoided each year or 4 million trees planted)

Capacity clearance

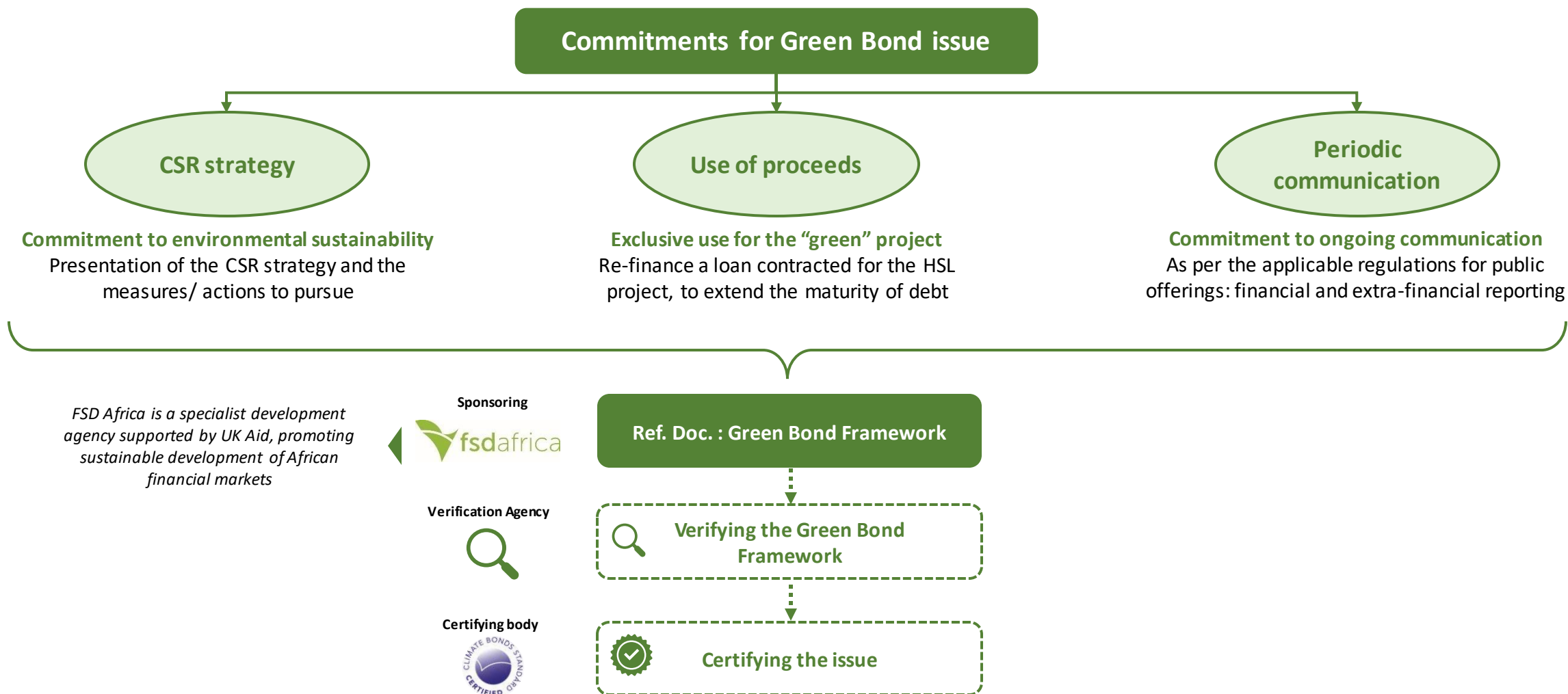
- Freeing up capacity for freight transport at Tangier-Med Port
- Development of freight traffic in favor of Tangier-Med Zone
 - Logistic competitiveness of the Kingdom

Local railway ecosystem

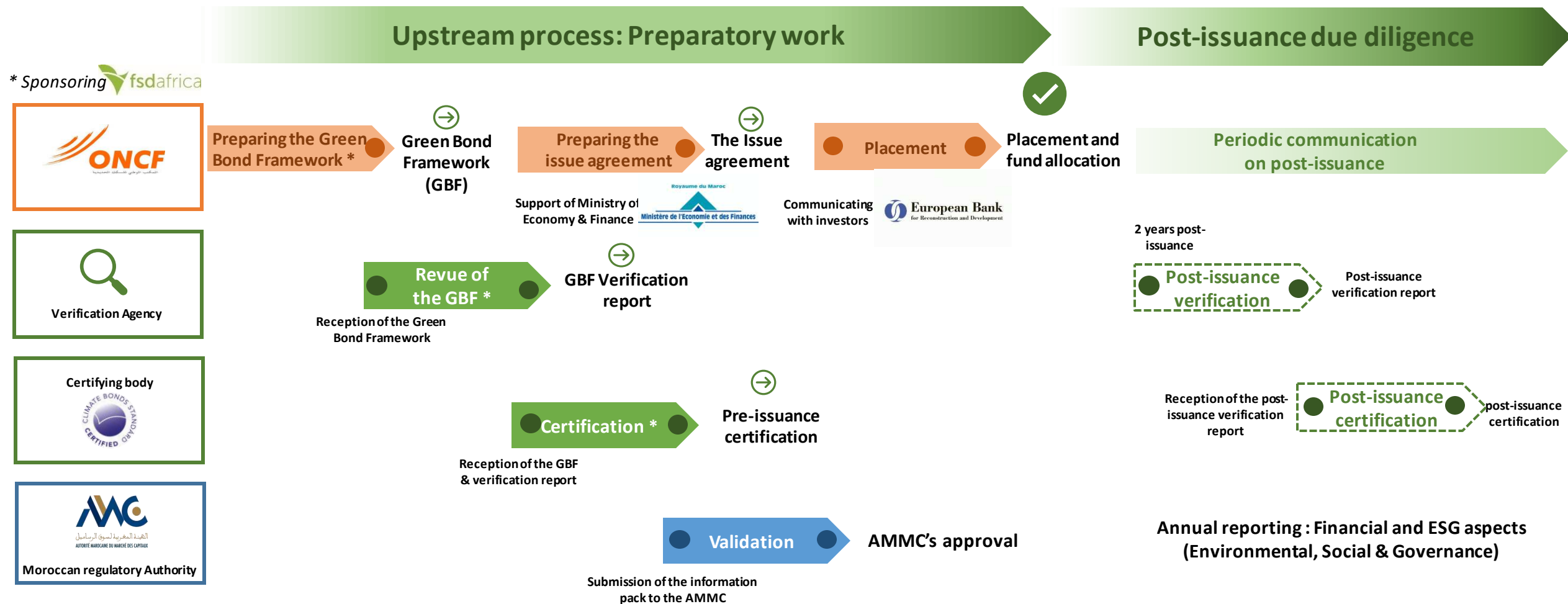
- Mobilizing 5000 workers
 - Creating 1500 direct jobs
- 90% of civil engineering work carried out by local companies
- Transfer of expertise for ONCF and Moroccan companies



GREEN BONDS – COMMITMENTS



GREEN BONDS – SPECIFIC PROCEDURES





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A NEW APPROACH FOR STAKEHOLDER ENGAGEMENT ALONG THE ENTIRE LIFE-CYCLE OF RAILWAY INFRASTRUCTURES

Nicoletta Antonias
Head of Sustainable Infrastructures, RFI, Italy
Session3-1.3 Project architecture and management





ITALIAN HIGH SPEED RAIL REVOLUTION IN MOBILITY AND PEOPLE'S LIFESTYLE

By *reducing distances* and bringing *citizens closer* together



Infrastructure as a milestone of a *complex system* of relationships and connections



Infrastructure to create a new projects «network» for a transformation of cities and territories



Mobility as an enabler of social life and territorial cohesion



The Station as an access «door» to local services

A NEW APPROACH FOR STAKEHOLDER ENGAGEMENT ALONG THE ENTIRE LIFE-CYCLE OF RAILWAY INFRASTRUCTURES



INFRASTRUCTURES BEYOND NEW SCENARIO OF SUSTAINABLE MOBILITY

- ❖ **elements able to trigger new economic, social and environmental development trend**, in the areas impacted by projects realization
- ❖ **active components of the processes of landscape structuring, transformation and territory upgrading**

The infrastructure works enable new connections between territories and sustainable mobility scenarios, but first of all improve the quality of life and increase the development and attractiveness of places, creating actual benefits and opportunities in a long term perspective

Transport infrastructure makes a real contribution to global sustainable development strategies that address social economic and territorial inequalities, through an improved accessibility and the integration of territories and represent the main milestone for the economic and social development of the Country, influencing its productivity, enhancing trade with other areas and markets





SUSTAINABILITY DRIVER OF A NEW MODEL FOR INFRASTRUCTURAL DEVELOPMENT

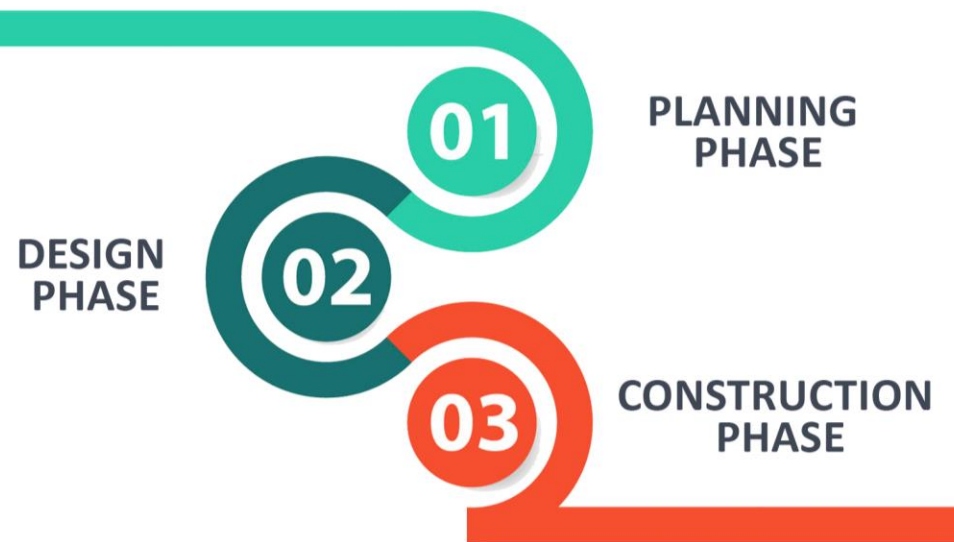


New approach

STAKEHOLDER Engagement



- ❖ To enhance the **integration of the infrastructural projects** in the territory
- ❖ To promote the **development of the socio-territorial context** of reference



Citizens and Communities must be the focal point of this model in which the railway infrastructures are part of a regeneration process aimed at building more sustainable, resilient and inclusive cities and territories



IDENTIFY THE “RIGHT” PROJECT



Identify the “right” project that meets the expectations of the Community



MAIN GOAL

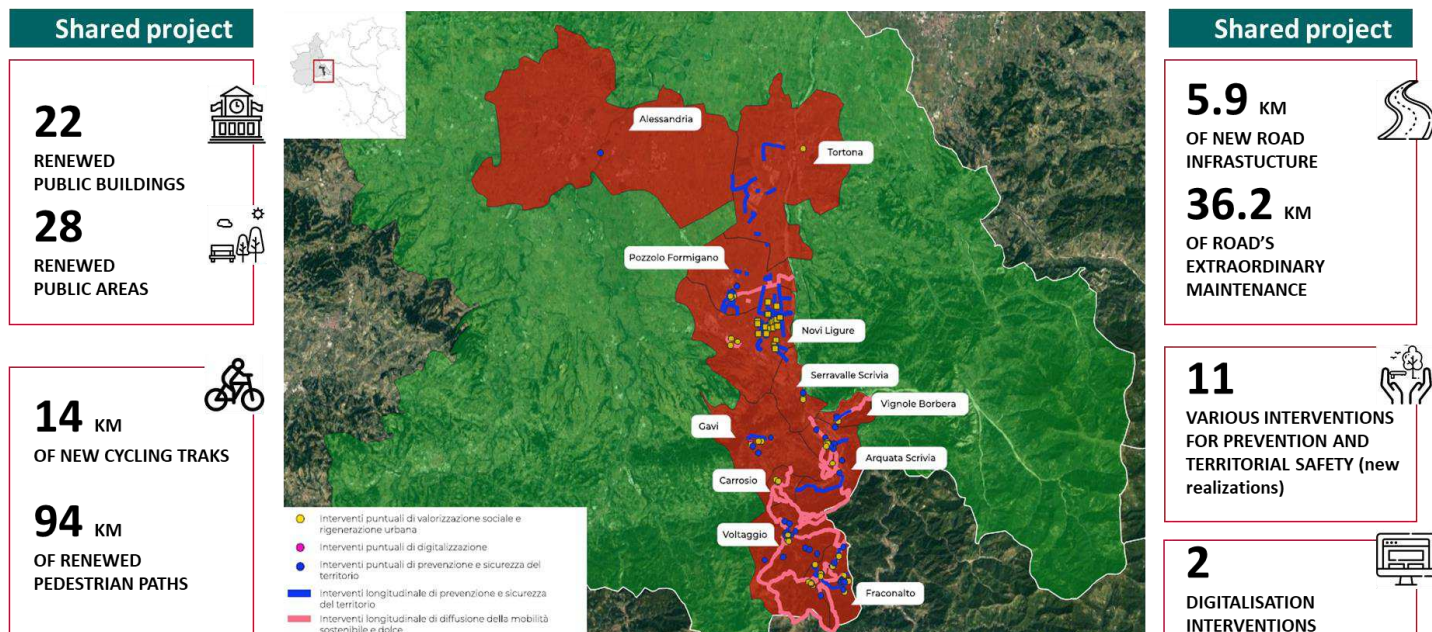
Identify and measure the benefits of the Project in terms of new opportunities for economic, social, environmental and touristic development

01 CONTEXT ANALYSIS

- ❖ Analysis of the main characteristics, potential and specific features of the territory
- ❖ Identification of opportunities for territorial development
- ❖ Social web monitoring



The example of Milano-Genova High Speed



The Sustainability Study has identified the benefits that the project brought to the communities in terms of sustainable and inclusive growth, measuring them by means of sustainability indicators that illustrate the opportunities generated, not only in relation to the new functionalities of the works, but also in their ability to enable a new perspective of connection and development of the territories

As a result, four lines of action were identified to promote the socio-economic development of the territory:

- diffusion of sustainable and soft mobility**
by valorising, requalifying and connecting pedestrian and cycling tracks and naturalistic areas;
- social valorisation and urban regeneration**
through the expansion and requalification of parks and other recreational and cultural facilities in urban areas;
- prevention and territorial safety includes increasing accessibility and territorial safety**
by means of new viability infrastructures and mitigation actions of hydrogeological risks;
- digitalisation of public services**
to support an effective communication with the general public and increase tourism attractiveness.

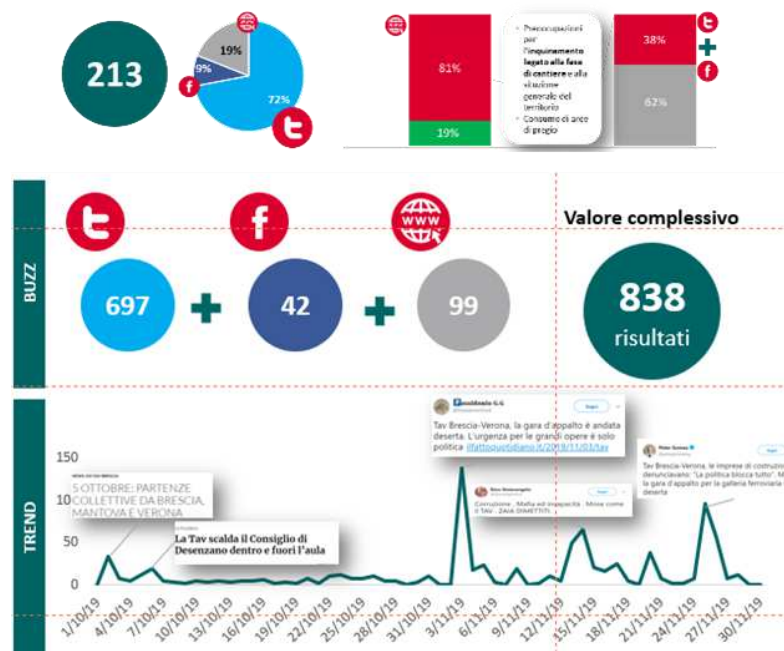




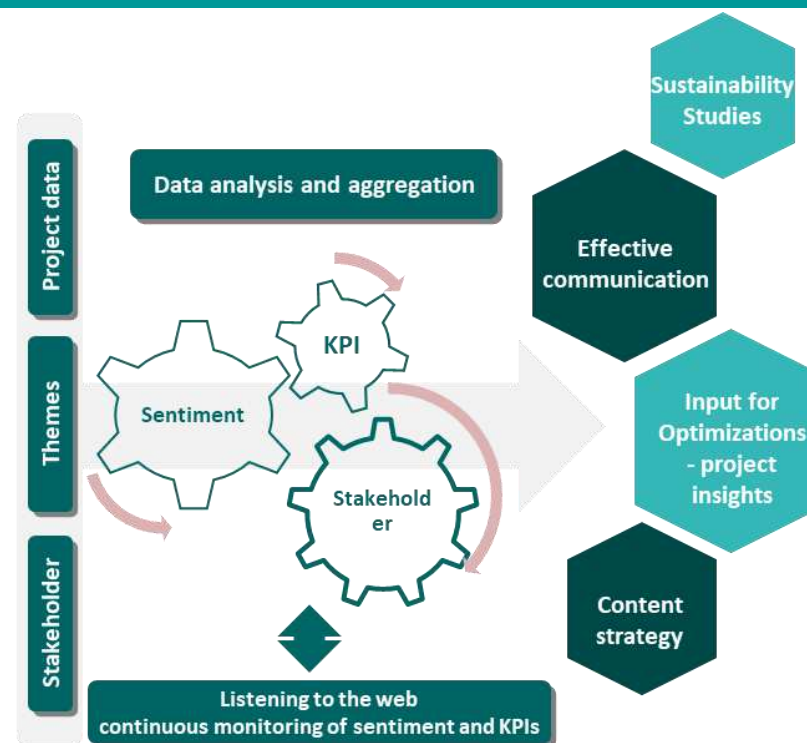
AN ACTIVE LISTENING OF STAKEHOLDER'S NEEDS

Main Tool

The Social Web Monitoring



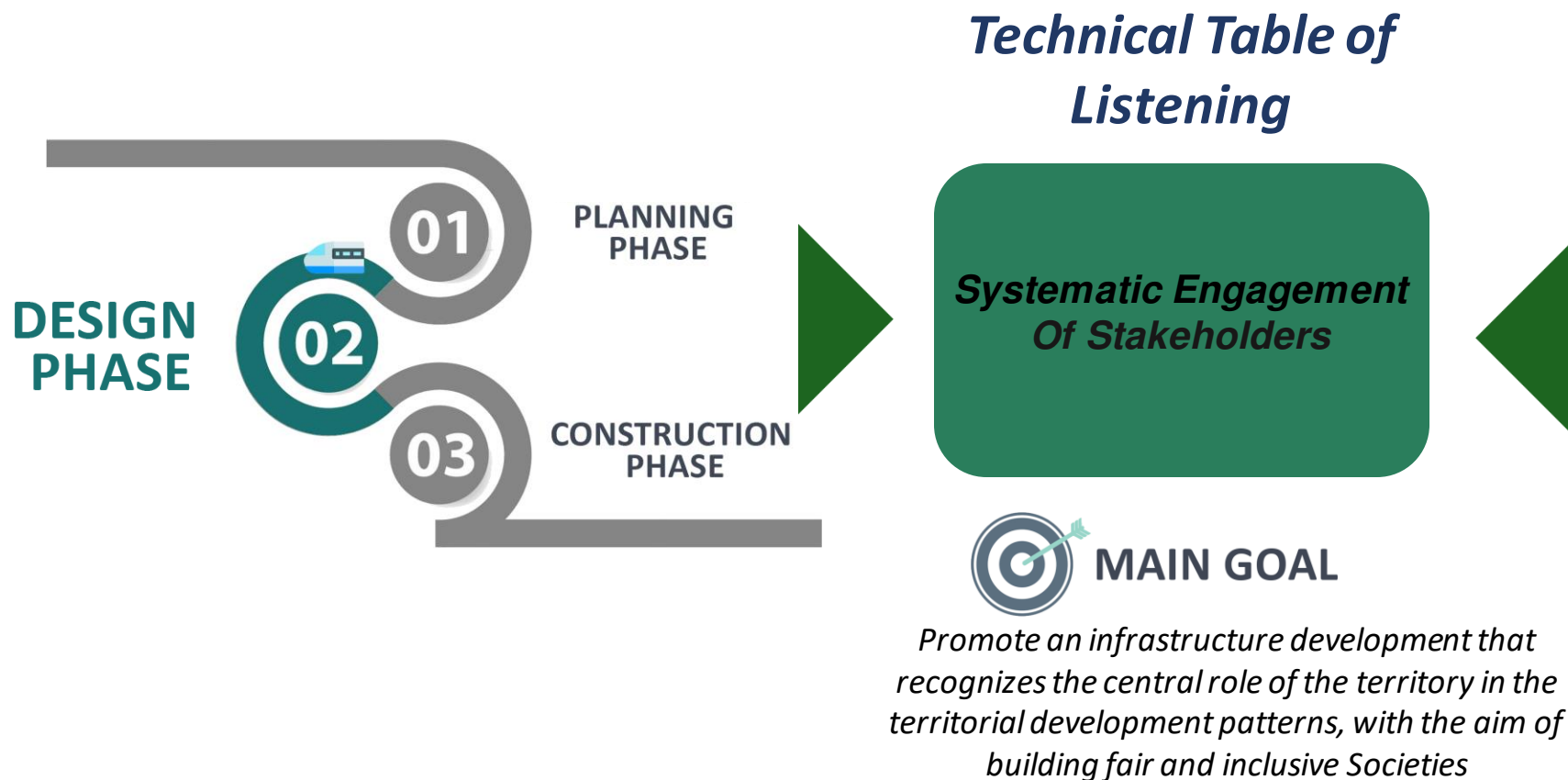
The Sentiment Analysis platform



The “Active listening” approach is useful for collecting opinions and monitoring the perceptions of stakeholder on key issues, by processing large amounts of data collected from newspapers, messages, tweets, posts and comments on the web



A NEW APPROACH FOR STAKEHOLDER ENGAGEMENT ALONG THE ENTIRE LIFE-CYCLE OF RAILWAY INFRASTRUCTURES



02 STAKEHOLDER ENGAGEMENT

STAKEHOLDER ENGAGEMENT PLAN

that identify for each project the **reference activities and the most appropriate methods and tools** for the engagement process

MEETINGS WITH STAKEHOLDERS

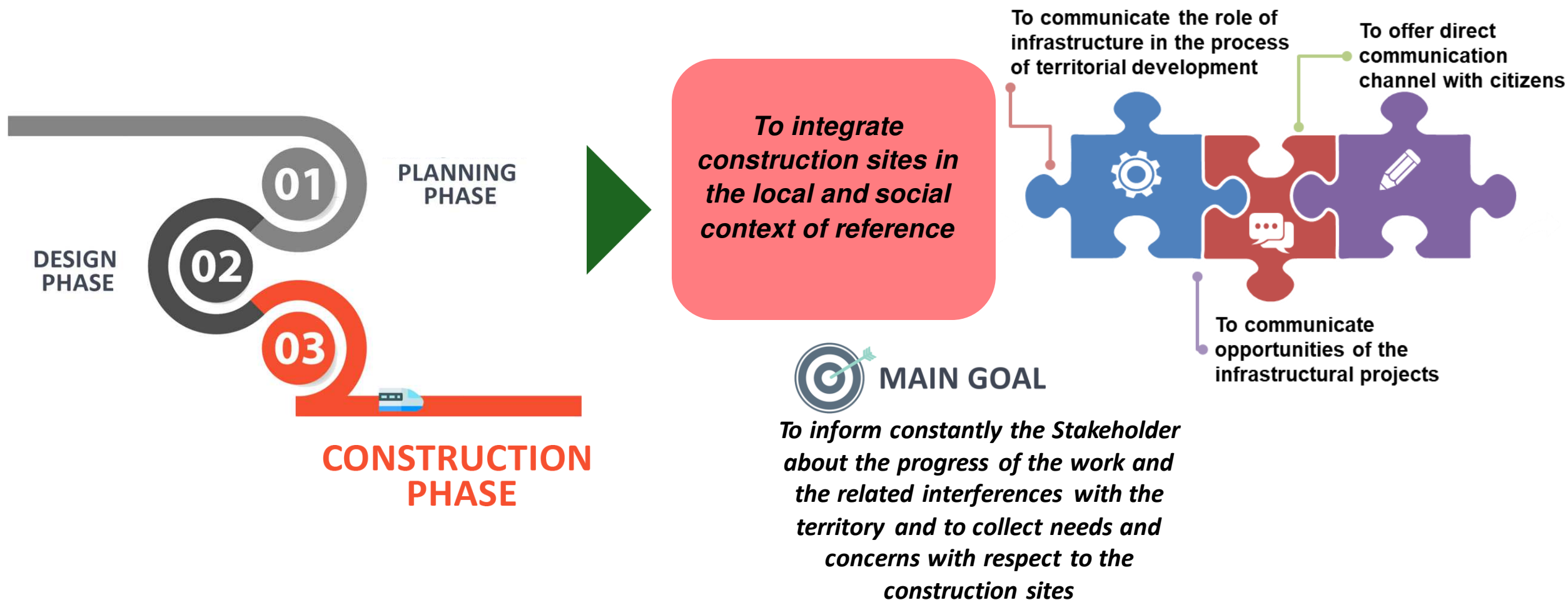
to **start the activities** outlined in the Stakeholder Engagement Plan for each one of the highlighted projects

MONITORING OF STAKEHOLDER ENGAGEMENT PROCESS

to constantly **check the quality of the relationship set with the stakeholders**



CREATE A STABLE PARTNERSHIP WITH CITIZENS

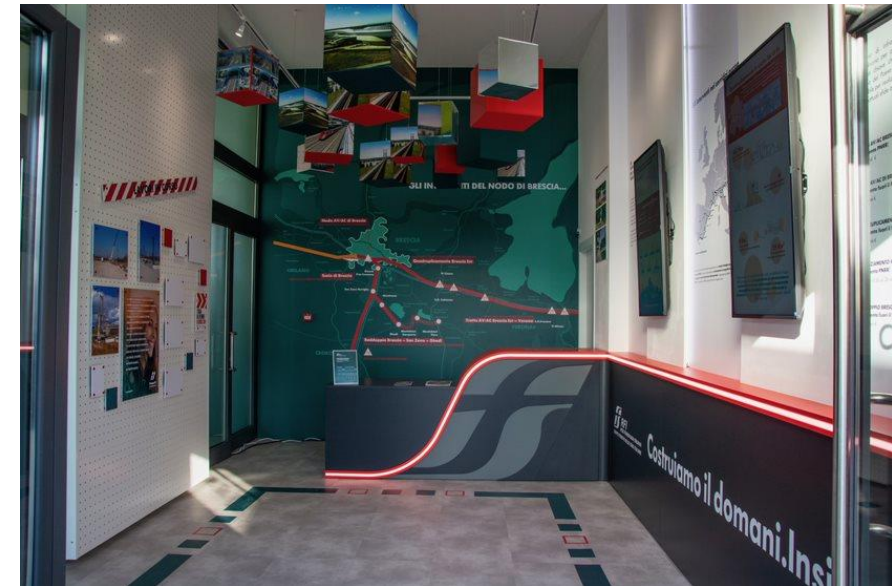
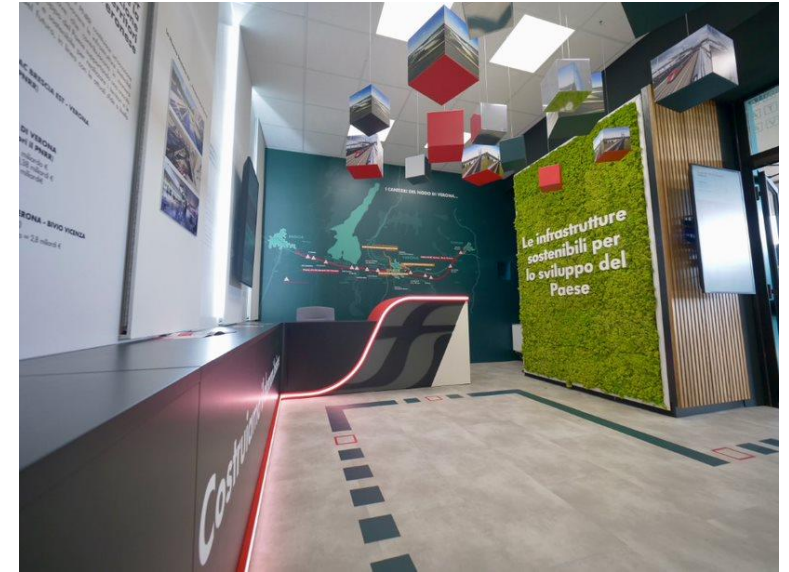




DIRECT COMMUNICATION CHANNEL TO SHARE INFRASTRUCTURAL PROJECT OPPORTUNITIES

RFI is implementing

- ❖ **a network of Info Points** in order to share with the Stakeholder the benefits of the transformation generated by the projects in a perspective vision and also provide up-to-date information on progress of the work





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Public and Private Financing Schemes delivering long-term Rail Performance



Alexis de Pommerol
COO, Société du Grand Paris, France
Session3-1.3 Project architecture and management

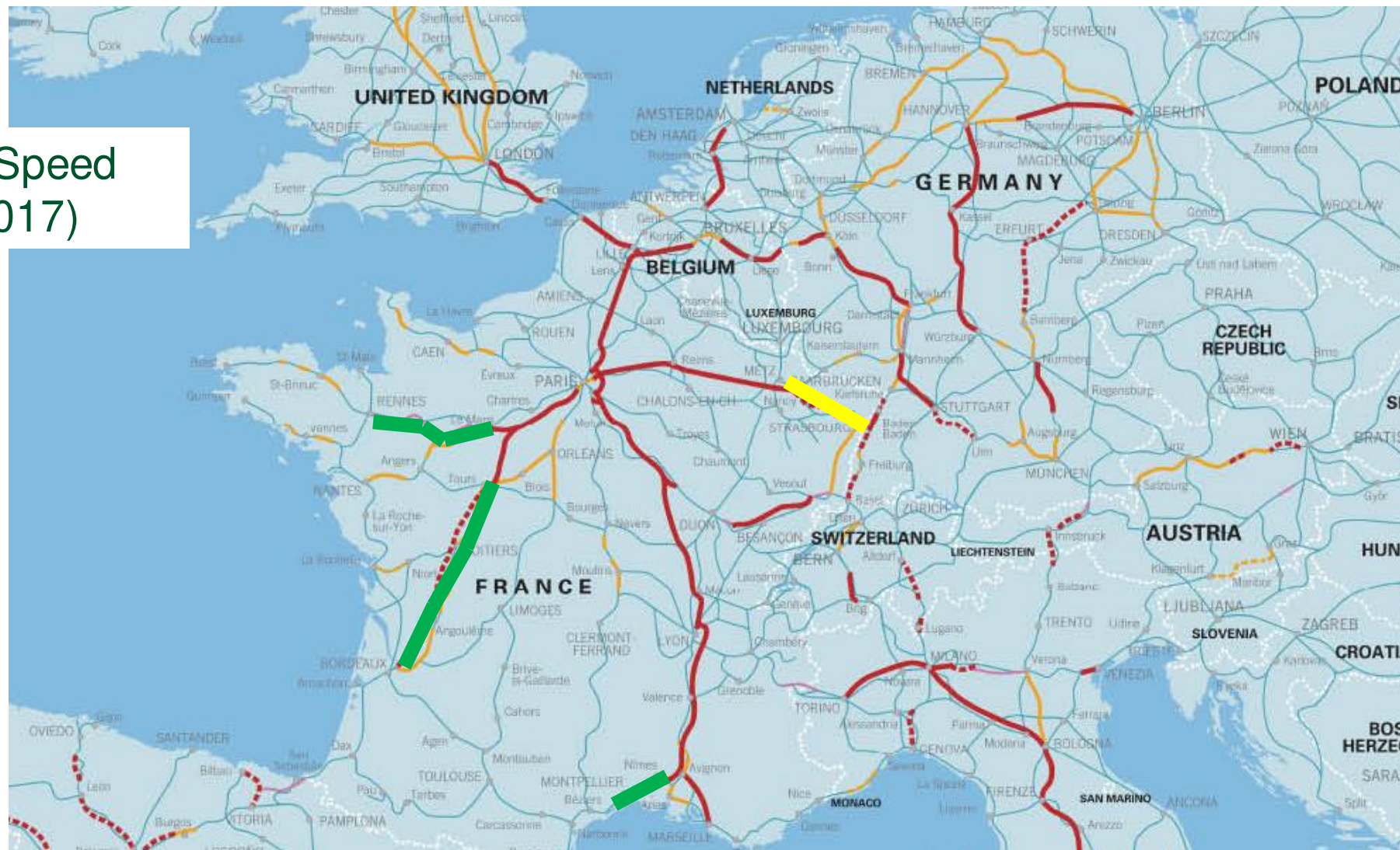




French High Speed Network (2017)

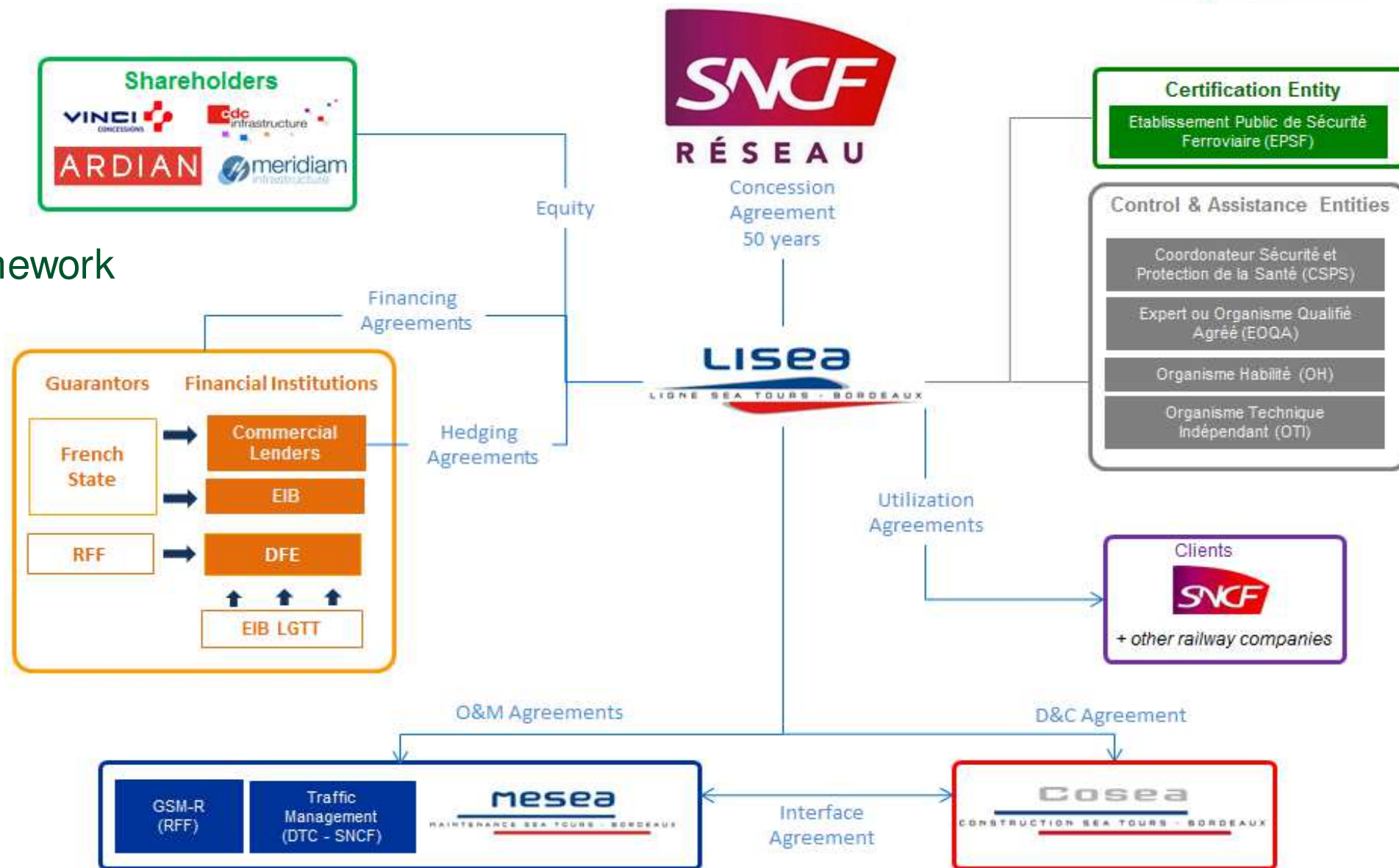
New HSL

- ❖  Public Funding
- ❖  Public-Private Funding





SEA Contractual Framework



- ❖ Private Funds: €3.8bn
- ❖ Public Contribution: €4bn
- ❖ 50-year Concession
- ❖ 302 km HSL
- ❖ 10 junctions
- ❖ 320 km/h
- ❖ ERTMS + TVM



Delivering Long-Term Performance through Private Funding

❖ Risk allocation

- ❖ Standard and Technology
- ❖ Permits and authorizations, land acquisition
- ❖ Interfaces
- ❖ Operation

❖ Long – Term Investment

❖ Reducing public subsidies

❖ Innovation: construction and maintenance

❖ Strong contracts, penalty regime



**Grand
Paris —
express**



200 km – 4+ lines

68 new stations

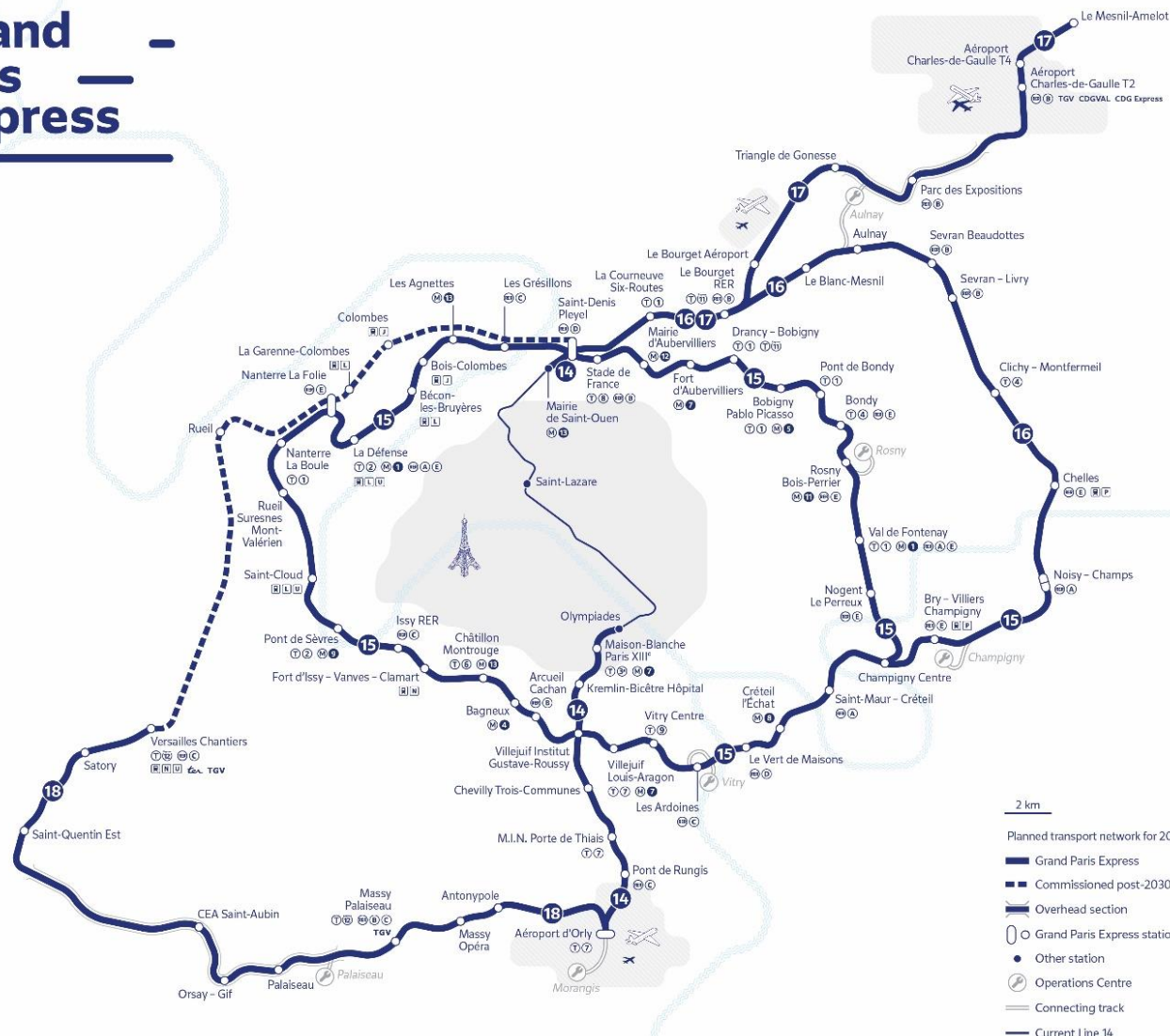
90% underground

100% automatic

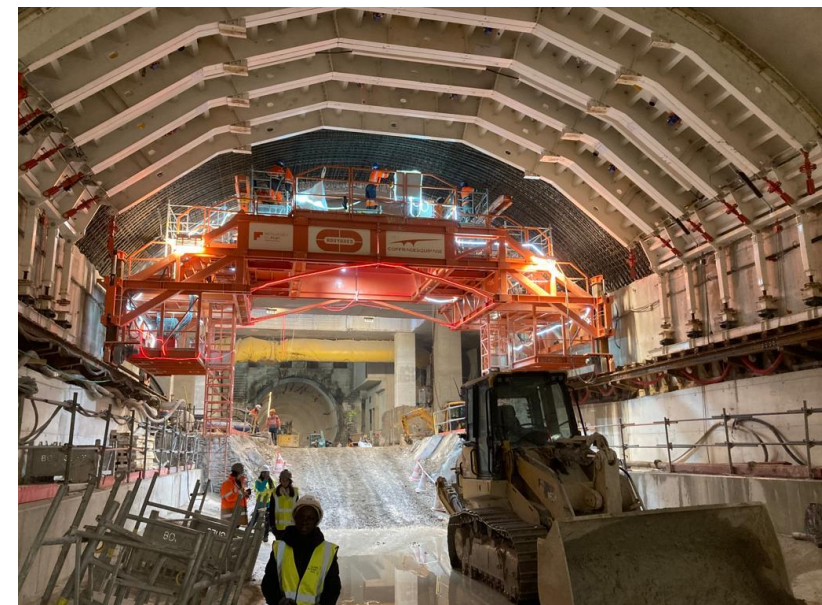
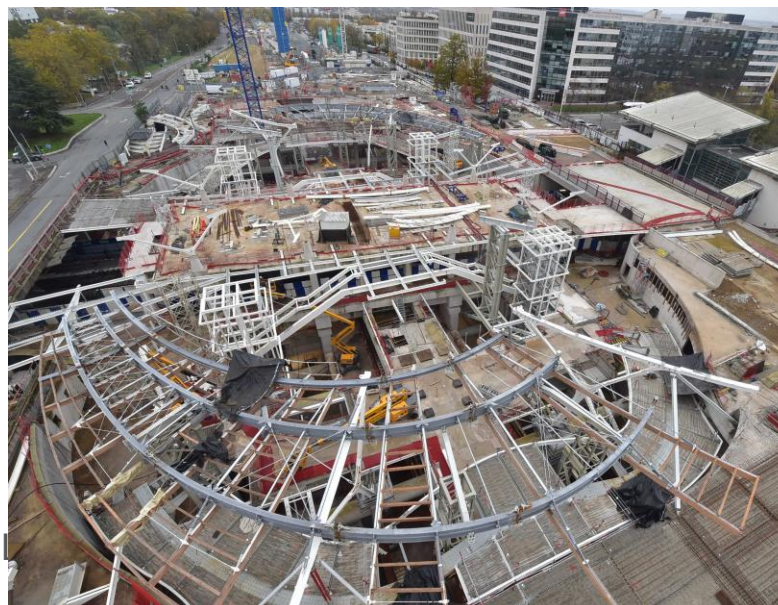
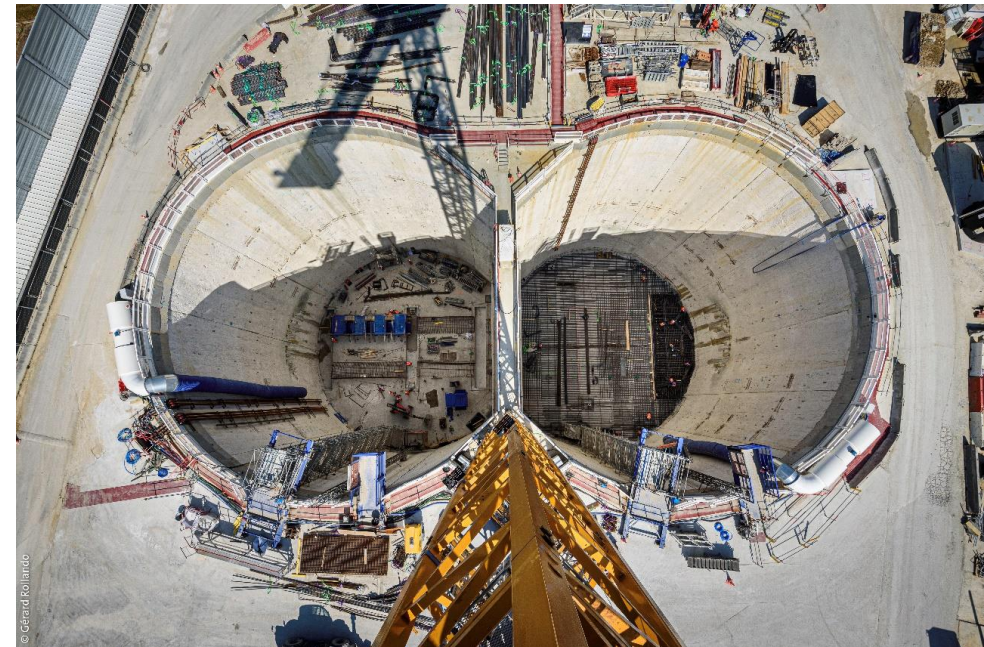
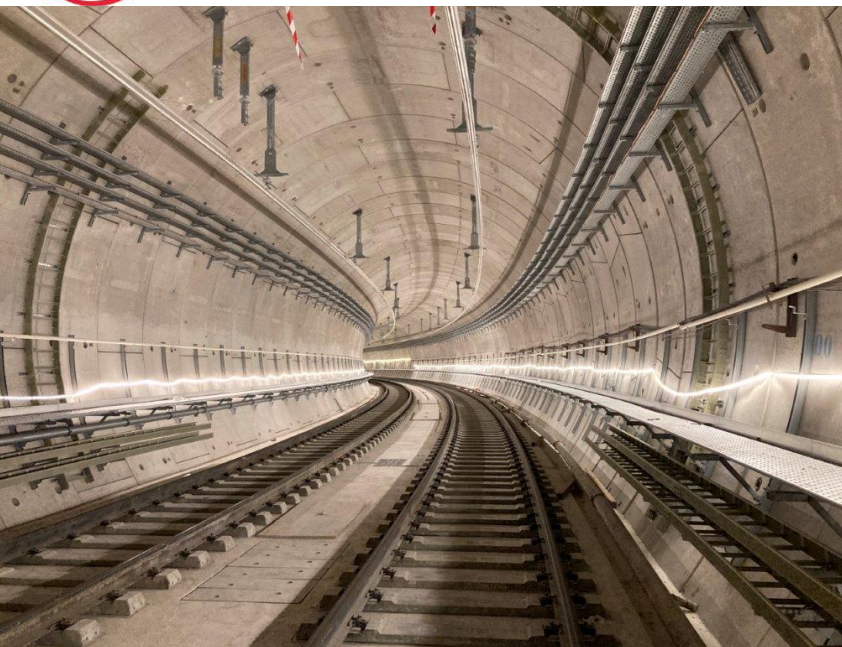
100% accessible

2 - 3,000,000 pax / day

55-65 km/h



THE NEW METRO BY
**Société
du Grand
Paris**





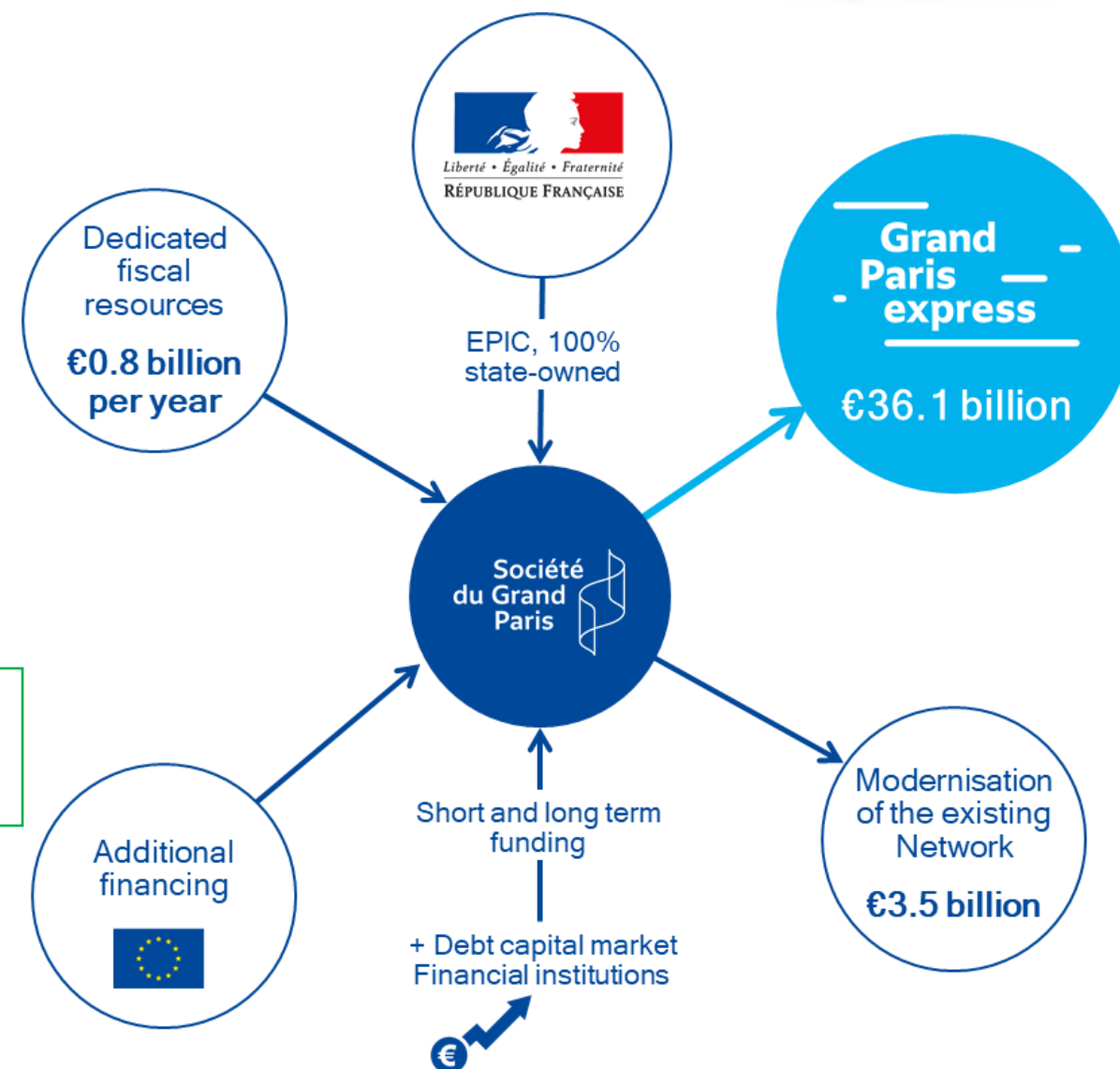
FINANCING MODEL

2010 : Société du Grand Paris

2016 : Preparatory Works on first section

2024 – 2030 : Revenue Services start

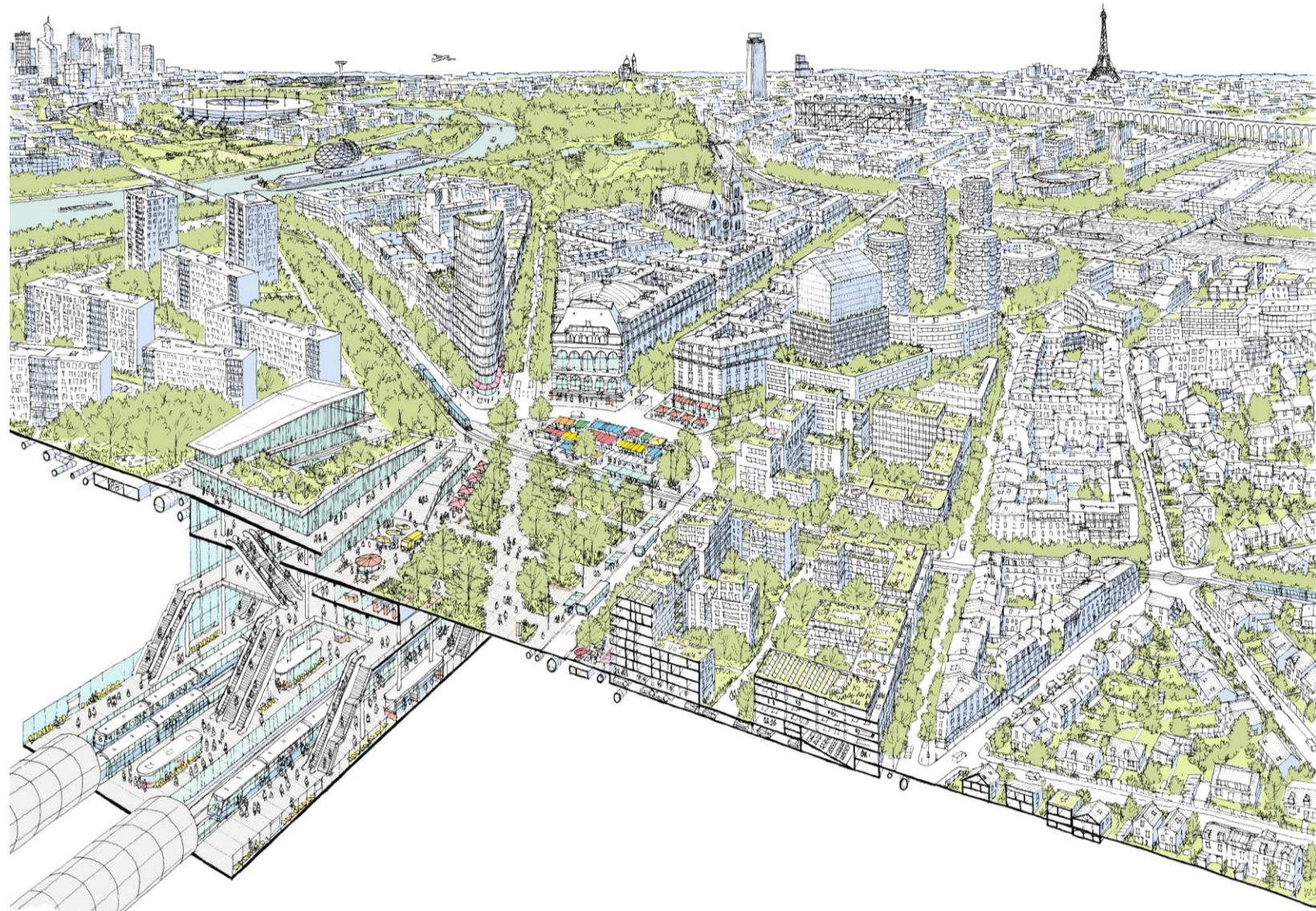
- ❖ 2018 Green Bonds Principles Compliance
- ❖ Climate Bond Initiative (CBI) Certification from Sustainalytics





NEW STATIONS DISTRICTS

- ❖ 100+ real estate projects
- ❖ Ambitious ESG criteria
- ❖ Win-win Rail – City connections
- ❖ Partnerships for each project
- ❖ Additional financial resources





Some Lessons Learned

- ❖ Specific Financing & Delivering Engineering
- ❖ High Rail Performance & Ambitious Stations Design
- ❖ Continuous Dialog & Communication
- ❖ Financing: Long-Term Operational Performance & ESG Performance



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**Private Participation in the African Union's
"Agenda 2063": Leveraging Regional
Efficiencies**



TAYLORAIL

David Taylor
Chief Executive Officer, Taylorail, South Africa
Session3-1.3 Project architecture and management





INTRODUCTION

Current Environment

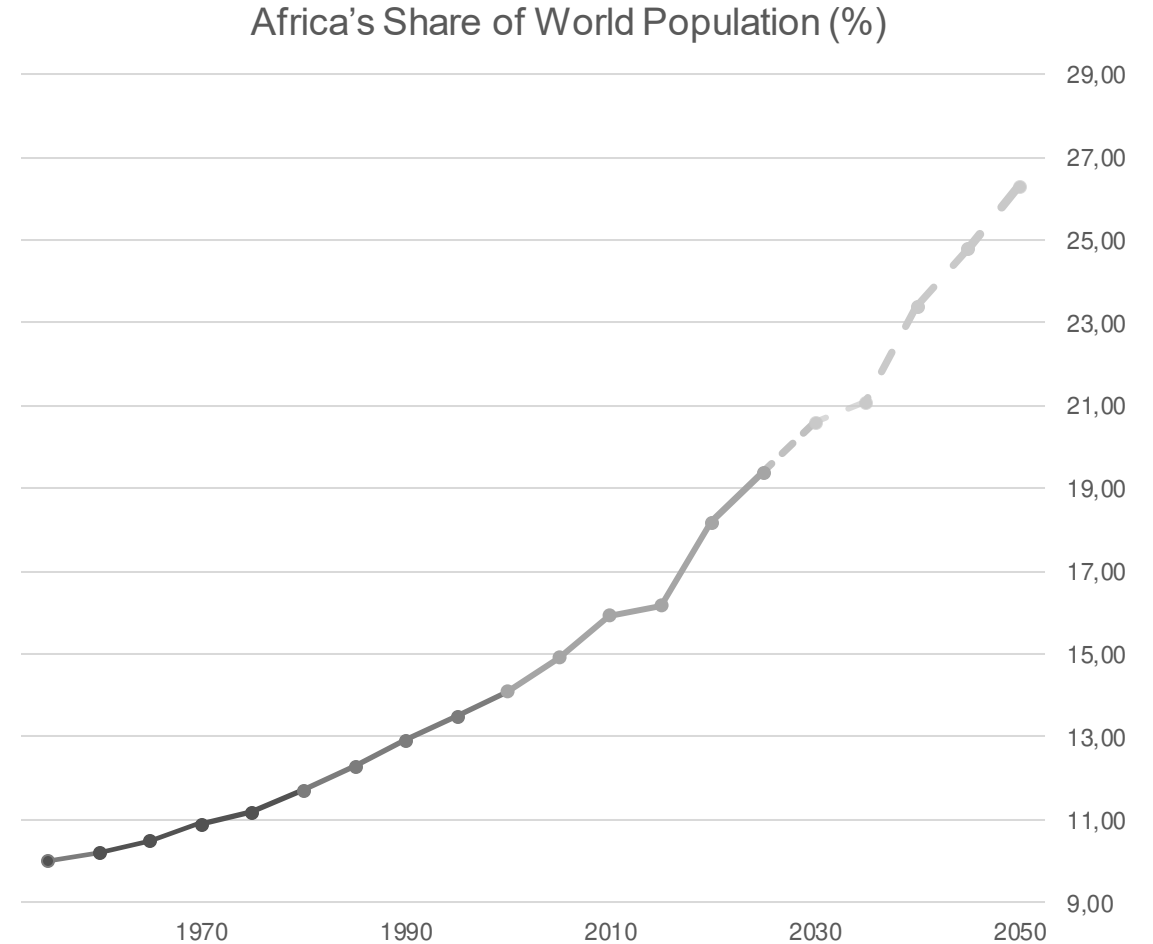
- ❖ World Leader:
 - ❖ Fastest growing populace
 - ❖ Most expensive logistics costs

Infrastructure Deficit

- ❖ Fewer kilometers of road today than 30 years ago
- ❖ Barrier to Regional and International Trade

Options?

- ❖ Build new infrastructure?
- ❖ Change the way we do things.





What is Agenda 2063?

Africa's framework to achieve inclusive and sustainable.

Key Project

Africa's Integrated High Speed Rail Network

Four main objectives:

- ❖ Interconnect Landlocked Countries (2033)
- ❖ Connect different regions of the continent (2033)
- ❖ Establish Trans-Africa Beltways (2033)
- ❖ Connect Capitals and Economic Hubs, enabling AfCFTA (2043)





New Model of Operation: Private Participation / Open Access

What is Open Access?

- ❖ What Open Access is **not**.

How Does Open Access Work?

- ❖ Freight and Passenger
- ❖ Open Market vs. Public Service Offering (PSO)

What do we need to get right?

- ❖ Strong Transport Economic Regulator
- ❖ Political Will
- ❖ Cross Acceptance agreements for regional travel
- ❖ Asset Protection
 - ❖ Cape Town Convention / Luxembourg Rail Protocol

*“I dream of the realization
of the **Unity of Africa**
whereby its **leaders**
combine in their efforts to
solve the problems of this
Continent.”*

- Nelson Mandela

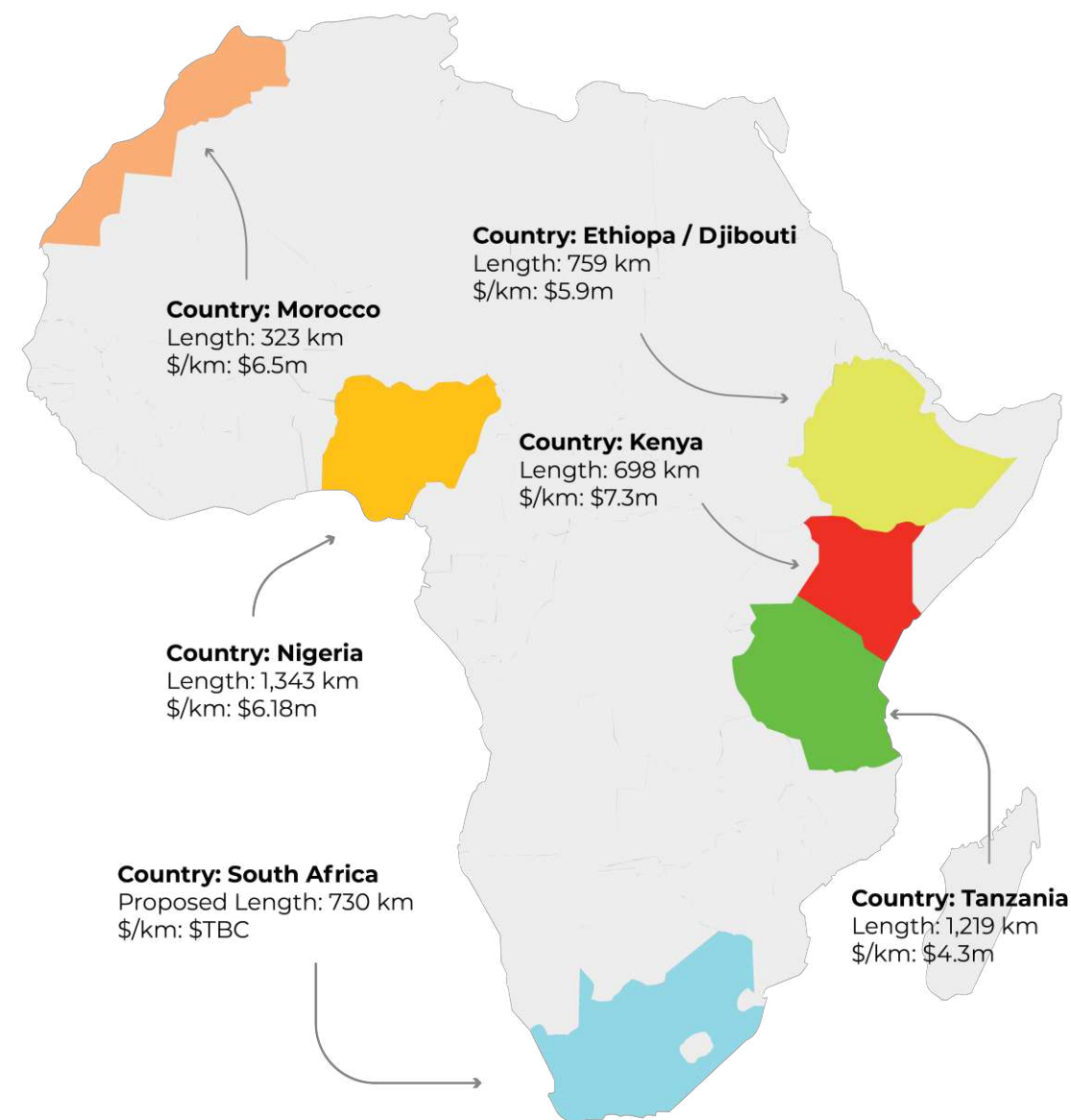


Risks & Challenges

- ❖ New Build Costs
- ❖ Operating Parameters & Conditions
- ❖ Government Monopolies
- ❖ Supporting Utilities

Impact and Benefits

- ❖ Alignment of risk profiles
- ❖ Increased efficiency
- ❖ Decreased Cost
- ❖ Increased Service Levels

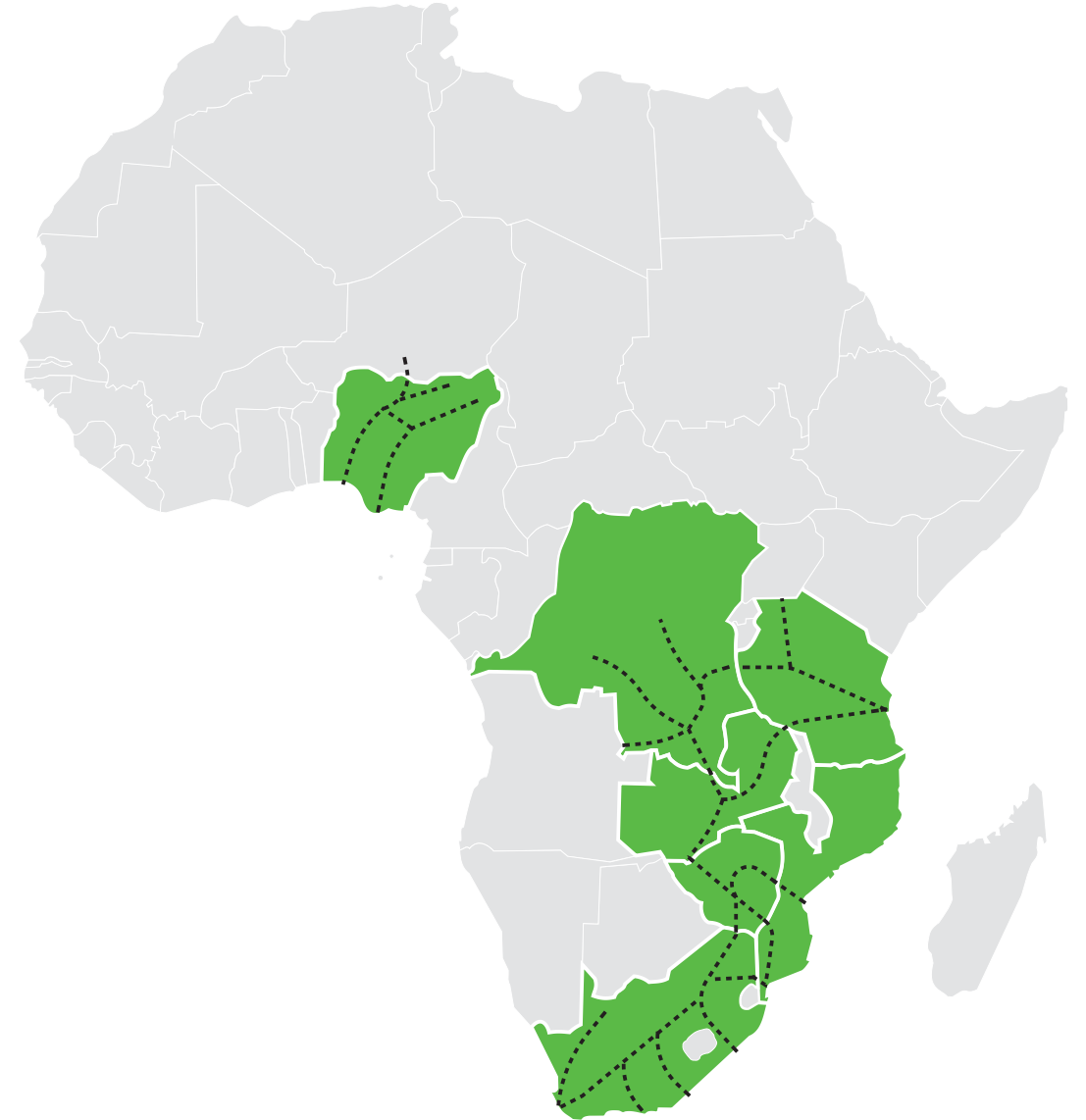




Where are we now?

Current Open Access movements on the Continent:

- ❖ Tanzania – Zambia Rail Authority (TAZARA)
- ❖ Tanzania Central Corridor
- ❖ Mozambique
- ❖ South Africa
- ❖ Nigeria
- ❖ Zambia
- ❖ Zimbabwe
- ❖ Democratic Republic of Congo

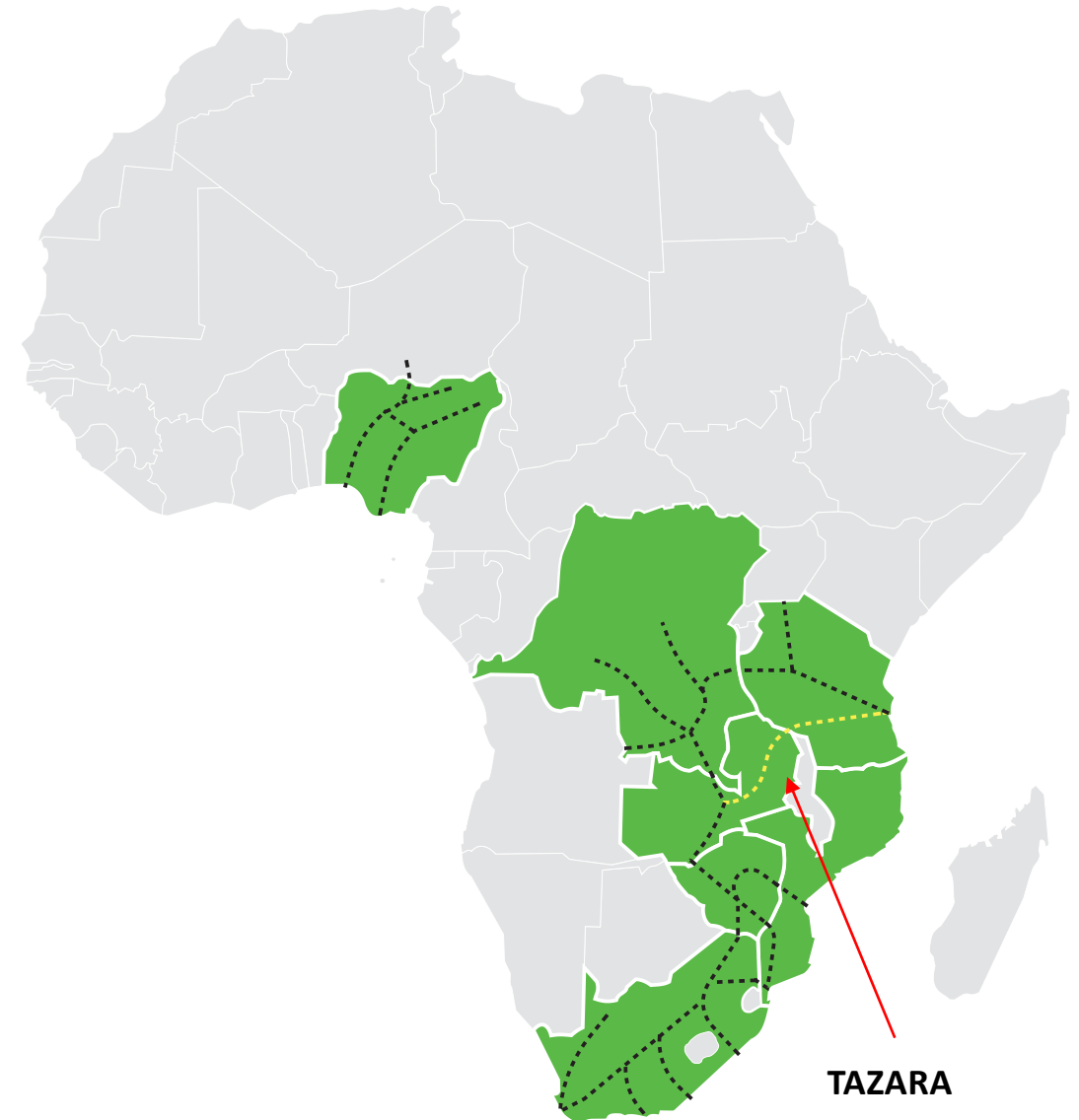




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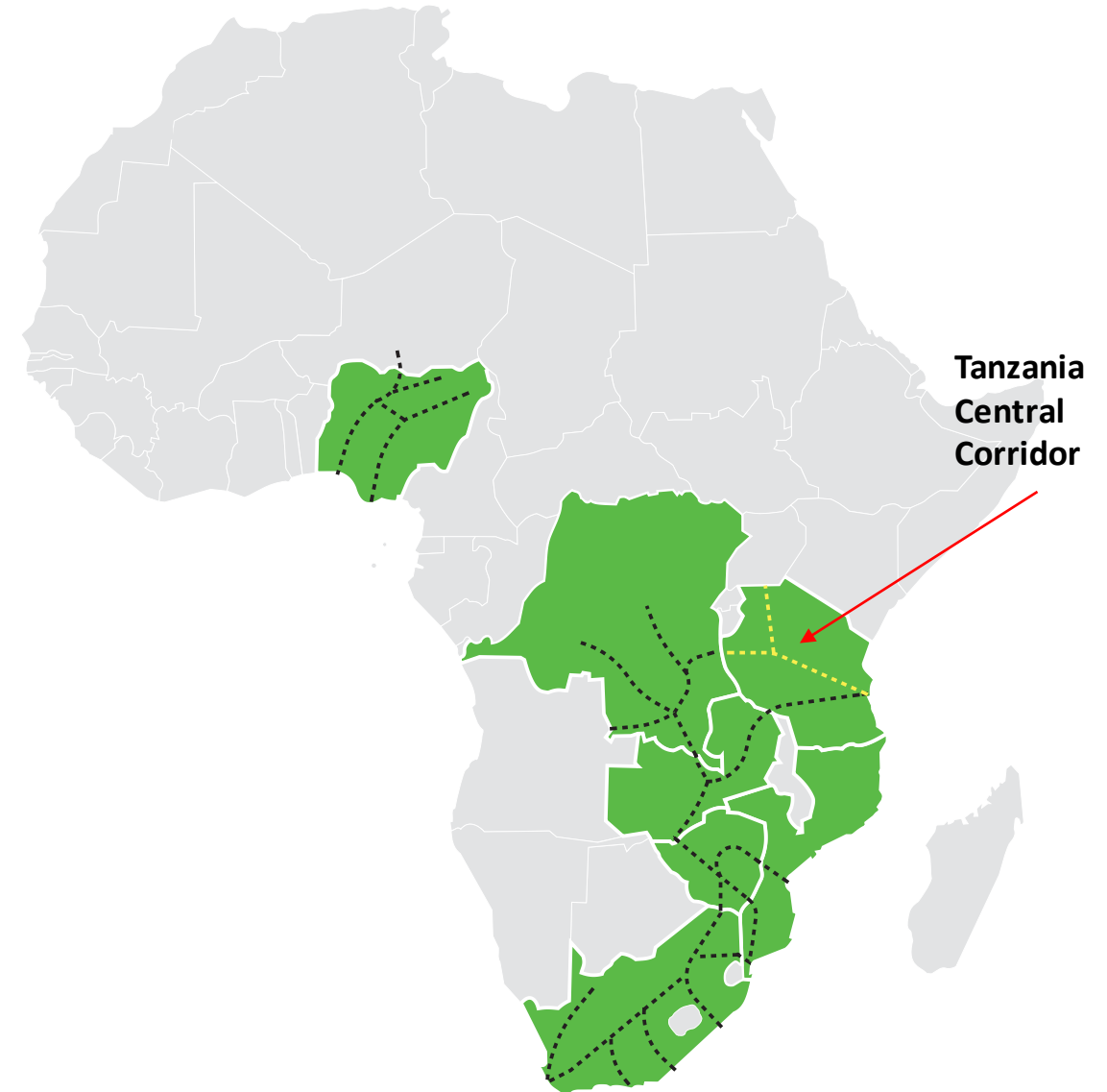




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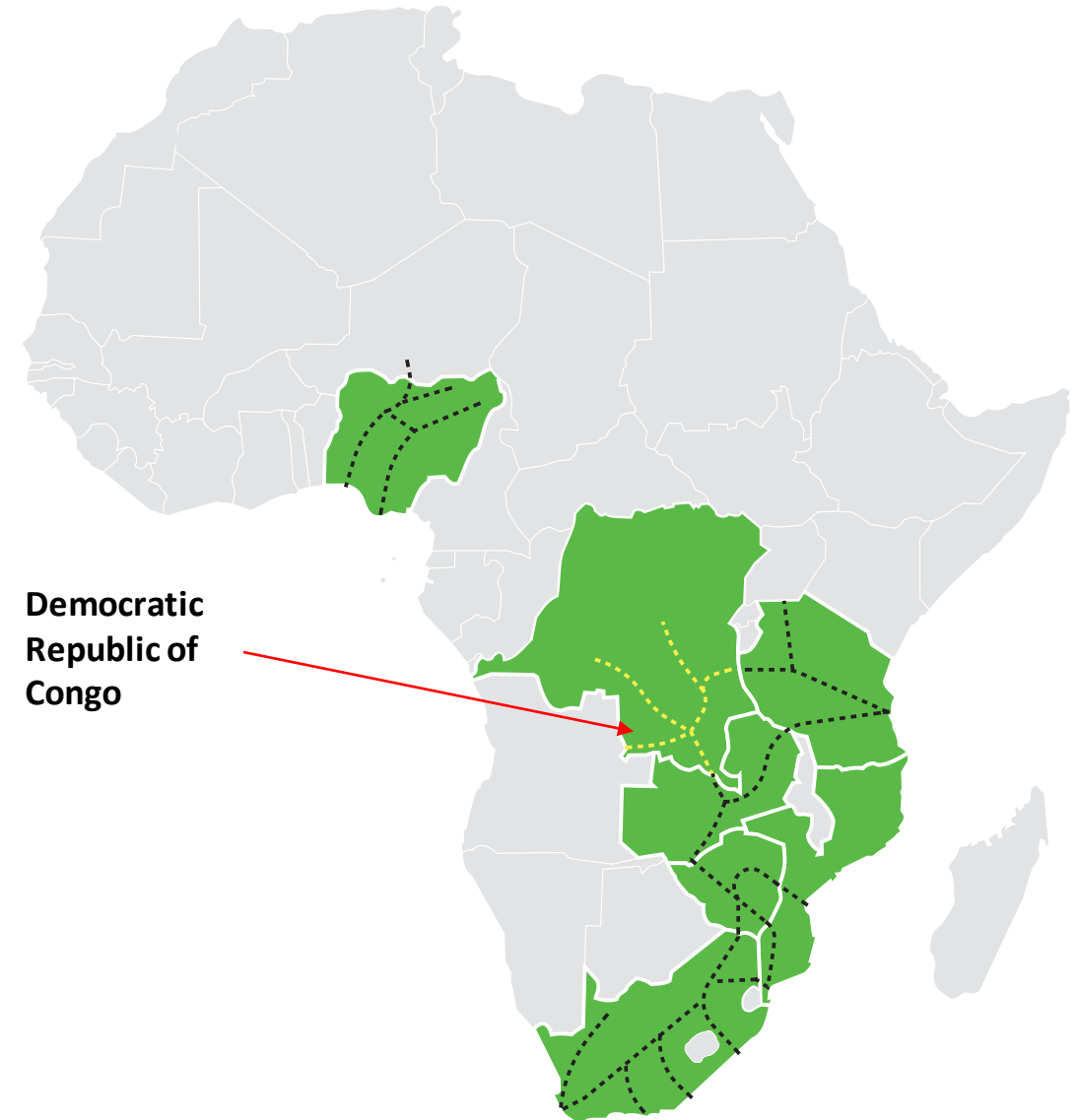




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Case Study: European Open Access

- ❖ 70% of Europe's Busiest Networks
- ❖ Trend for Introduction of Competition:
 - ❖ Ticket prices half
 - ❖ Ridership doubles
- ❖ Rome-Milan
 - ❖ 40% Price reduction
 - ❖ Modal shift: 36% - 75%
 - ❖ Ridership doubled
- ❖ Competition between SOE's:
 - ❖ Milan – Lyon – Paris
 - ❖ Italy's FS Trenitalia and France's SNCF
 - ❖ Ridership Increase by 58% in 9 months.





Conclusion

- ❖ New Model needed
- ❖ Cement a practical version of PPP
- ❖ Leverage competencies and align risk prof
- ❖ Bring Benefit to the Populace

Move forward as ***One Continent***, with rail backbone.





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11TH WORLD CONGRESS OF HIGH-SPEED RAIL

Marrakech, 7-10 MARCH 2023

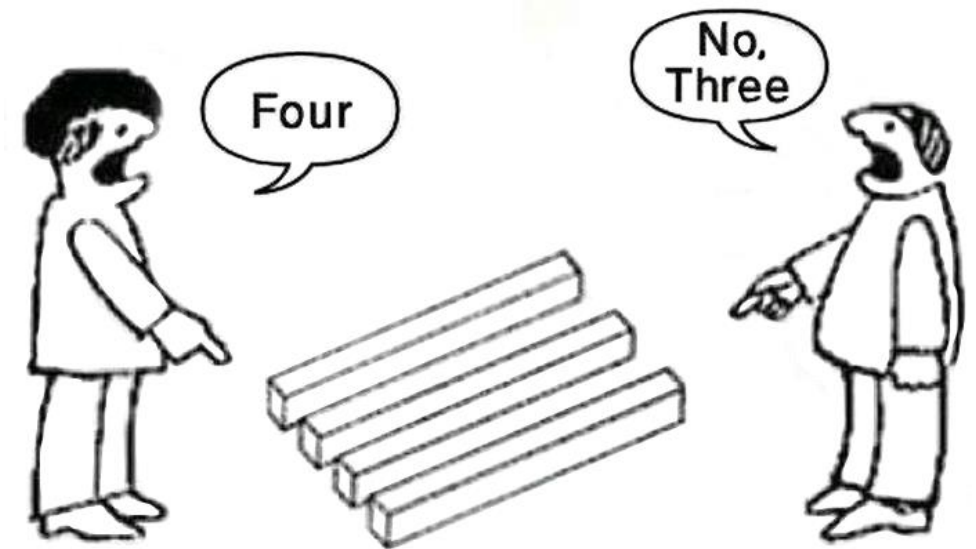
Whole System Decision Making

Mercedes Gutierrez Ferrandiz
Head of Asset Management and Infrastructure, UIC, France
Session3-1.3. Project Architecture and Management



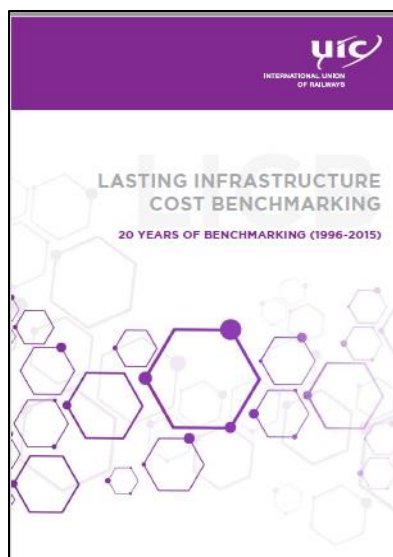
Role of the Asset Management Working Group

- Collaboration between 10-15 national railways lasting more than ten years
 - Provides a common interpretation for the growing discipline of Asset management
 - Undertakes benchmarking and comparisons of good practices
 - Supports railways seeking certification to the global Asset Management standard (ISO 55001)
 - Provides leadership on high-impact Asset Management initiatives

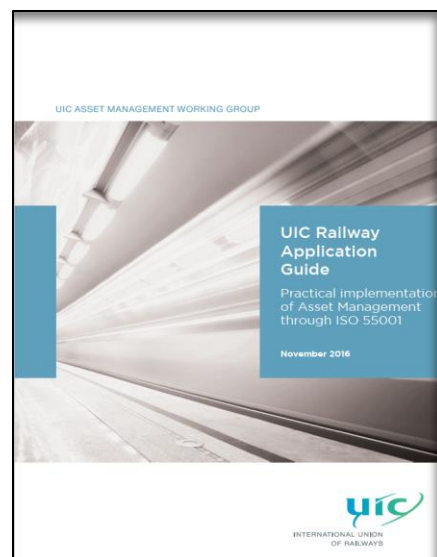




Examples of previous projects



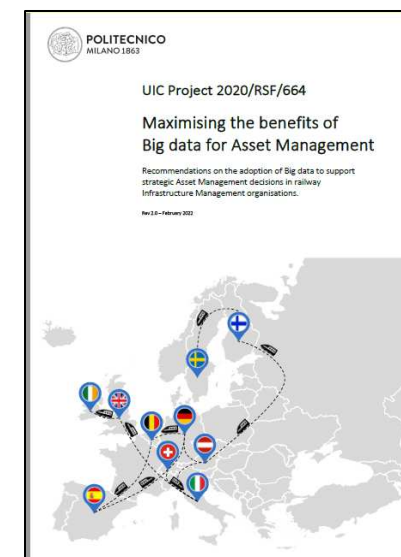
Cost benchmarking
between member
organisations



Guidance on the
implementation of
ISO 55001



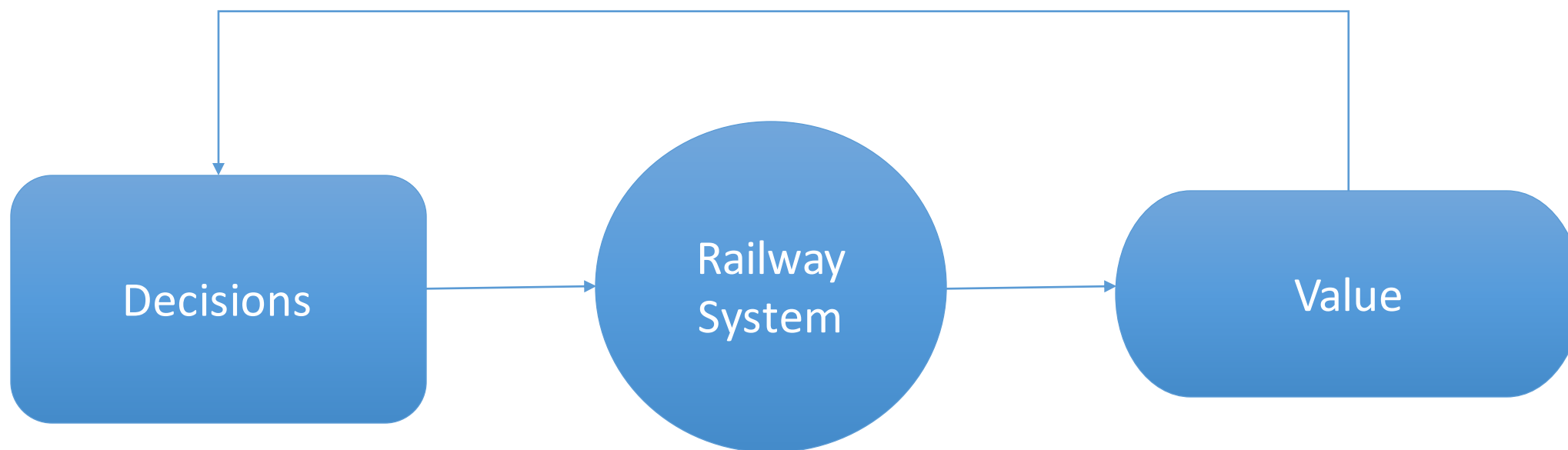
Analysis of key cost
drivers in railway
asset management



Benefits from Big
Data in railway asset
management



Project on Whole System Decision Making (WiSDoM)

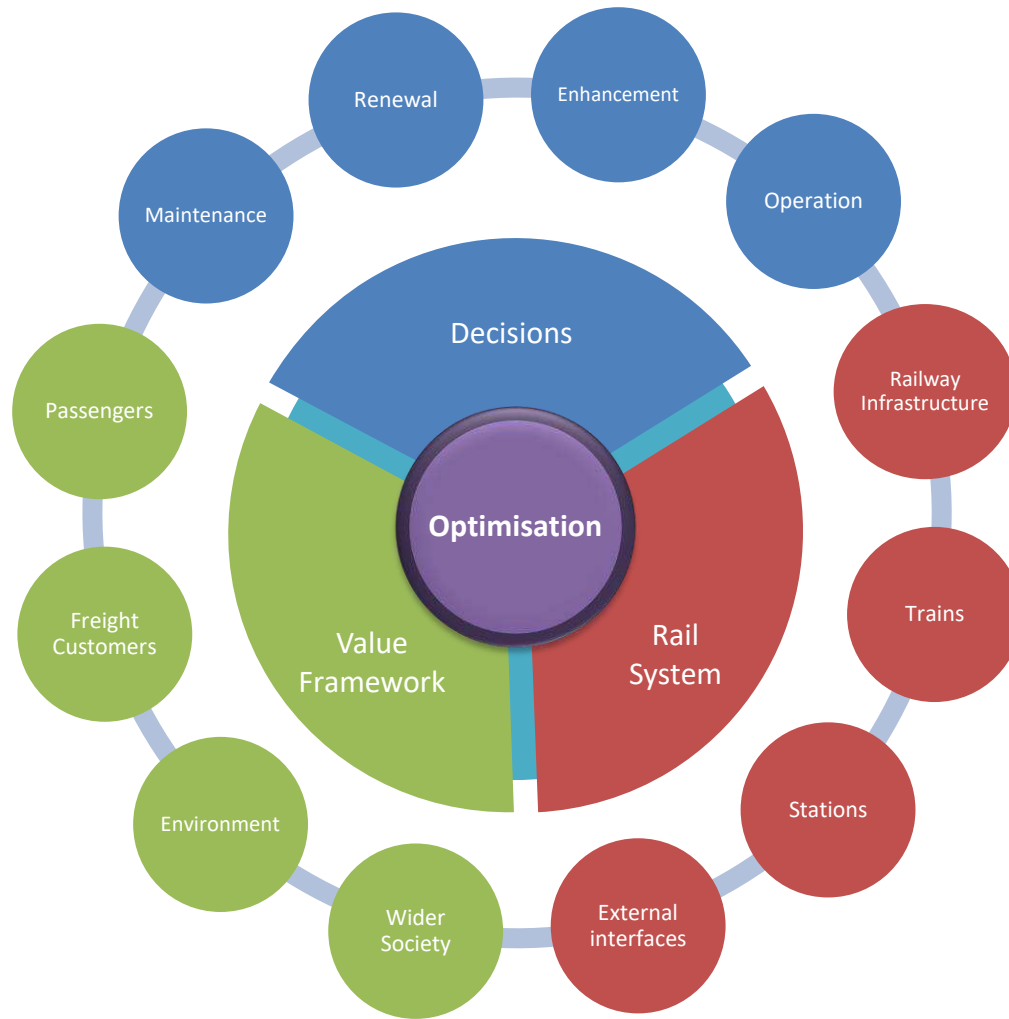


“Ultimately, a company’s value is just the sum of the decisions it makes and executes”

“We exist to get people and goods where they need to be and to contribute to economic sustainability and prosperity”

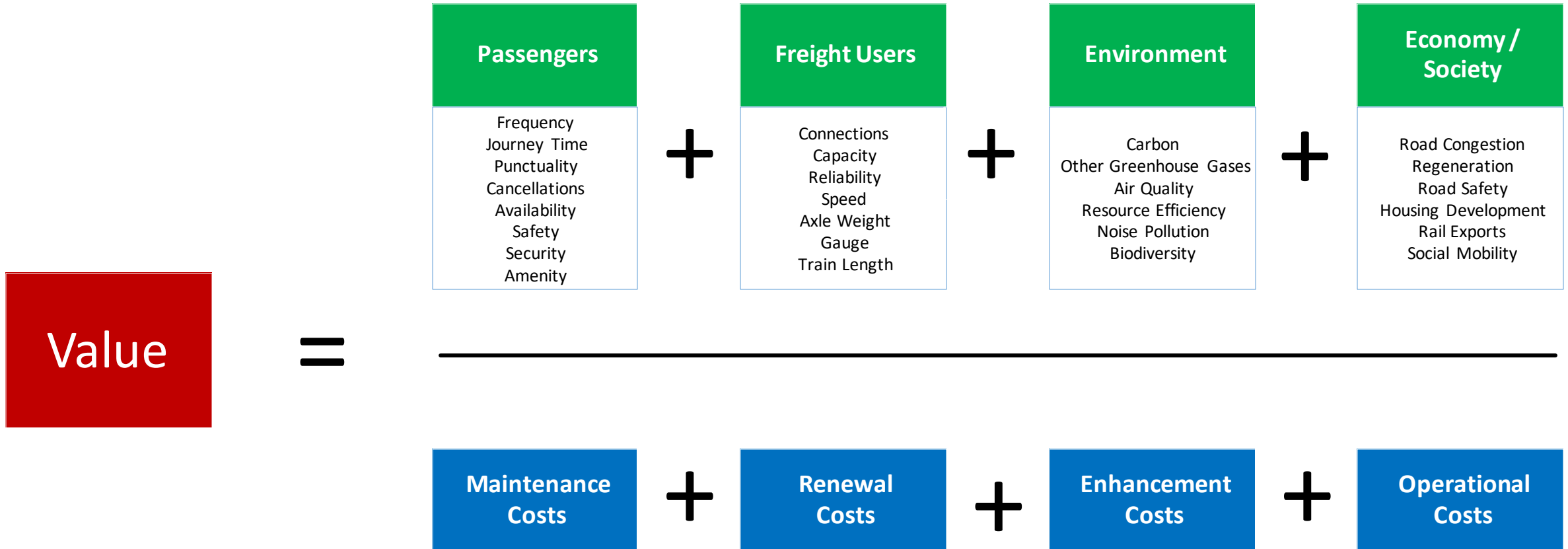
Scope of problem

- Primary Asset Management decisions
- Railway system and key interfaces
- Beneficiaries of rail services and funders



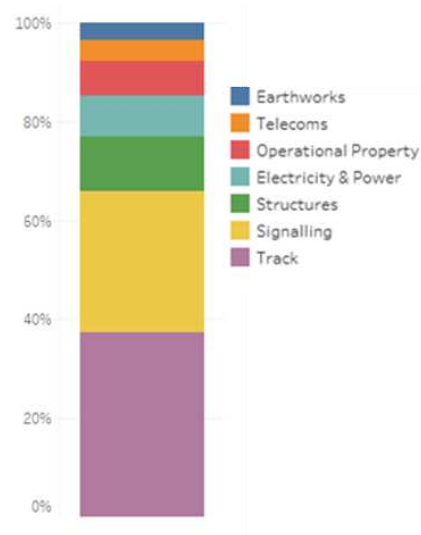


The value from rail services

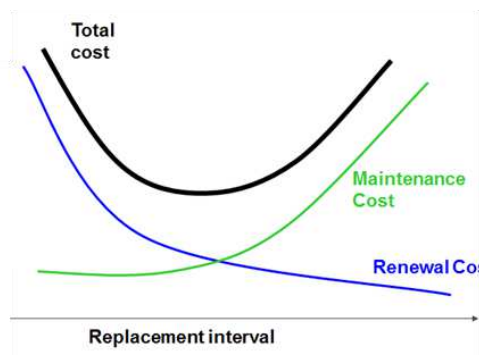




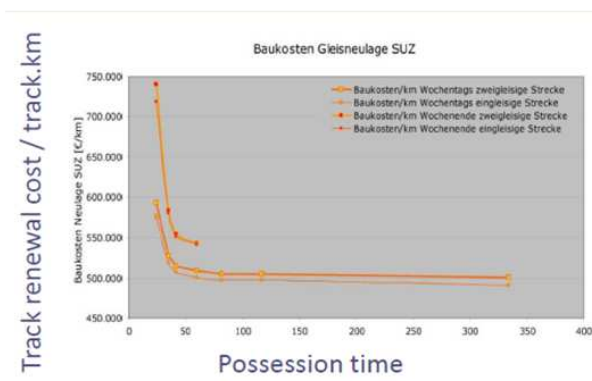
Decisions that must be improved



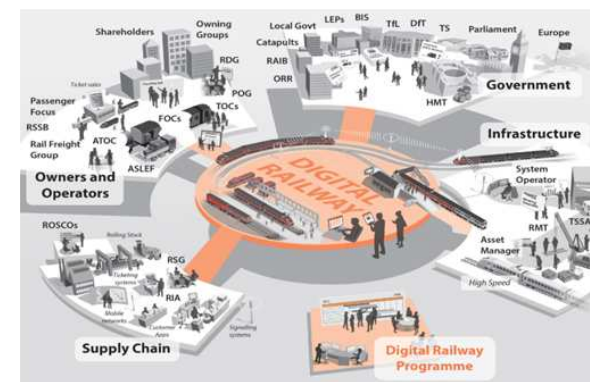
Difficult to move funding between asset disciplines



The trade-off between maintenance and renewal is more concept than reality



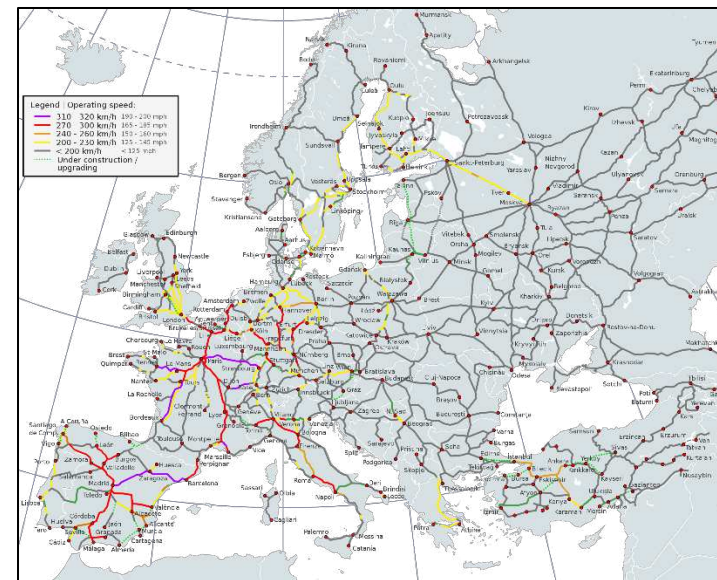
Sub-optimal possession strategies due to misaligned incentives between train operators and infrastructure manager



Adoption of new technologies is slowed down due to complexity of interactions between stakeholders

Architecture of the solution – System of Systems

- Place railway corridors (lines of route) at the centre of decision making
- Align information sources with lines of route
- Link all investments to the value provided to passengers, freight customers, the environment and wider society
- Establish decision methods and tools to minimise the whole-life, whole-system cost





Summary and conclusions

- The discipline of Asset Management is growing in influence in railways and in other asset intensive sectors.
- The first projects undertaken by AMWG provided a common railway interpretation of asset management. They compared costs and performance and documented good practices.
- More recent projects have focused on improved decision making in maintenance, renewals, operations and enhancements.
- The latest and most ambitious project to date is attempting to develop a whole system approach to decision making, due for completion in 2025.



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