



# Delivering Digital Automatic Coupling in Europe – transformation of rail freight

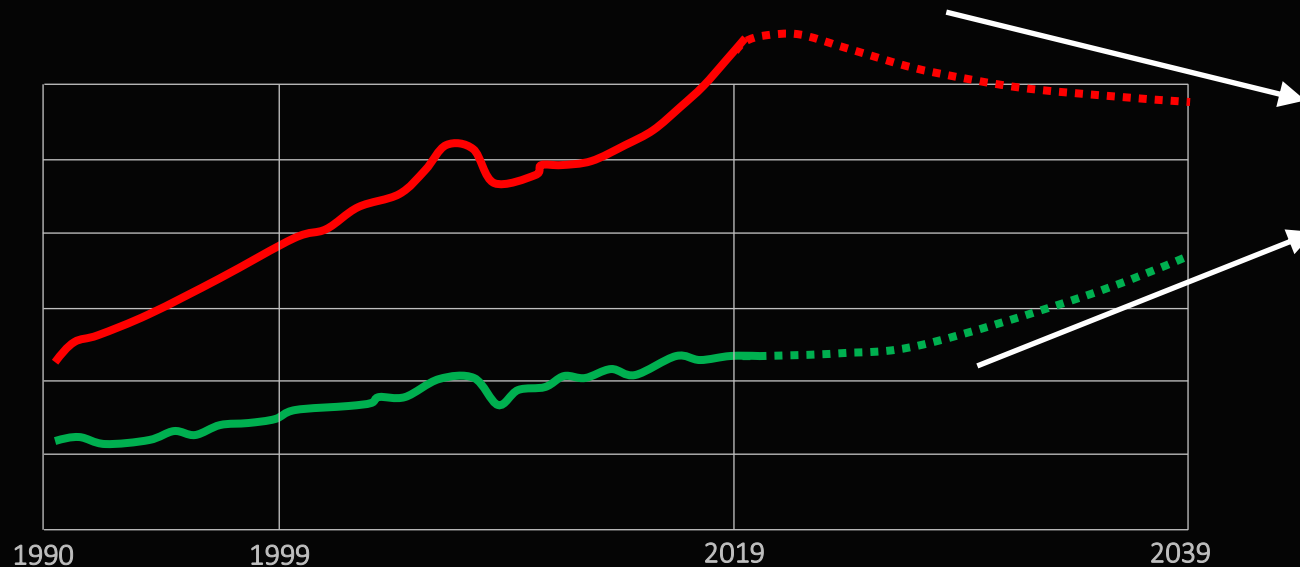
Railway undertaking advisory group, RFC North Sea - Med  
21 June 2022

31 March 2021

# Turn around needed

Development of freight volume road and rail in M t-km in a representative MS

- 1999-2019: Rail +35%, Road: +200% (1999-2019)
- 2019-2039: Rail up to+ 100% in order to meet the green deal objectives



How are we going to face this?

- Innovation
- Transformation
- Revolution?

driven by ....?



# 182 years screw coupling



[https://de.m.wikipedia.org/wiki/Datei:Nachbau\\_des\\_Telefons\\_von\\_Philipp\\_Reis,\\_Sprechseite.jpg](https://de.m.wikipedia.org/wiki/Datei:Nachbau_des_Telefons_von_Philipp_Reis,_Sprechseite.jpg)



<https://www.telespiegel.de/wissen/geschichte-telefonie/>



<http://www.medienmuseum.de/museum/Wohnen/Telefon/lefon1.htm>



<https://www.sunrise.ch/de/spotlight/2015/11/10-legendaere-handys-an-die-du-dich-garantiert-erinnerst.html> Copyright: Discostu



[www.A1blog.net/apple](http://www.A1blog.net/apple)



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1800

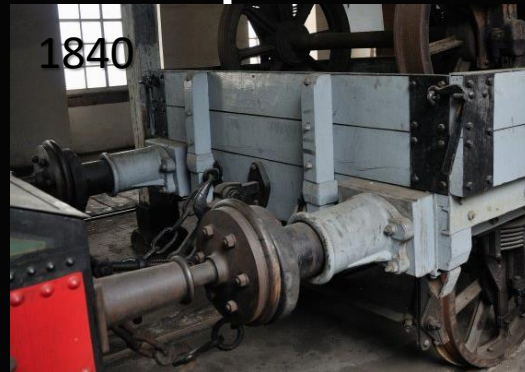
1850

1900

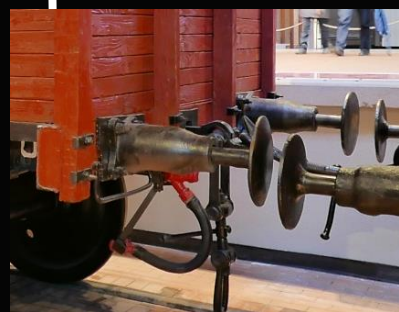
1950

2000

2030



1840. Historische Güterwagen der Pfälzischen L.B. im Eisenbahnmuseum Neustadt/Weinstrasse. (Mai 2009). Helmut Dimitroff



Gedeckter Güterwagen Ok 584032, gebaut vor 1900, im Russischen Eisenbahnmuseum in St. Petersburg, 4.11.2017 Patrick Sessler 10.02.2018,



<https://www.oebb.at>



<https://www.deutschebahn.com/de/presse/>



# Transforming the European Rail Freight System

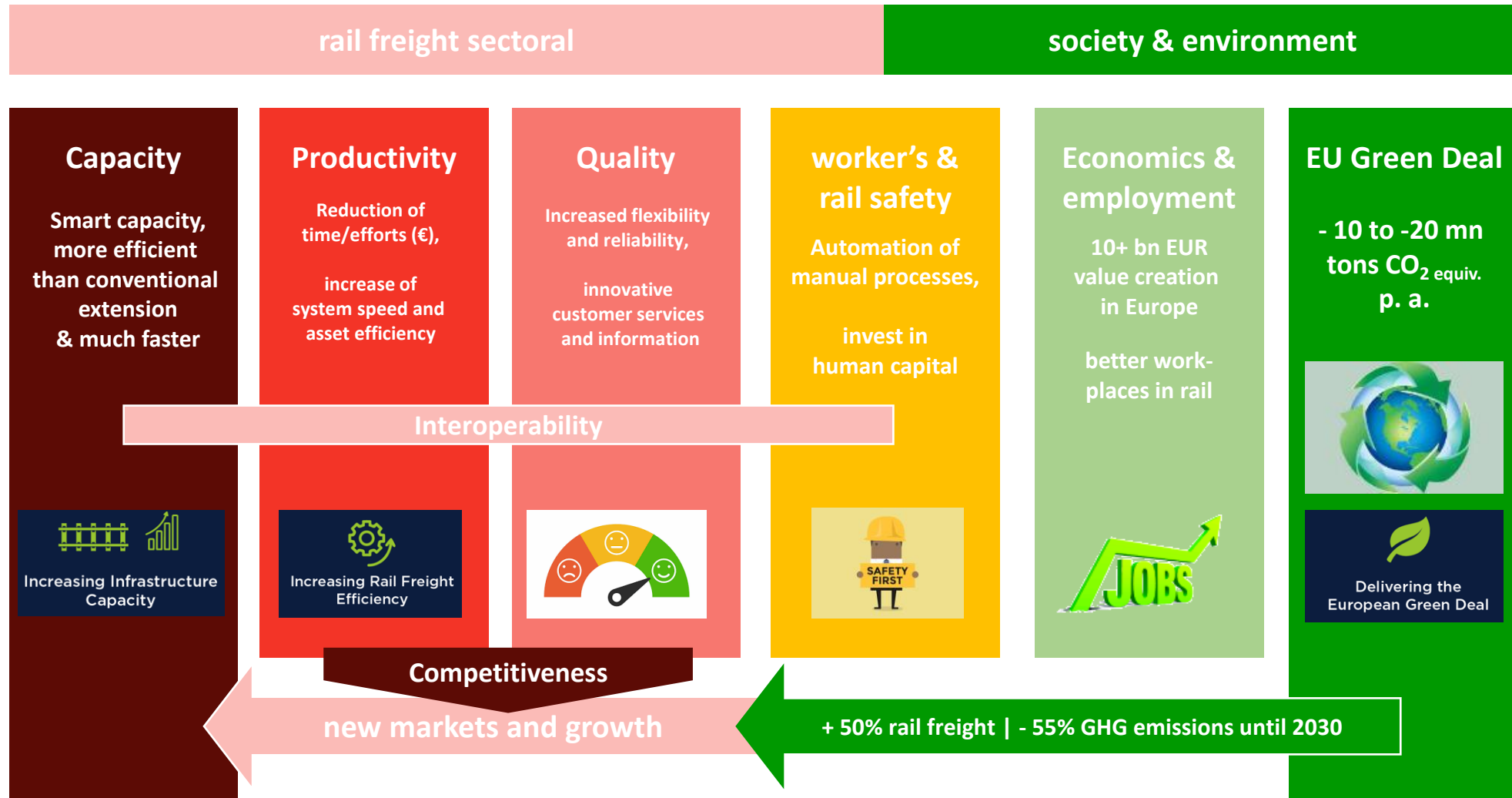
Capacity

Productivity

Quality & Safety



# The DAC and automation benefits for EU





# Use cases: DAC Core system and DAC applications (Full Digital Freight Train Operations)

benefits =

gains in the processes  
(time,  
system time,  
cost savings,  
capacity,  
reliability,  
quality,  
safety)

+ induced  
modal shift

## DAC Core system



- › Automated coupling & manual uncoupling and digital backbone
- › Recording of train composition
- › Automatic (remote) uncoupling
- › Heavier & longer trains (within existing infra limitations)
- › Increased payload
- › Increased speed via improved longitudinal forces

## DAC shunting



- › Automated parking brake
- › Draining of auxiliary air tanks
- › Automated air valve
- › Rear view camera for train driver
- › Proximity detection
- › Sound signals when train in motion

## DAC train preparation



- › Automatic brake test & calculation of brake capacity
- › Automated technical wagon inspection

## DAC train run



- › Tail light (train integrity prior OTI function)
- › Train end device (intermediate solution?)
- › Vital on train integrity (OTI), enabling ETCS L3 moving block operations
- › Increased speed via better braking performance
- › Multiple loco traction and trains up to 1500m
- › Derailment detection

## DAC telematics (wagon & goods monitoring)



- › Predictive / preventive maintenance
- › detection of cargo condition
- › Cargo surveillance, intrusion alarm
- › Wagon data & loading information on mobile device

## DAC loading & unloading



- › Automatic loading/unloading processes (replacement of hydr/pneum components, electro-mechanical actuators for bridge plates, automated cargo securing, heating elements for defrosting, ...) via ext. energy supply
- › illumination for worker's safety & interior

# DAC for Full Digital Freight Train Operations

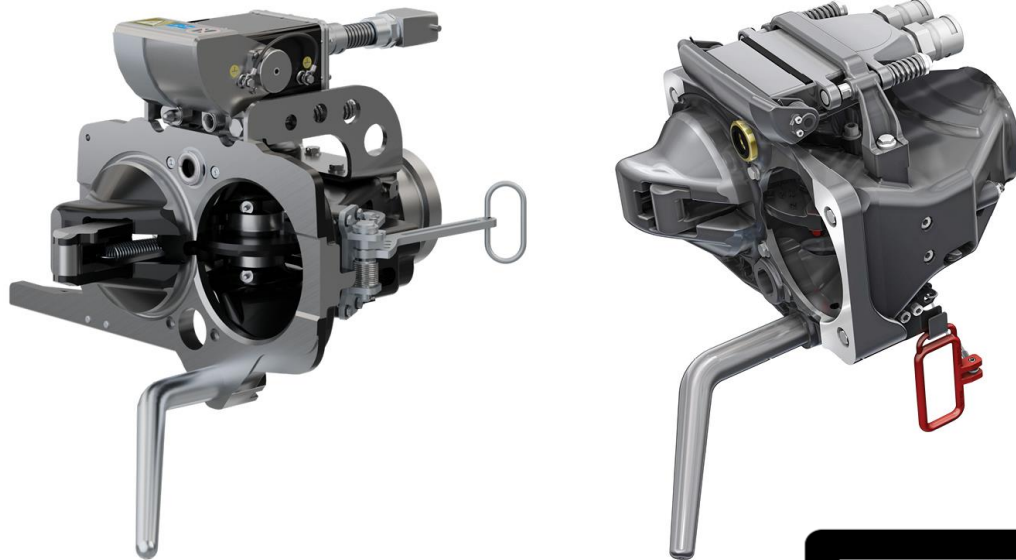


Video Link: [Digital Automatic Coupling - YouTube](#)

# DAC technology



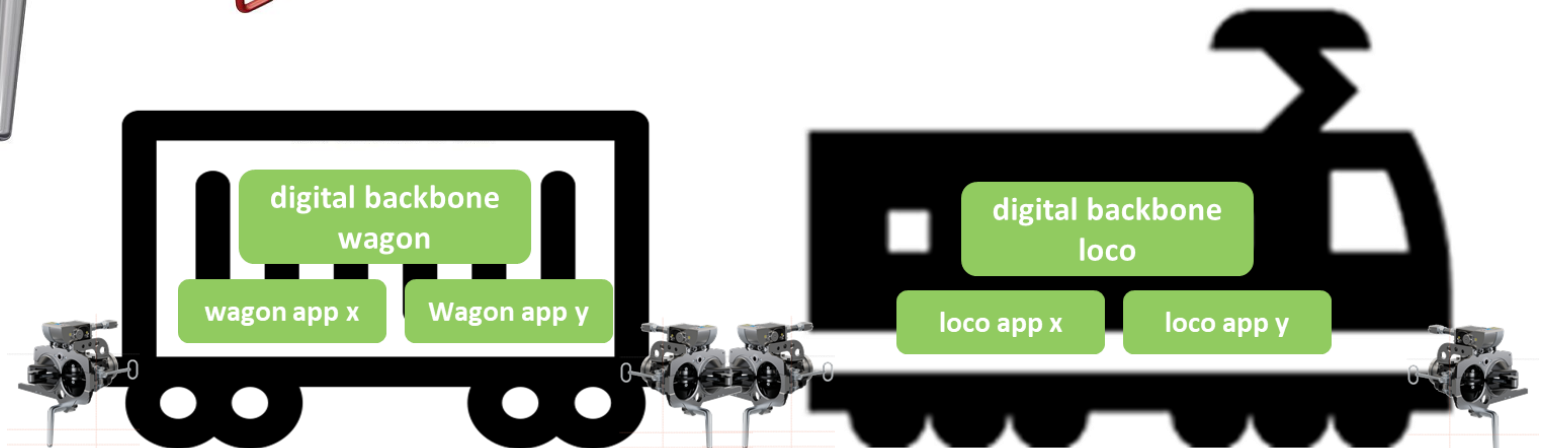
'Scharfenberg' latch-type design selected for future Europe-wide Digital Automatic Coupling (DAC) standard coupler head



DAC data/energy

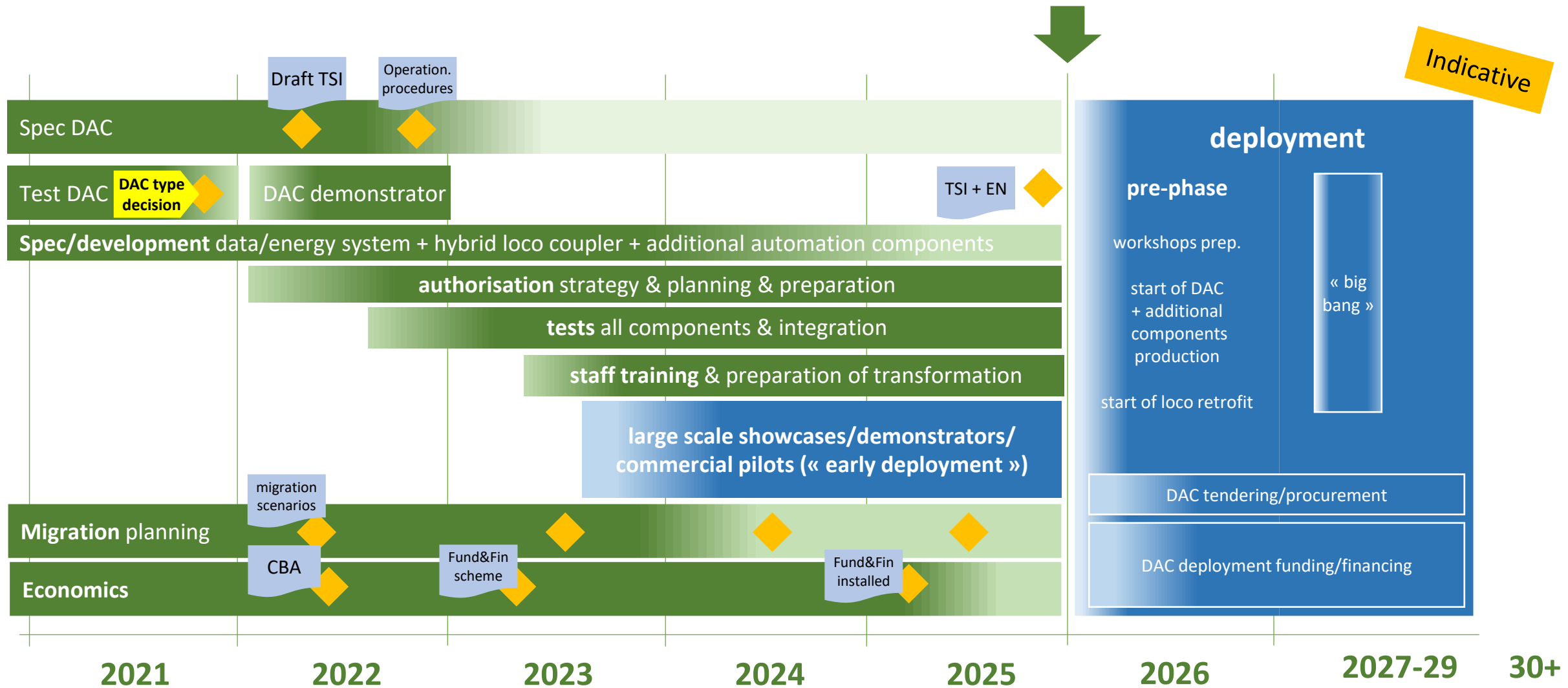
DAC mechanical/pneumatical

DAC 4: manual uncoupling  
DAC 5: automatic uncoupling





# Indicative overall time plan



# Major EDDP developments

- EDDP participation increased to **more than 80 actively participating companies**
- **Use Case definition**
- **Target operational** procedures **nearly ready** for the first use cases, first harmonised EU basis
- **Scharfenberg** design **selected** as a EU-standard
- Inclusion of DAC in the technical report of **TSI revision 2022**
- **Specifications** for DAC (**mechanical/pneumatical**) almost finalised
- Specifications for DAC (**data/energy**) to be closed asap: communication system recommendation for 2 systems to test in FP5 before decision
- **Operational DAC test** (with DAC4EU) **took an continue** to take **place** over Europe
- Development of **solid** and **feasible migration scenarios**, first time in Europe
- Analysis on **impact on workers** (workers safety, new job profiles / skills)
- **Huge progress** on **Cost Benefit Analyses** which is foreseen to be finalised in Q3 2022 **enabling** the current work on a **European Investment Plan for DAC**
- **Intensified dissemination** activities (e.g. **SEE/CEE**)



## Short-term (Q2-Q3/22)

1. Target **operational procedures** (shunting, train prep, train run) based on consolidated use cases
2. Critical **technical points/issues list**
3. **Transition** EDDP/ERJU FA5+SP
4. Key stakeholder outreach (in particular SEE/CEE)
5. **Migration/deployment scenarios** (principles, methods/tools, target scenario, deep dive fleet data analysis, boundary conditions to be established, prepare for detailed development deployment plan)
6. **CBA/ funding** financing (setting the scene)

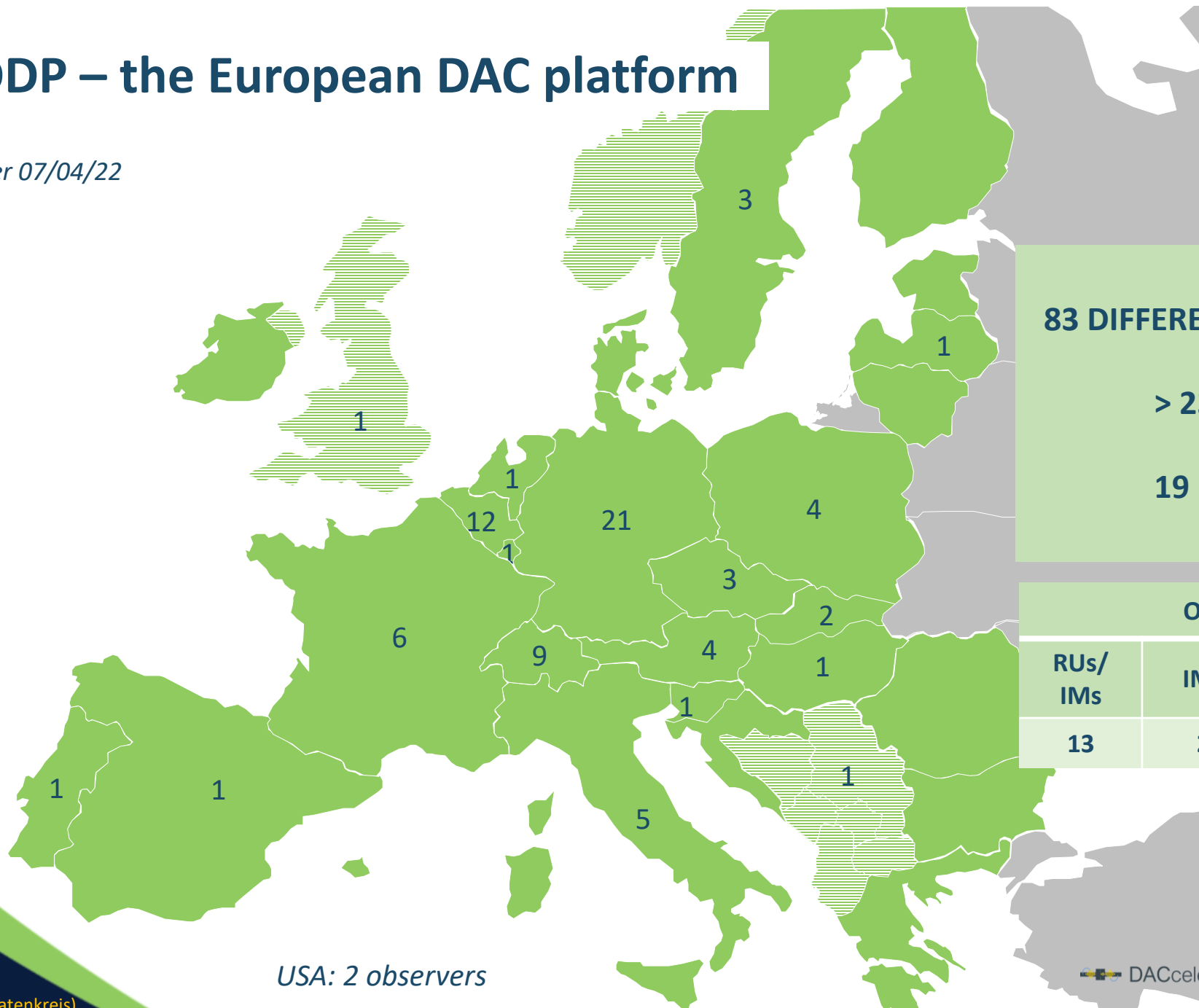
## Long-term (2025)

(= everything that needs to be proven before investment decisions will be taken)

1. Demonstrated and proven **technical feasibility** and performance (incl. reliability, availability)
2. Standardized and pre-agreed **authorisation procedures** for wagons and locos (incl. availability of relevant documentation)
3. Demonstration of **operational functionality** (incl. safety aspects and expecting benefit)
4. Positive **CBA incl. guaranteed funding** (funding/financing instruments available)
5. Solid, aligned European **migration/deployment** plan (incl. organizational set-up for synchronic deployment)
6. **Sector agreement/management** and **Regulatory framework** in place (TSI,...)

# EDDP – the European DAC platform

as per 07/04/22



**83 DIFFERENT ORGANISATIONS** (04/22)  
**> 230 PARTICIPANTS**  
**19 DIFFERENT COUNTRIES**

**ORGANISATIONS BY TYPE**

RUs/IMs	IMs	WKs	INDUSTRY	OTHER
13	2	16	17	35

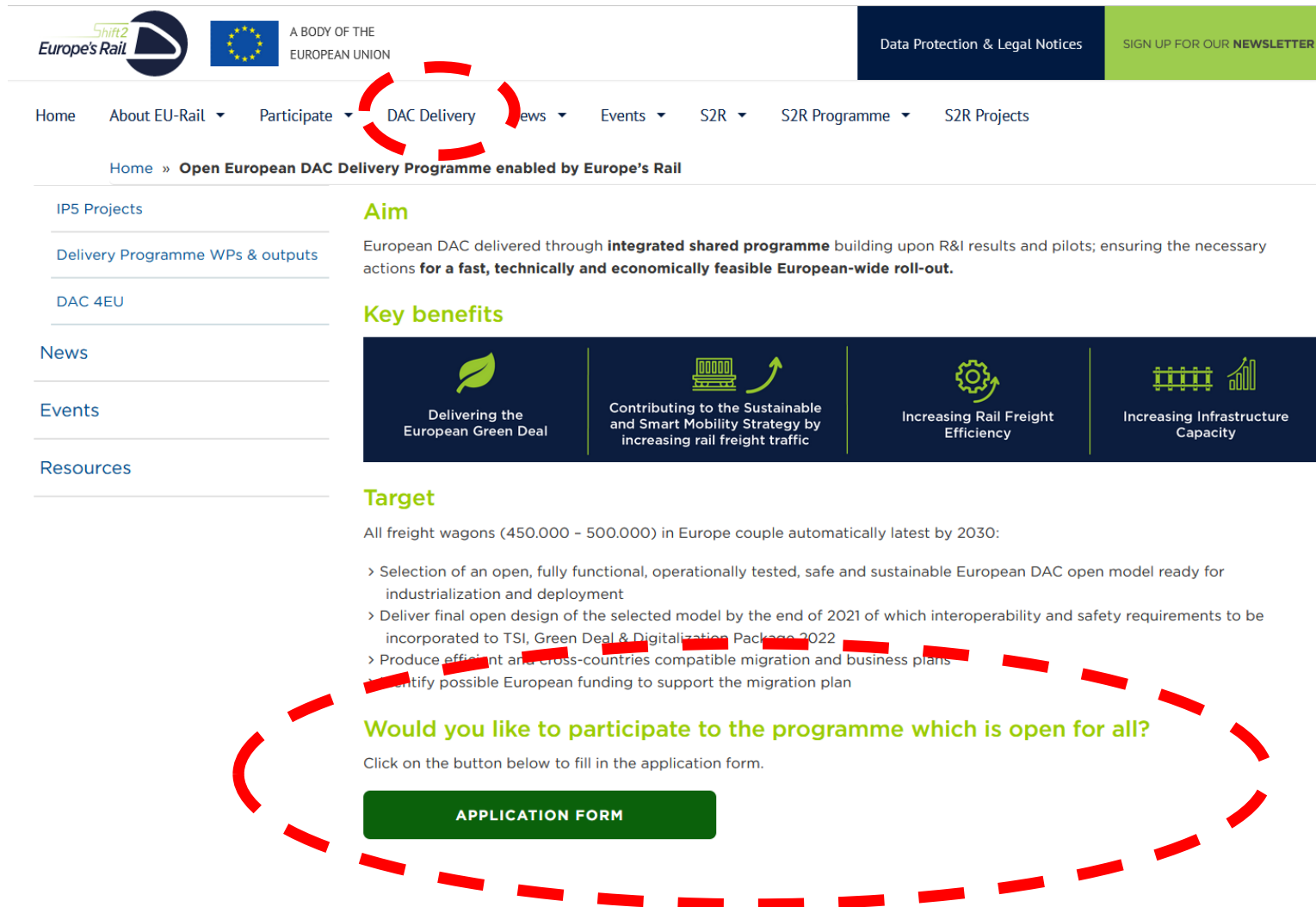
w/o US, UK

USA: 2 observers



# A single entry point for all Europe and beyond

<https://rail-research.europa.eu/european-dac-delivery-programme/>



The screenshot shows the website's navigation menu with 'DAC Delivery' highlighted. The main content area features a sidebar with links to IP5 Projects, Delivery Programme WPs & outputs, DAC 4EU, News, Events, and Resources. The main content includes an 'Aim' section, a 'Key benefits' section with four icons (leaf, train, gear, and tracks), a 'Target' section with a list of goals, and a call to action for an 'APPLICATION FORM'.

Home » **Open European DAC Delivery Programme enabled by Europe's Rail**

IP5 Projects

Delivery Programme WPs & outputs

DAC 4EU

News

Events

Resources

### Aim

European DAC delivered through **integrated shared programme** building upon R&I results and pilots; ensuring the necessary actions **for a fast, technically and economically feasible European-wide roll-out.**

### Key benefits

- Delivering the European Green Deal
- Contributing to the Sustainable and Smart Mobility Strategy by increasing rail freight traffic
- Increasing Rail Freight Efficiency
- Increasing Infrastructure Capacity

### Target

All freight wagons (450.000 - 500.000) in Europe couple automatically latest by 2030:

- > Selection of an open, fully functional, operationally tested, safe and sustainable European DAC open model ready for industrialization and deployment
- > Deliver final open design of the selected model by the end of 2021 of which interoperability and safety requirements to be incorporated to TSI, Green Deal & Digitalization Package 2022
- > Produce efficient and cross-countries compatible migration and business plans
- > Identify possible European funding to support the migration plan

### Would you like to participate to the programme which is open for all?

Click on the button below to fill in the application form.

**APPLICATION FORM**

# Any questions?

- Constanze Bannholzer      ÖBB      Constanze.Bannholzer@oebb.at

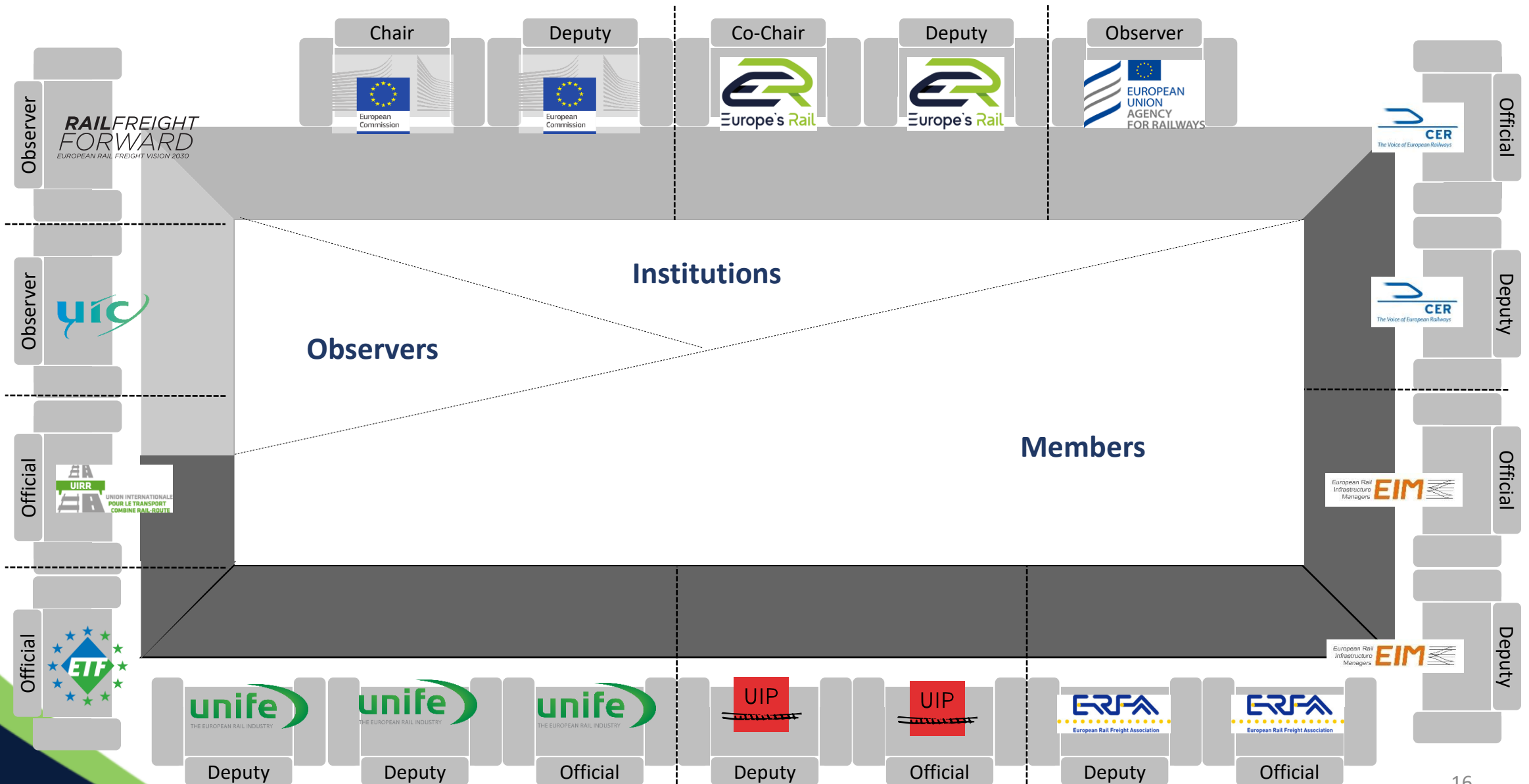
More information: <https://rail-research.europa.eu/european-dac-delivery-programme/>



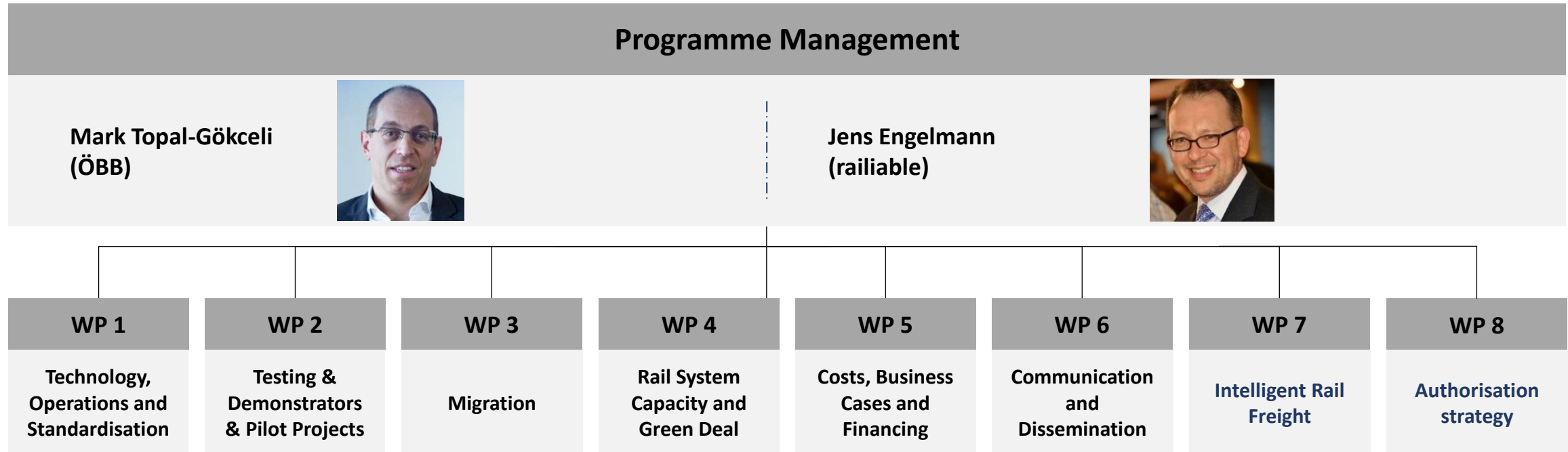
# EDDP Governance – Programme Board



# EDDP Governance – Supervisory Board



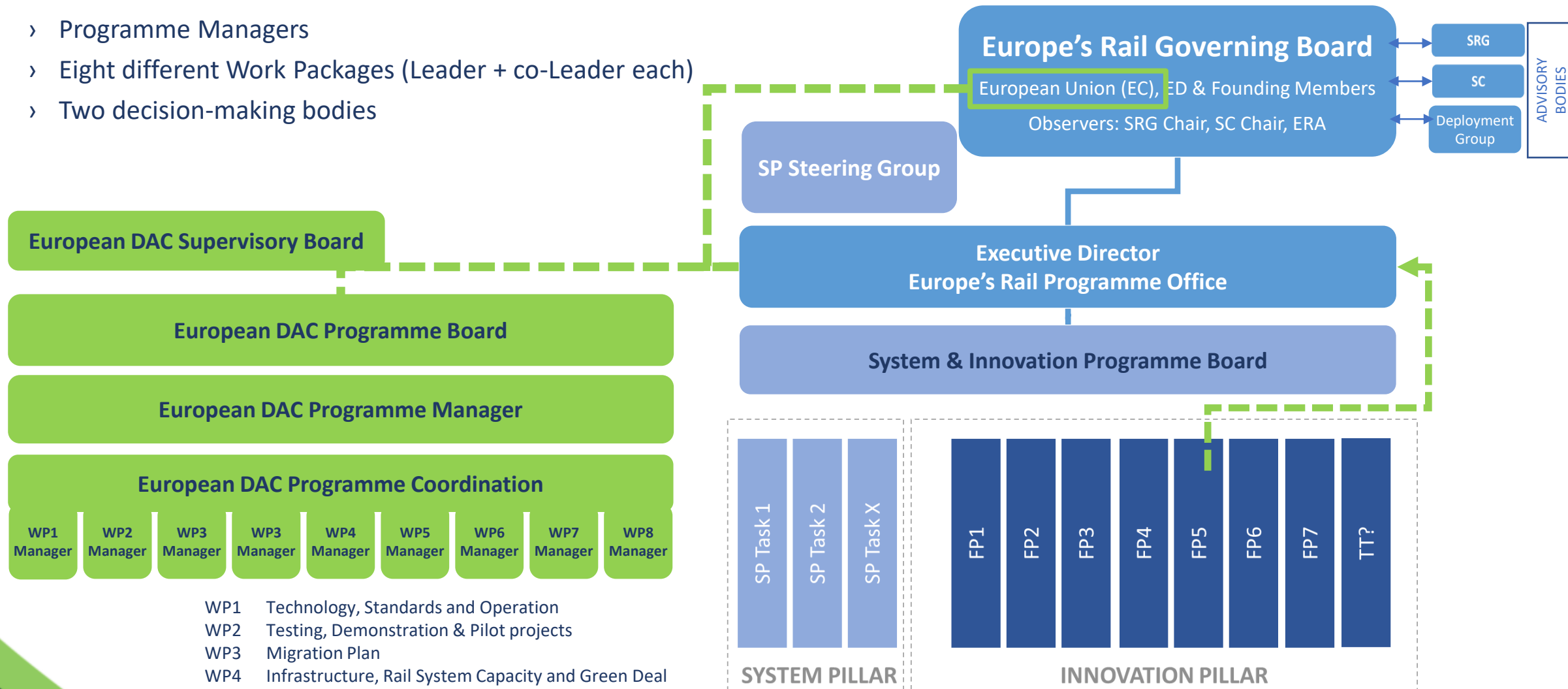
# EU DAC Governance – programme and WPs





# The EDDP structure

- › Programme Managers
- › Eight different Work Packages (Leader + co-Leader each)
- › Two decision-making bodies



- WP1 Technology, Standards and Operation
- WP2 Testing, Demonstration & Pilot projects
- WP3 Migration Plan
- WP4 Infrastructure, Rail System Capacity and Green Deal
- WP5 Costs, Business Case and Financing
- WP6 Communication and Dissemination
- WP7 Intelligent Rail Freight (future additional automation)
- WP8 Authorisation strategy for retrofit of wagons & locos