European Freight DAC Delivery Programme

enabled by Europe's Rail

Moving European Rail Freight Forward

Meeting, place, xx month 2022

Version 01 February 2022

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EDDP introduction

2

EDDP structure

European DAC Delivery Programme enabled by Europe's Rail

Key Benefits

- *Increasing infrastructure capacity*
- *Increasing rail freight efficiency*
- *Make modal shift possible: +50% by 2030, +100% by 2050*
- *Delivering the European Green Deal*

Aim

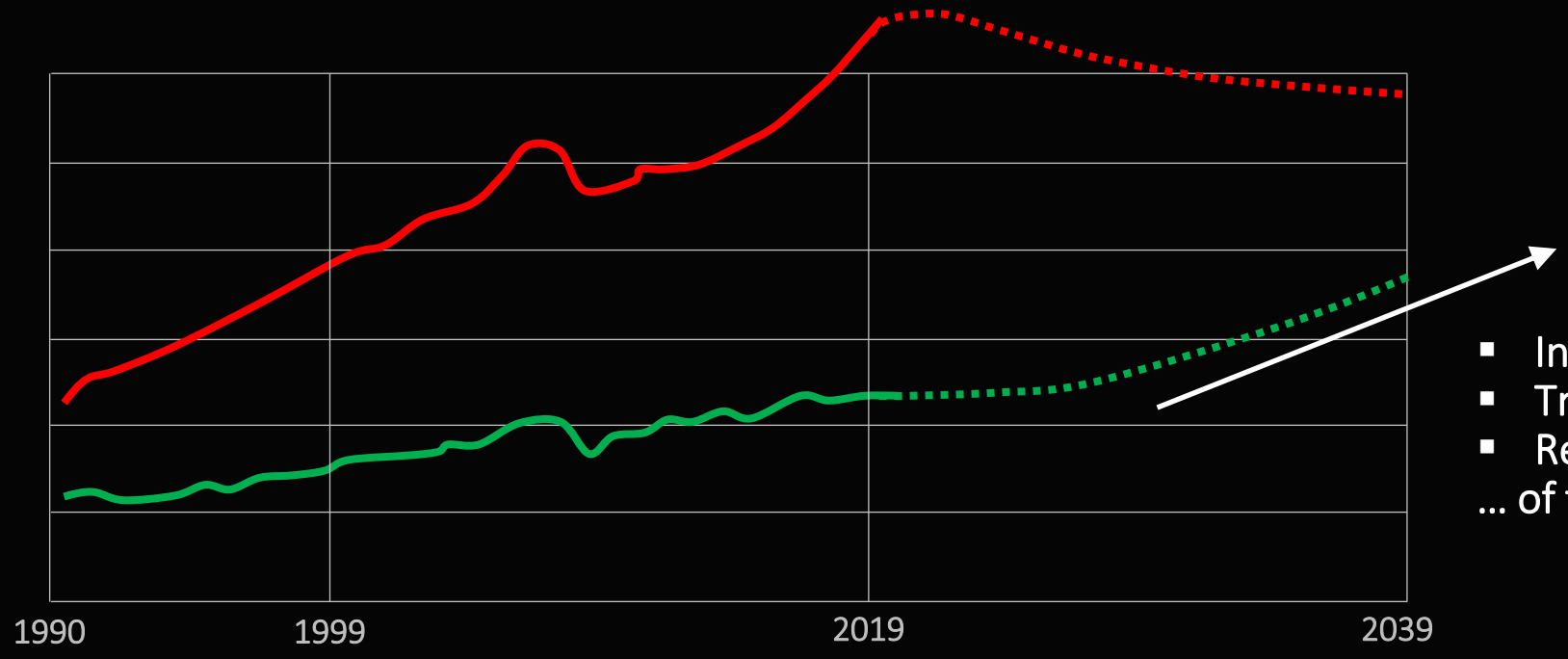
- Selection of an open, fully functional, operationally tested, safe, sustainable European DAC open model ready for industrialization and deployment (assessments of available solutions, testing and demos)
- Deliver final open design of the selected model by the end of 2021 of which interoperability and safety requirements to be incorporated to TSI, Green Deal & Digitalization Package 2022
- Identify necessary add-on automation components and integrate them
- Identify migration and business plans compatible across Europe as well as the necessary resources to match them
- communication and dissemination to facilitate DAC deployment in Europe

Enabler

This work is enabled by **Europe's Rail** to ensure technology and oversight independence, with a major role for the railway operating community as major future customer of the operational changes introduced, **to meet final logistic customer expectations**.

Development of freight volume road and rail in mn tkm in a representative MS

- Rail increased 35% (1999-2019)
- but needs to increase 60% (2019-2039) in order to meet the green deal objectives



- Innovation
- Transformation
- Revolution?

… of the rail freight system is needed

The challenges for EU rail freight

Capacity

+ 50% rail freight

- 55% GHG emissions

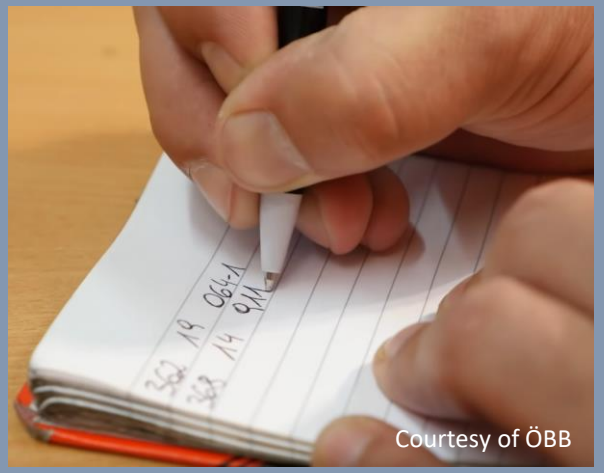
by 2030

from bottleneck
to green backbone

Productivity

from manual intervention
to automation

Quality



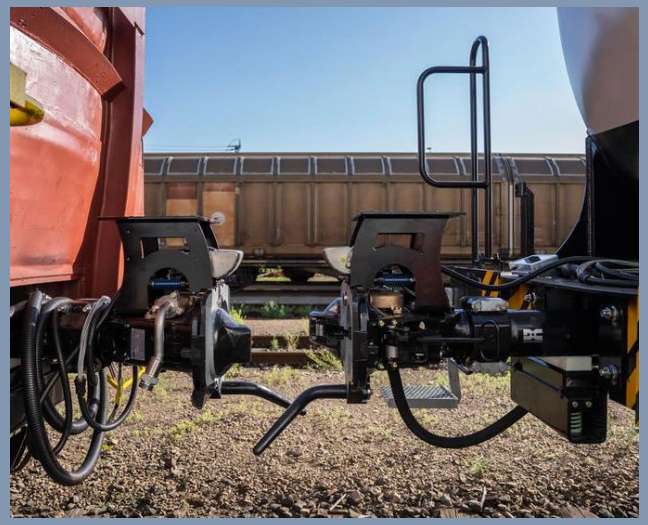
from paper
to digital

Processes today – and tomorrow

manual freight wagon coupling

Courtesy of ÖBB

automatic freight wagon coupling



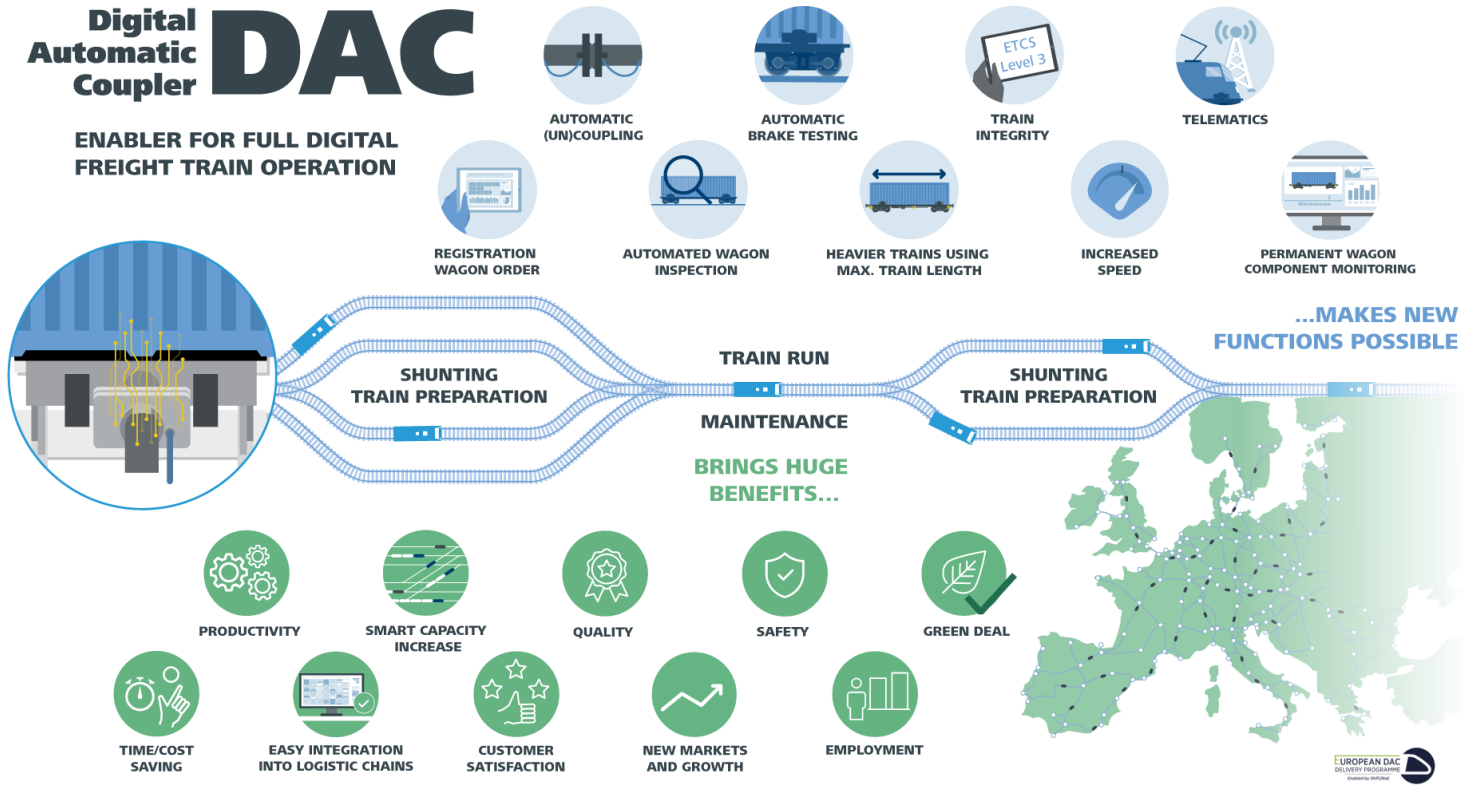
Courtesy of DAC4EU consortium

DAC = Digital + Automation + Coupling

this is a major transformation project

- push EU rail freight operations from heavily relying on human factor to 21st century world benchmark
- rail freight automation with DAC is ***the*** chance for Europe and ***the*** offer to European policy makers

DAC for Full Digital Freight Train Operations



- DAC is **more than just a coupler**
- DAC is a key and unique **enabler for numerous applications**
- DAC is not a stand-alone technology but the backbone for **“full digital freight train operations”** to achieve the ambitious transformation in European rail freight
- This will allow the DAC to enable even more **use cases** and to **generate** a max. possible **benefit**

EUROPEAN DAC DELIVERY PROGRAMME Enabled by Shift2Rail

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

Source: Dellner & Voith

DACcelerate

This project has received funding from the Shift2Rail Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement no. 101046657.

The DAC and automation benefits for EU

EUROPEAN DAC DELIVERY PROGRAMME
Enabled by Europe's Rail

rail freight sectoral

society & environment

Capacity

Smart capacity, more efficient than conventional extension & much faster

Productivity

Reduction of time/efforts (€),

increase of system speed and asset efficiency

Quality

Increased flexibility and reliability,

innovative customer services and information

Competitiveness

new markets and growth

worker's & rail safety

Automation of manual processes,

invest in human capital

Economics & employment

10+ bn EUR value creation in Europe

better work-places in rail

Green Deal

- 10 to -20 mn tons $CO_{2\ equiv.}$ p. a.

Implementation: DAC and automation use cases

EUROPEAN DAC DELIVERY PROGRAMME
Enabled by Europe's Rail

	Functionality (DAC/automation use case)	Basis	additional automation component	Benefit allocation to process steps: Shunting	Train prep	Train run	Maintenance
1	**Automated coupling + manual uncoupling**	DAC*	-	X			
2	**Automatic brake test & calculation of braking capacity**	DAC*	automatic braking test device		X		
3	**Recording of train composition + abandon of rear signal**	DAC*	-		X		
4	**Heavier trains & longer trains (within existing infra limitations)**	DAC*	-			X	
5	**Increased payload**	DAC*	(elimination of buffers, modified new vehicle design)			X	X
6	**Train integrity (for moving block operations)**	DAC*	train integrity system **(+ ETCS level 3)**			X	
7	**Increased speed via improved longitudinal forces**	DAC*	-			X	
8	**Increased speed via better braking performance**	DAC*	electro-pneumatic brake		X	X	
9	**Wagon condition/performance info (incl. derailment detection)**	DAC*	wagon telematics			X	X
10	**Telematics for customers**	DAC*	wagon telematics			X	
11	**Automated parking brake**	DAC*	automated parking brake system	X	X		
12	**Automatic uncoupling (remote)**	DAC*	actuator + automated parking brake system	X	X		
13	**Automated technical wagon inspection**	DAC*	wagon telematics + video gate + infra check points		X		
14	**Longer trains up to 1500m**	DAC*	(infrastructural adaptations +) ep-brake/distributed power			X	
	Future automation use cases						
15	**Dynamic coupling and uncoupling**	DAC*	actuator + dynamic coupling system			X	

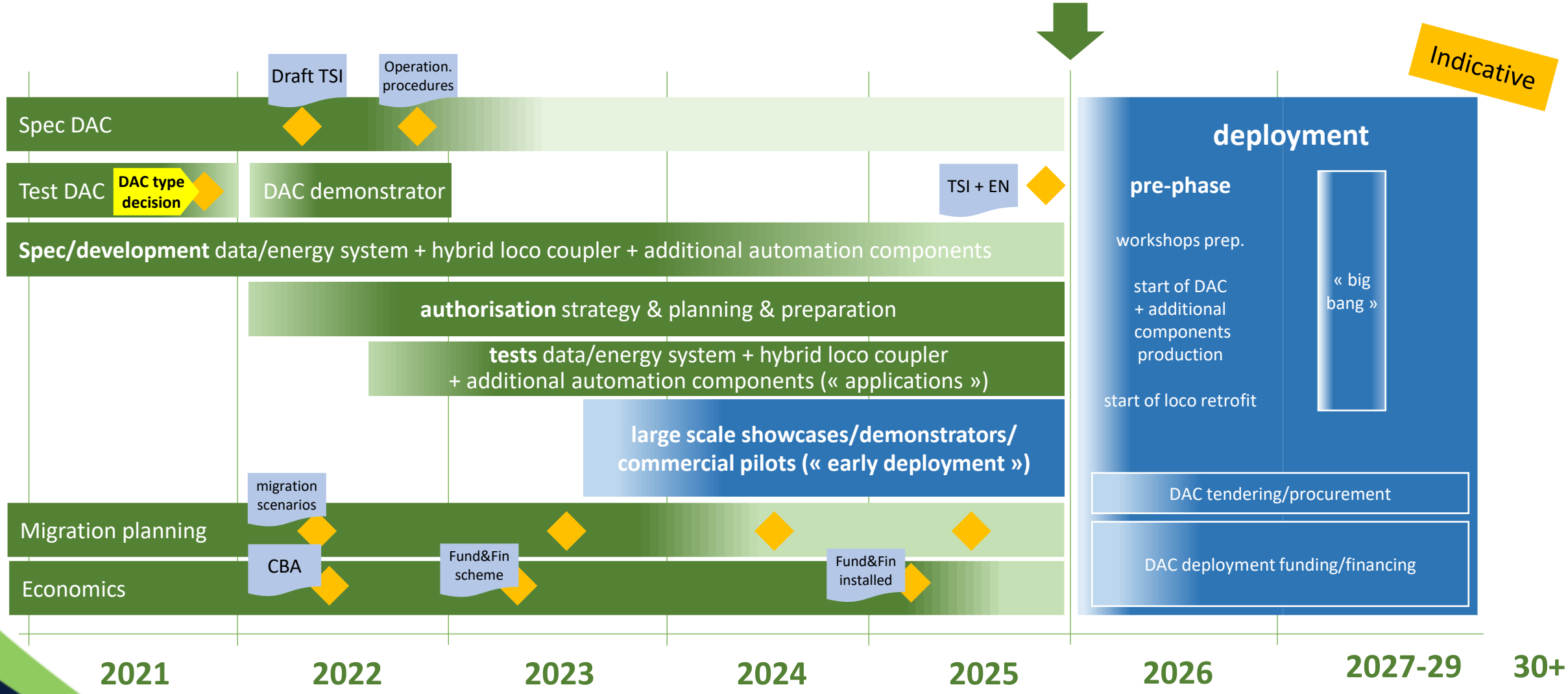
Benefits assessed for different stakeholder groups
- **IMs**
- **RUs**
- **WKs**

** incl. infrastructural adaptions for safe DAC operation (e.g. buffer stops, ..)*

1. **Cost-benefit assessment for all use cases**
2. **Selection of use cases and linked technology packaging for roll-out to be defined based on CBA results**

benefits = gains in process (time, system time, cost savings, capacity, reliability, quality, safety + induced modal shift)

Indicative overall time plan



Implementation: DAC as employment booster

EUROPEAN DAC DELIVERY PROGRAMME
Enabled by Europe's Rail

material	to be produced:				
	› 900k – 1 mn	DAC	(wagons)	€ 5-6 bn	€ 7,6 – 8,9 bn + *tbd*
	› 450k – 500k	automation components	(wagons)	€ 2,2 - 2,5 bn	
	› 34k - 40k	hybrid couplers	(locos)	€ 0,4 bn	
	› xx	buffer stops, …		*tbd*	
labour	to be retrofitted:				
	› 450k - 500k	freight wagons		€ 1,4 – 1,5 bn	€ 1,5 – 1,6 bn + *tbd*
	› 17k - 20k	locos		€ 0,1 bn	
	› xx	buffer stops, …		*tbd*	
	produced in EU retrofitted in EU countries				€ 9,1 – 10,5 bn + *tbd*

all numbers indicative and under assessment

Implementation: DAC funding/financing to ensure business case

costs	benefits	business case	propositions
dimensions: CAPEX OPEX	capacity productivity quality beneficiaries: RUs, IMs, WKs, socio-economic	huge benefits but small margin business benefits do not yet lead to business case by itself safeguarding a good balance between funding/financing	› Observation time for return on cost <10 years › CAPEX funding › Additional OPEX funding › distribution of costs/benefits between actors

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EDDP introduction

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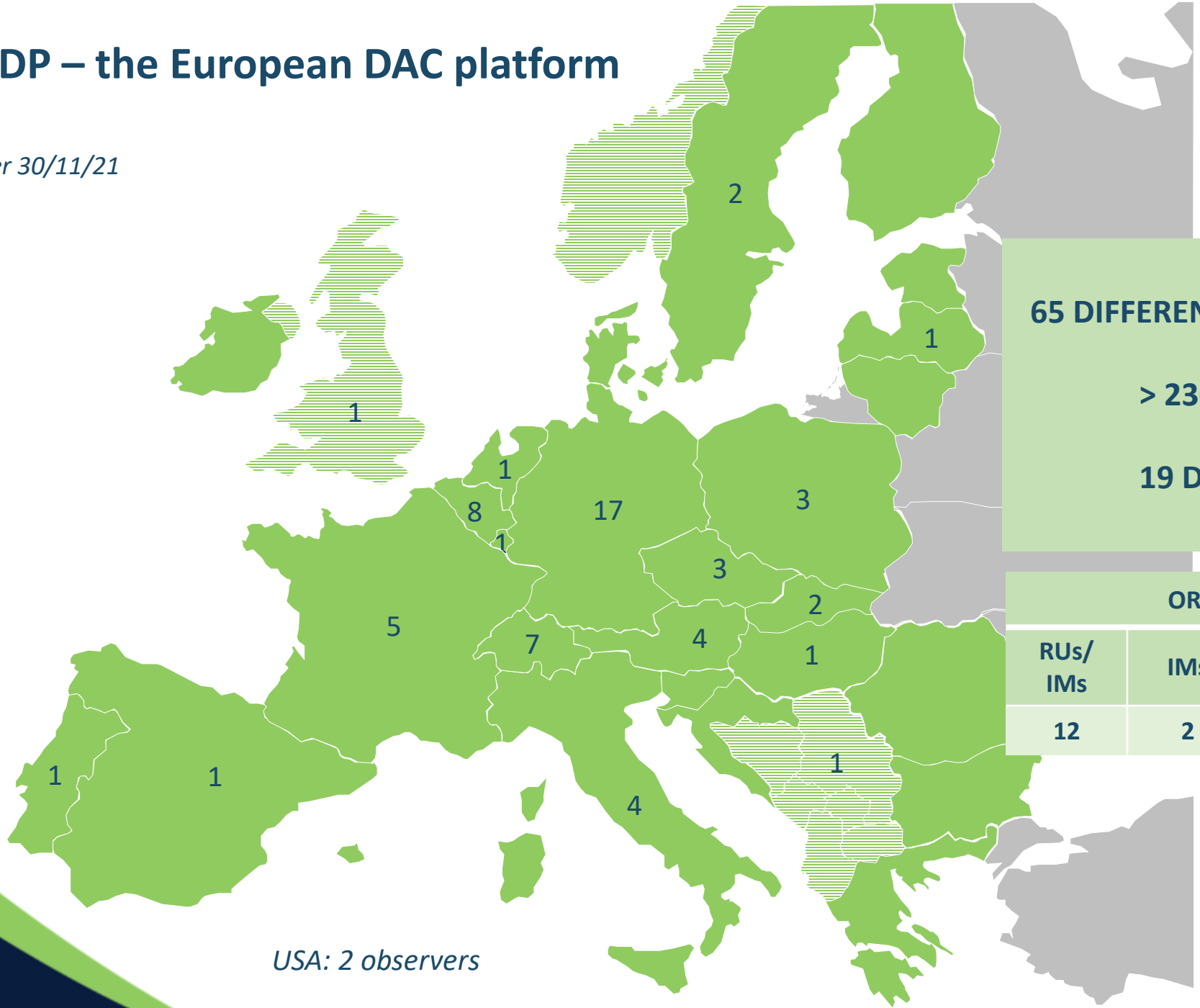
EDDP structure

EDDP – the European DAC platform

as per 30/11/21



65 DIFFERENT ORGANISATIONS (09/21: 59)

> 230 PARTICIPANTS

19 DIFFERENT COUNTRIES

ORGANISATIONS BY TYPE

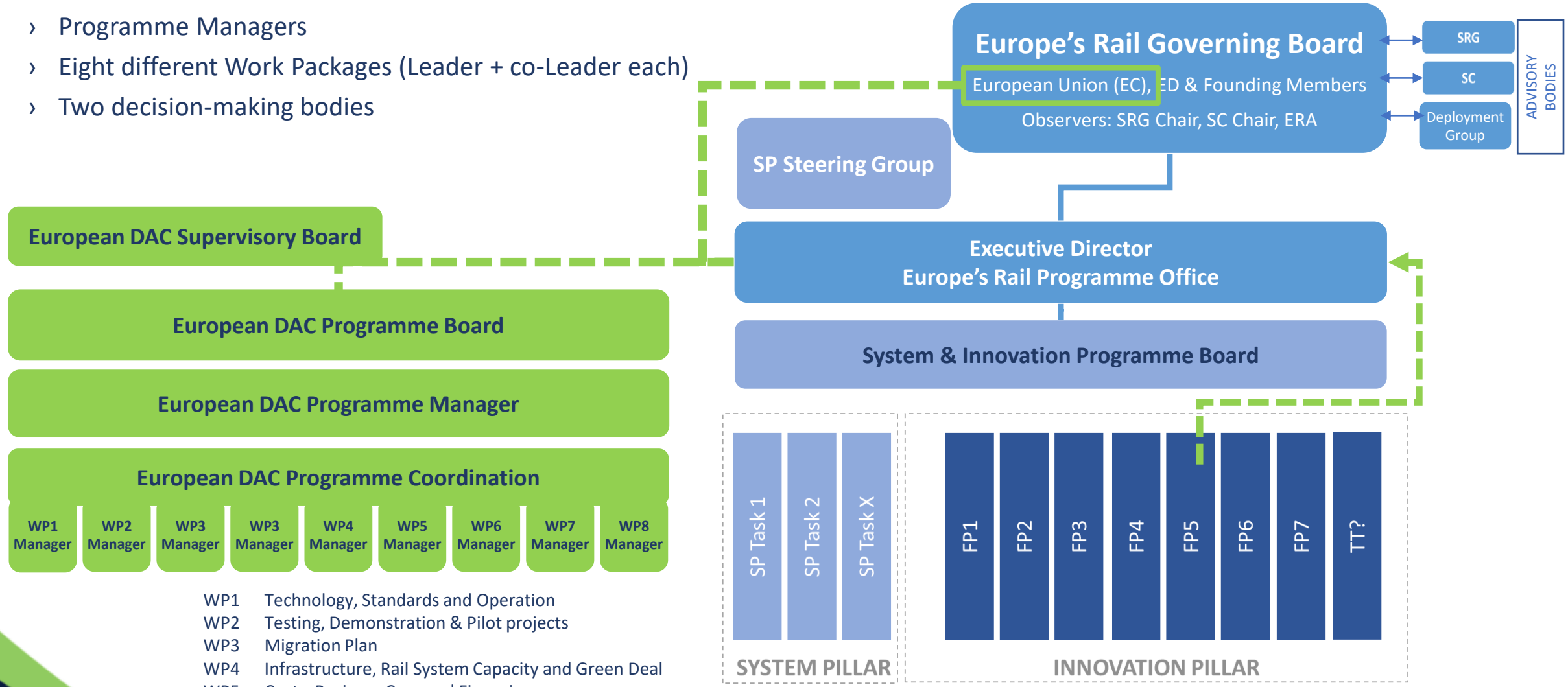
RUs/ IMs	IMs	WKs	INDU-STRY	OTHER
12	2	14	13	20

w/o US, UK

USA: 2 observers

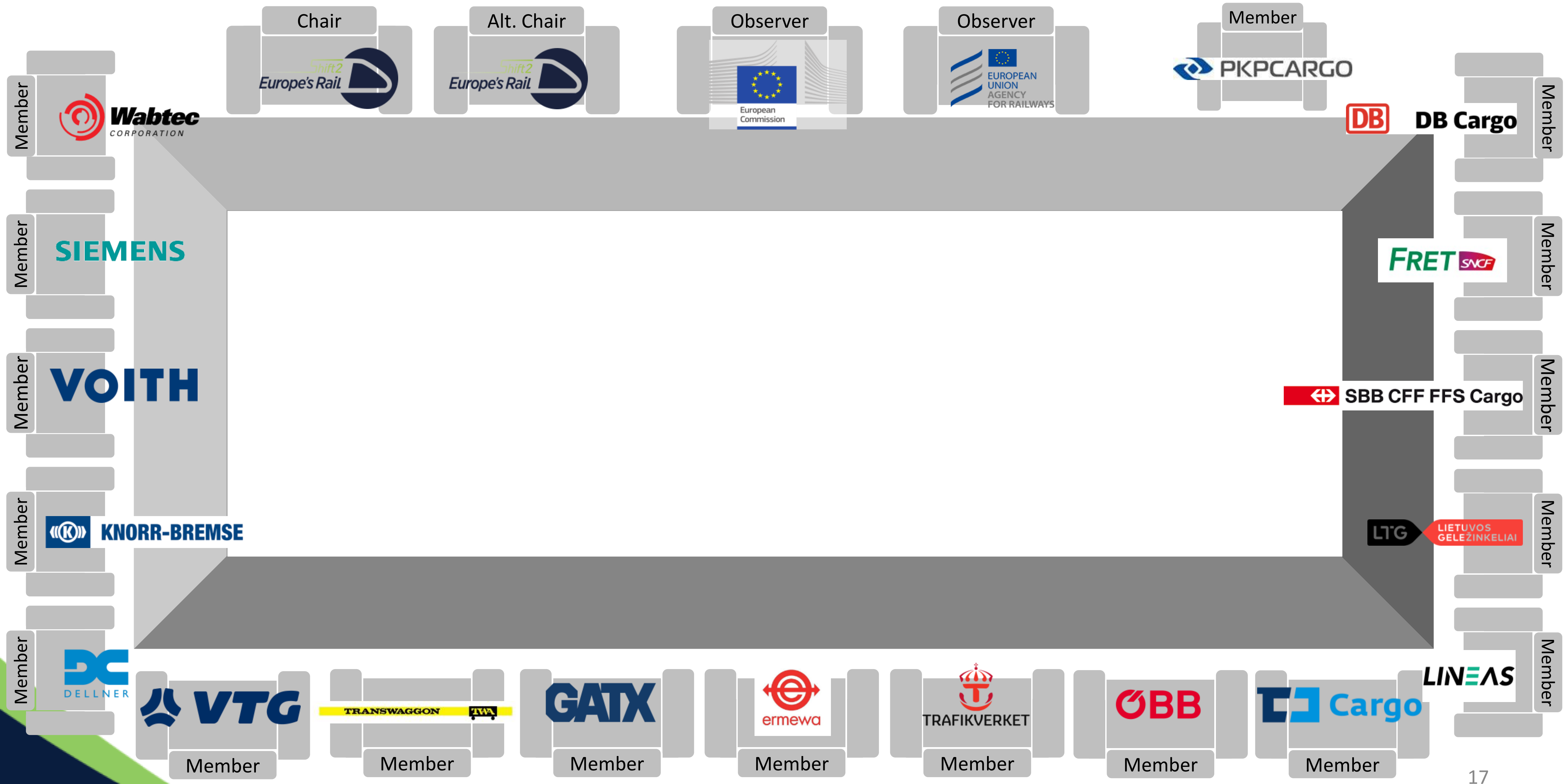
The EDDP structure

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

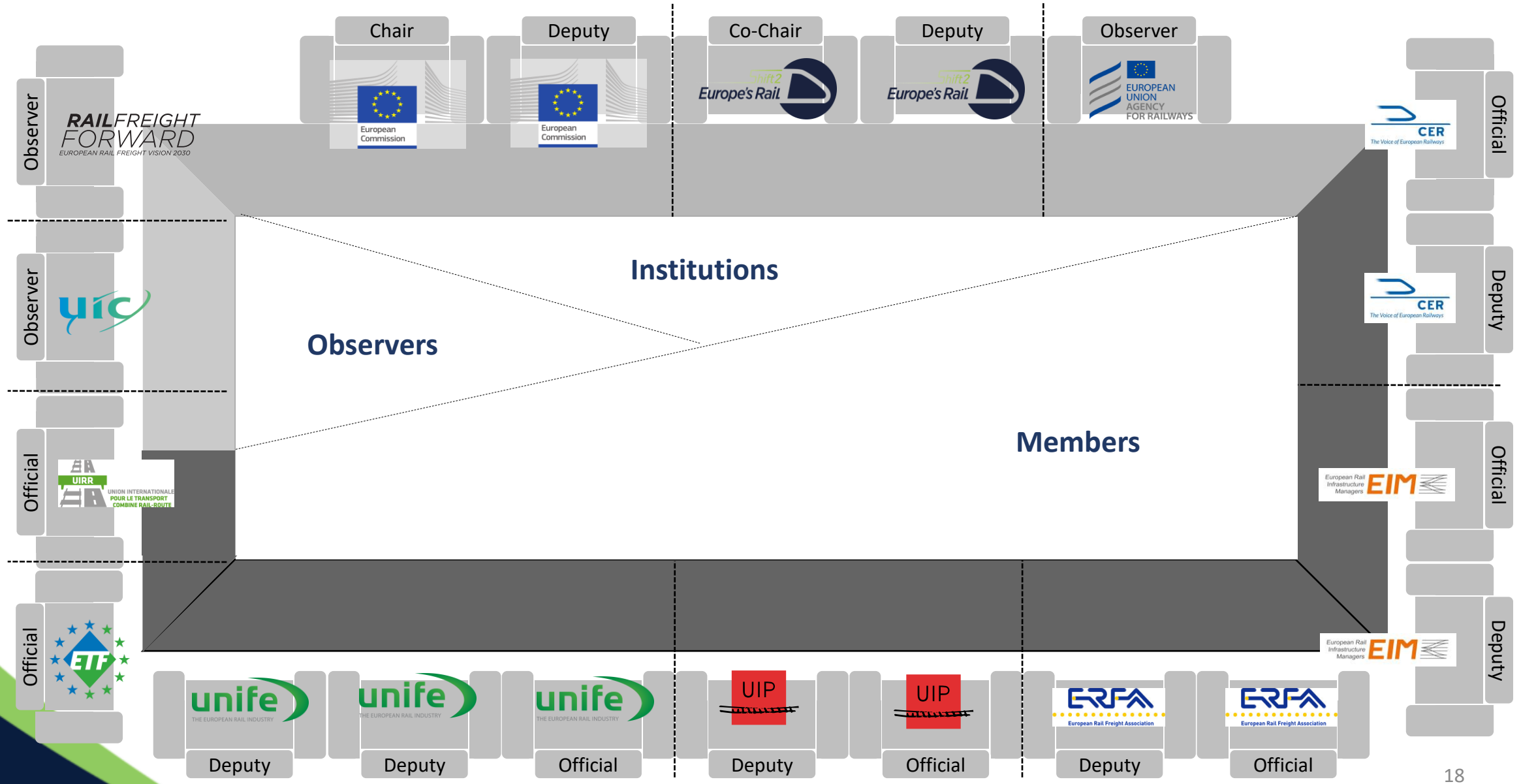


WP1	Technology, Standards and Operation
WP2	Testing, Demonstration & Pilot projects
WP3	Migration Plan
WP4	Infrastructure, Rail System Capacity and Green Deal
WP5	Costs, Business Case and Financing
WP6	Communication and Dissemination
WP7	Intelligent Rail Freight (future additional automation)
WP8	Authorisation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

EDDP Governance – Programme Board



EDDP Governance – Supervisory Board



EU DAC Governance – programme and WPs

Programme Management

Mark Topal-Gökceli (ÖBB)

Jens Engelmann (railiable)

WP 1	WP 2	WP 3	WP 4	WP 5	WP 6	WP 7	WP 8
Technology, Operations and Standardisation	Testing & Demonstrators & Pilot Projects	Migration	Rail System Capacity and Green Deal	Costs, Business Cases and Financing	Communication and Dissemination	Intelligent Rail Freight	Authorisation strategy

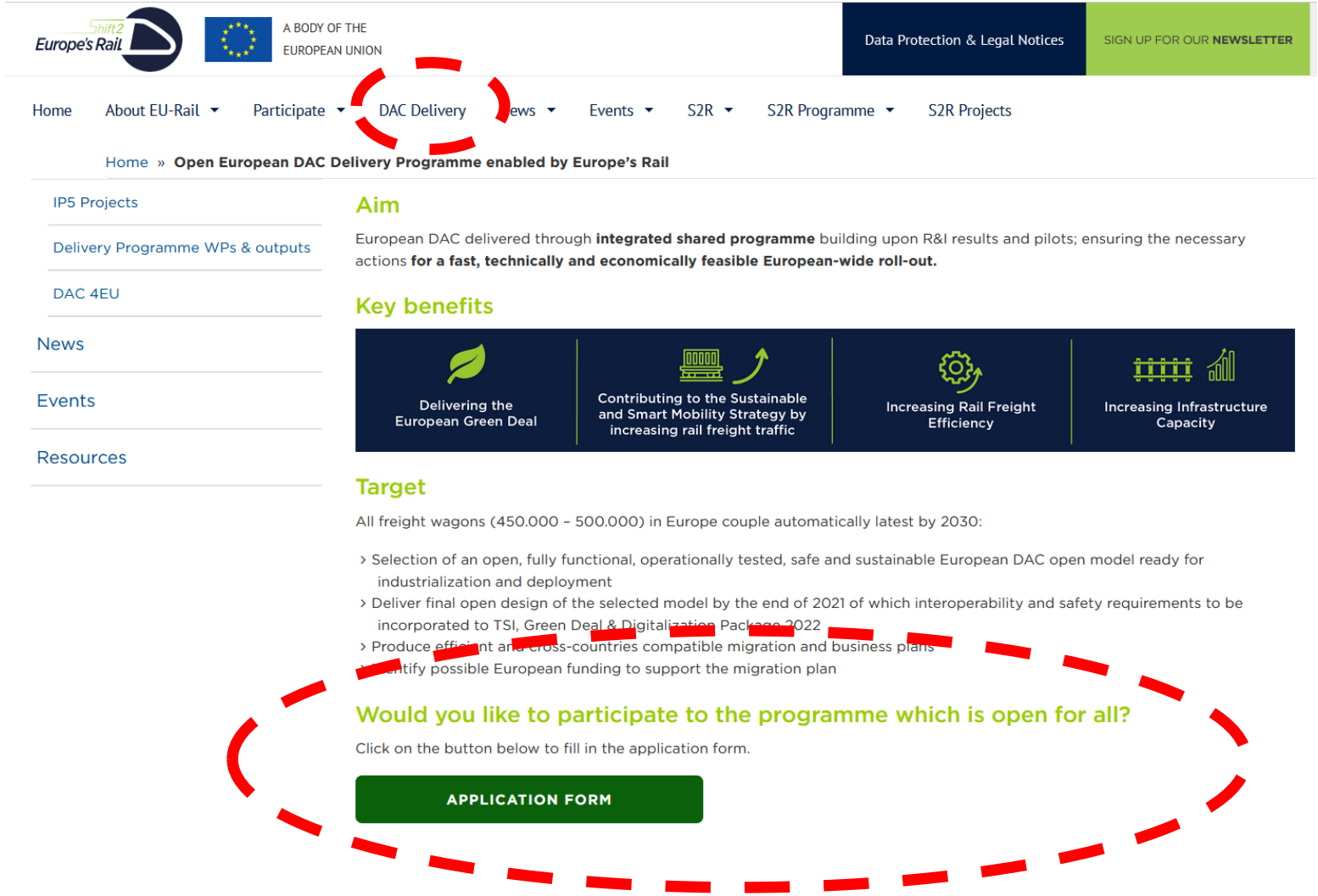
On-going connected activities

DAC4EU BMVI	Project officially started after receiving € 13mn from German Government in June 2020 *[DB / DB Cargo, SBB Cargo, Rail Cargo Group, Ermewa, GATX Rail Europe, VTG]*. Couplers from four different manufacturers under DAC mechanical, pneumatic, electrical and communication tests, implying a freight train formation of 12 wagons coupled with DACs. Dynamic testing until July 2021. Demonstrator train in Europe (24 wagons) with selected DAC type in phase 2. Certified DAC as output until Dec. 2022.
DAC Winter Tests	All DACs are tested under winter conditions, including telematics in winter 2020/21, organized by Trafikverket with the aid of Green Cargo. A train formation will be tested in marshalling yards and in circulation through different places in Sweden. Possible phase 2 is industrial business case in a real environment.
IP5 Shift2Rail	FR8RAIL II DAC Type 4 Prototype final Test Bench Tests completed. FR8RAIL IV under study and pre-approved, will support DAC Trafikverket tests.
ERA	Has started the TWG – Freight for the TSI Revision 2022. Sector is expected to deliver the necessary input to ERA for the adoption of the DAC in the necessary TSIs that regulate interoperability and railway approvals / authorizations in EU.
CEN	WG for developing a new standard for “Automatic Coupler for Freight”

Political supports: Berlin declaration ministries of transport, MoU of major Freight operators & keepers

A single entry point for all Europe and beyond

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



Any questions?

Europe‘s Rail EDDP Programme Management

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