Document Summary Information

Revision history (including peer reviewing & quality control)

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Copyright message

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Glossary of terms and abbreviations used

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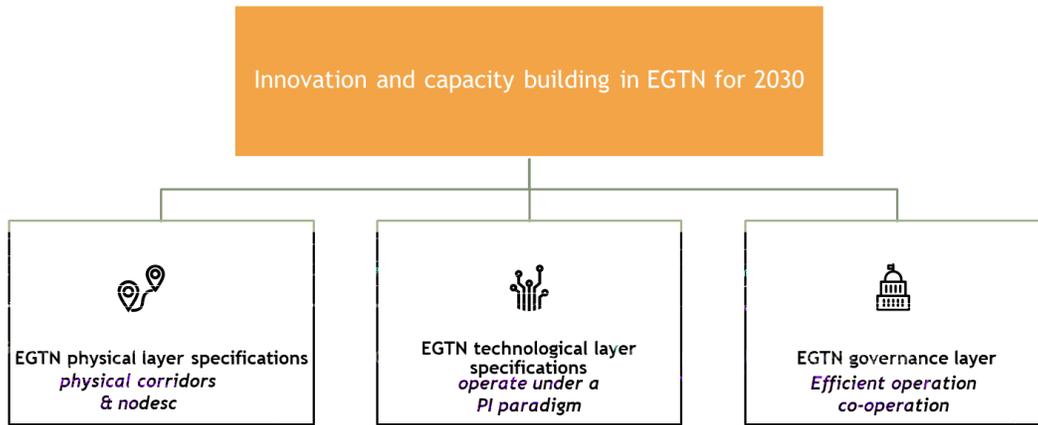
Figure 1 EGTN innovation layers for 2030

Figure 2 Approach followed for the development of the recommendations
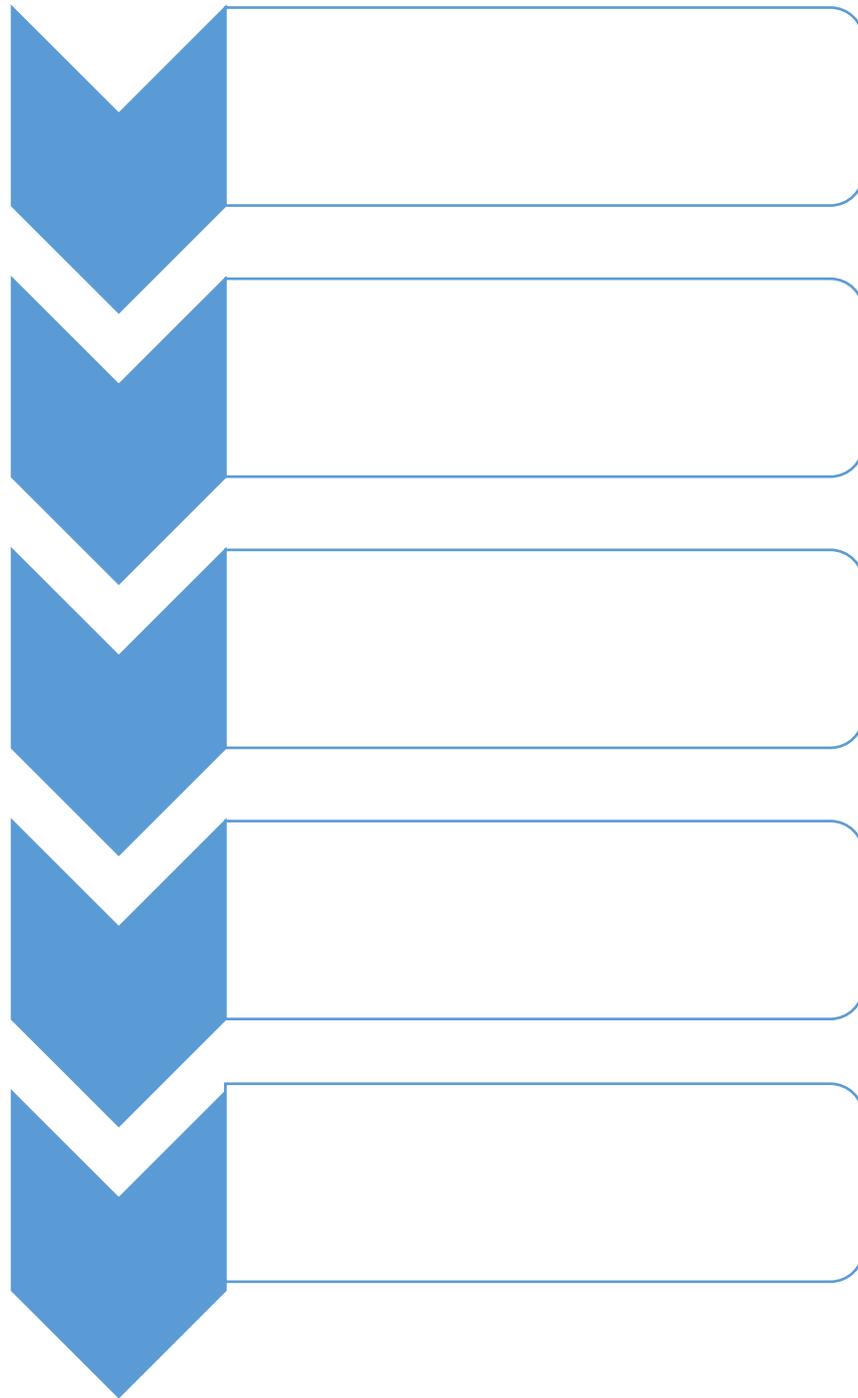
Figure 3 Methodology of Task 4

Table 2 Summary of LL KPIs

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Table 3 Final version of the Evaluaton Matrix

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		

	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Table 4 Scenarios taken under consideration in PLANET D4.1

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			✓
		✓	
		✓	
			✓
		✓	✓
			✓
		✓	
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		✓	
			✓
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		✓	

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Summary results of validation workshop

Table 5 Summary results of the validation of the evaluation matrixes.

_____AA	Nr of respondents who totally agreed - no changes	Nr of respondents who made minor changes (1-6 changes)	Number of respondents who made major changes (more than 6 changes)
	5	3	1
	7	1	2
	7	1	2
	6	2	2
	5	3	1
	6	2	1
	8	1	1
	9	0	0
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	8	1	1
	9	1	0
	9	0	0
	8	1	0

Figure 4 Selected funding mechanism

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The effect of the Ukrainian war

Where do containers take the route that used to go by rail?
Share per sea basin

Legend:
- Adriatic
- Atlantic range
- Black Sea
- Hamburg-Le Havre range
- Mediterranean
- Scandinavia/Baltic
- UK/Ireland
- NaN

9% Scandinavia/Baltic

67% Hamburg - Le Havre range

7% UK/Ireland

2% Atlantic range

2% Black Sea

9% Mediterranen

4% Adriatic
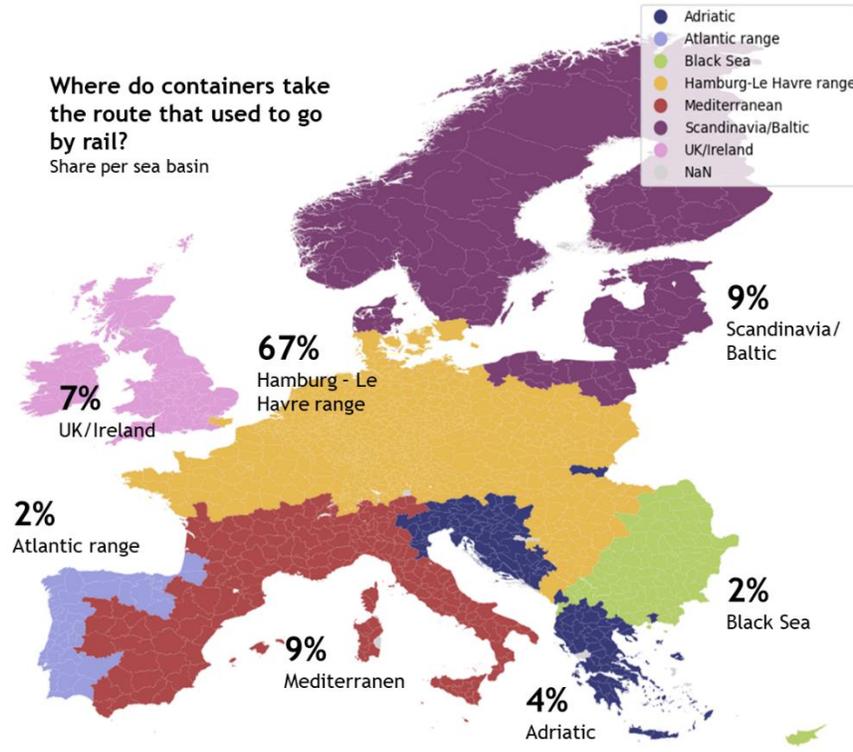
Figure 5 Results of the cargo shift due to the Ukrainian war

G A n A A A A A A
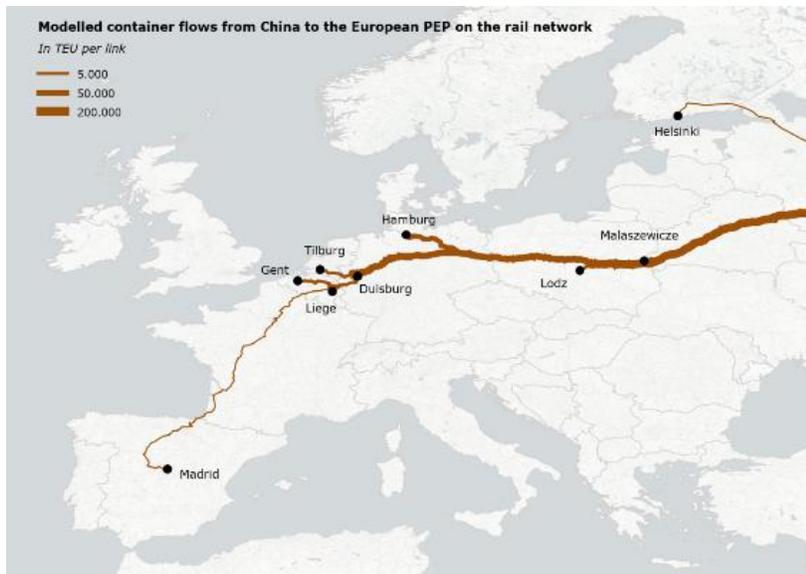
Figure 6 Modelled container flows from China to the European PEP on the rail network
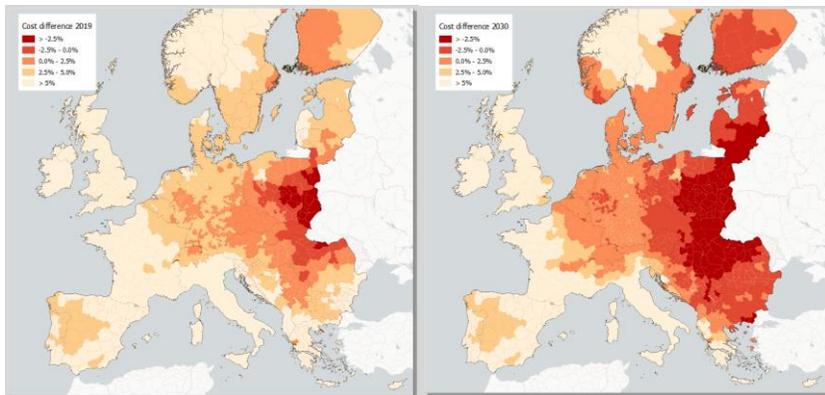
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Simulation model results

Figure 7 Cost difference Eurasian rail transport compared to maritime transport for high value (> 15 €/KG) goods (Left: 2019, Right: 2030)

Tab... ...d from Eurasian Freight in 2030 based on the PLANET simulation model

					Number of tracks	Max axle load	TEN-T status
					2	22,5	Core
					2	22,5	Core
					2	22,5	No
					2	22,5	Core
					2	22,5	Core
					2	22,5	Core
					2	22,5	Core
					2	22,5	Core
					2	22,5	Core
					2	22,5	Core
					2	22.5 until HU, after which 20	Partly Core & Comprehensive

Table 7 Additional demand in terminals from Eurasian Freight in 2030 based on the PLANET simulation model

Node name	TEU 2030 Trains/day	TEU 2030 Trucks/day	TEUs 2030 rail	TEUs Dis. Reg.	Total TEUs 2030
Tilburg RT	4,4	190	163.736	104.191	267.927
Liege RT	1,1	48	43.557	26.177	69.734
Madrid RT	0,6	25	33.137	13.459	46.596
Hamburg RT	8,0	348	296.757	187.233	483.990
Duisburg RT	5,2	223	199.680	120.947	320.626
					-
					-
Lodz RT	4,2	183	135.935	112.098	248.033
Gent RT	2,9	124	144.265	68.009	212.274
Malaszewicze RT	6,5	281	196.328	168.056	364.383
Helsinki RT	0,4	17	17.672	7.877	25.549
Slawkow RT	2,1	92	74.010	59.716	133.725
Kosice RT	2,1	90	58.752	54.412	113.164
Bratislava RT	0,5	23	18.857	15.059	33.916
Be6grad RT	0,0	0	5	2	6
Bucuresti RT	0,0	0	2	2	4
Constanza RT	0,7	32	32.221	20.780	53.001
Kaunas RT	1,7	74	57.828	49.148	106.976
Vienna RT	1,0	43	36.639	18.475	55.114
Milan RT	1,1	46	48.447	25.162	73.609
Budapest RT	3,1	132	104.642	87.622	192.265
Istanbul RT	0,8	33	31.792	21.507	53.298

Table 8 Corridors for intervention and their bottlenecks

		Number of tracks	Max axle load	TEN-T status	Bottlenecks
		2	22,5	Core	Until Lukow there is sufficient capacity[5] The part

		Number of tracks	Max axle load	TEN-T status	Bottlenecks
		2	22,5	Core	
		2	22,5	No	Serious capacity bottleneck[8]
		2	22,5	Core	Szechowice Dziedzice - Zwardoń border PL and Slovakia; Border crossing Skalité -Zwardoń, Single track, max train length 330/360m (or route via CZ can be taken as well) + Žilina zr.st - Žilina (Speed restriction - 40 km/h)
		2	22,5	Core	Electrified, no issues with capacity.
		2	22,5	Core	Electrified, no issues with capacity.
		2	22,5	Core	No capacity bottleneck expected
		2	22,5	Core	Electrified, no issues with capacity.
		2	22,5	Core	Dětmarovice - Petrovice - Karviné state border. Limited capacity during section upgrade

Table 9 Terminals for intervention and their bottlenecks

Node name	TEU 2030 Trains/day	TEU 2030 Trucks/day	Total TEUs 2030	TEN-T network	Bottlenecks
Tilburg RT	4,4	190	267.927	No	No information
Hamburg RT	8,0	348	483.990	No	Today functions in full capacity[9]
Duisburg RT	5,2	223	320.626 - -	Core	Programmed project development of the Iron Rhine that connects Flemish ports to Duisburg
Lodz RT	4,2	183	248.033	No	No information
Gent RT	2,9	124	212.274	Core	No capacity issues
Malaszewicze RT	6,5	281	364.383	Comprehensive	Already faces capacity issues
Slawkow RT	2,1	92	133.725	Core	No capacity issues[10]
Kosice RT	2,1	90	113.164	Core	No capacity issues[11]
Budapest RT	3,1	132	192.265	Core	No significant capacity issues; minor infrastructure interventions could further increase capacity

Softer measures

Ref. no.*	Proposed measures	Issue impact	Total score	Priority category
1B	Enhance surveying and consideration of RU demand in PaP parameters and RC to offer competitive RFC capacity	high	18	proposed
2A	Actions to improve communication efficiency and transparency at national borders	high	18	proposed
2C	Interventions improving coordination in planning and sharing information on capacity restrictions, disturbances	high	16	proposed
3A	Harmonisation of processes and procedures at borders	high	16	proposed
3B	Interventions to ensure priority and increase punctuality of RFC trains	medium	16	proposed
3C	Develop efficient re-routing options, contingency for disturbances, restrictions	high	16	proposed
4A	Enhance cross-border interoperability by harmonisation of national rules, requirements and use of common IT platforms	high	16	proposed
2B	Improve functionality and reliability of RNE Tools for RFC Amber	medium	14	to be considered
1A	Ensure resources and increase role of a competent C-OSS for path allocation and capacity planning	medium	12	to be considered
2D	Improve language skills of staff and ease their communication by using standardized forms, messages with IT support	medium	12	to be considered
12	to be considered	3D	Strengthen role of and capacity of RFC traffic management by preparing staff and exchange of experience		low
10	to be considered	4B	Simplify procedures in the multimodal transport chains and support freight forwarders in route planning, cost calculation and path reservation		medium
8	desired	1C	Improve applicability of the PCS and reliability of its data content		low
6	desired	4C	Harmonisation of rules, legislation to ease administrative burden (at EU border)		medium

Figure 8 List of possible softer measures. Source: (Amber, 2020)

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Digital documents

Table 10 Evaluation of digital documents.

	Resilient		
	Adaptive		
	Maturity	Medium	High
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Smart Contracts

Table 11 Evaluation of Smart Contracts

	Resilient		
	Adaptive		
	Maturity		

	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

ALICE

Blockchain

Table 12 Evaluation of Blockchain

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		

	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Sensors and IoT technologies

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Table 13 IoT technologies evaluation.

	Resilient		
	Adaptive		

	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental Impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Predictive Models

Table 14 Predictive Models evaluation.

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		

	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Optimization Models

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Table 15 Optimization Models evaluation.

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Collaborative Platforms

Table 16 Collaborative platforms evaluation

	Resilient		
	Adaptive		
	Maturity		

	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

DSS

Table 17 DSS evaluation

	Resilient		
	Adaptive		
	Maturity		

	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Paperless documents

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Smart contracts

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Blockchain

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Sensors and IoT technologies

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Predictive Models

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Optimization Models

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Collaborative platforms

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DSS

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Training stakeholders

Table 18 Training stakeholders evaluation

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		

	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Monitoring services

Table 19 Monitoring services evaluation

	Resilient		

	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

Trust and increase awareness

Table 20 Trust and increase awareness evaluation

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		

	EU land cohesion		
	Stakeholder inclusion		
	Cost related		

	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

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Table 22 Summary of CEFs and HE scope and objectives

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Maintaining control over sensitive data in the Physical Internet: Towards an open, service oriented, network-model for infrastructural data sovereignty.

Better Regulation Toolbox,

IEEE Network,

D2.4 EGTN IoT infrastructure final version ,

D5.1 Stakeholder Analysis Report,

Position Paper 2 - New Trade Routes,

D2.1 Open EGTN Platform Architecture ,

D 1.4 Simulation based impact of new trade routes v1,

D2.9 Deliverable EGTN Support Services Based on Big Data and Analytic Models. ,

Deliverable 1.4 Simulation based impact of new trade routes on TEN-Ts and disadvantaged regions,

Deliverable 2.15 Integration and Interoperability of proprietary Blockchain Systems for Seamless Global Trade Workflows v1,

PLANET contribution to TEN-T revision,

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	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		

	Cost related		
	Stakeholders/ Governance related		

Blockchain technologies and concepts

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		

	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		

	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		

	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		

	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

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	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		

	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		

	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		

	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity	Medium	High
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		
	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		

	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		

	Resilient		
	Adaptive		
	Maturity		
	Feasible implementation / Efficacy		
	Social impacts		
	Environmental impacts		
	Economic impacts		
	Time saving impacts		

	Support intra- EU network integration		
	Support exo- EU network integration		
	Disadvantaged region inclusion		
	EU land cohesion		
	Stakeholder inclusion		
	Cost related		
	Stakeholders/ Governance related		