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Inspire Policy Making with Territorial Evidence

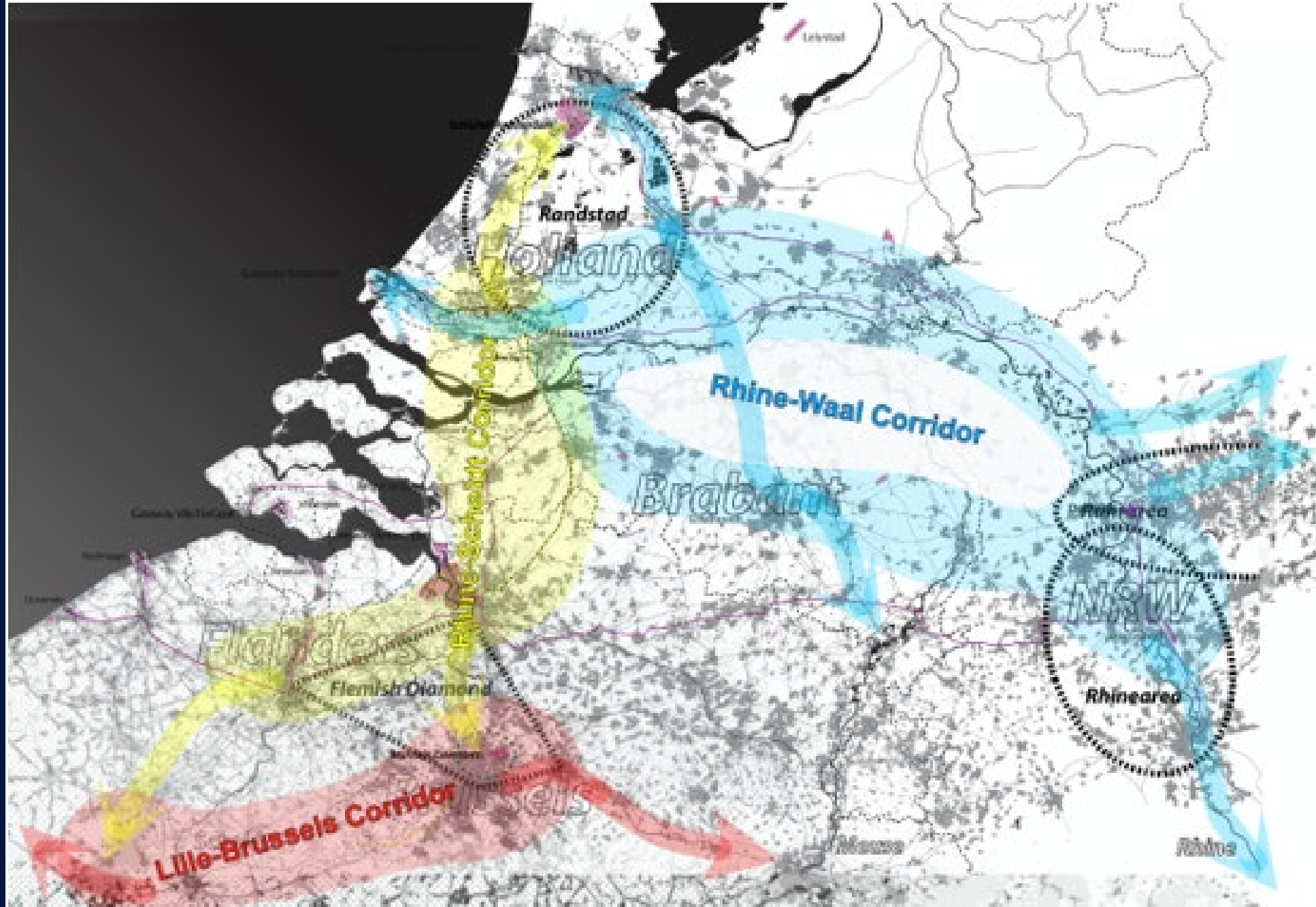
# Sustainable Transport Infrastructure in the Strategic urban region Eurodelta (STISE)

Targeted analysis

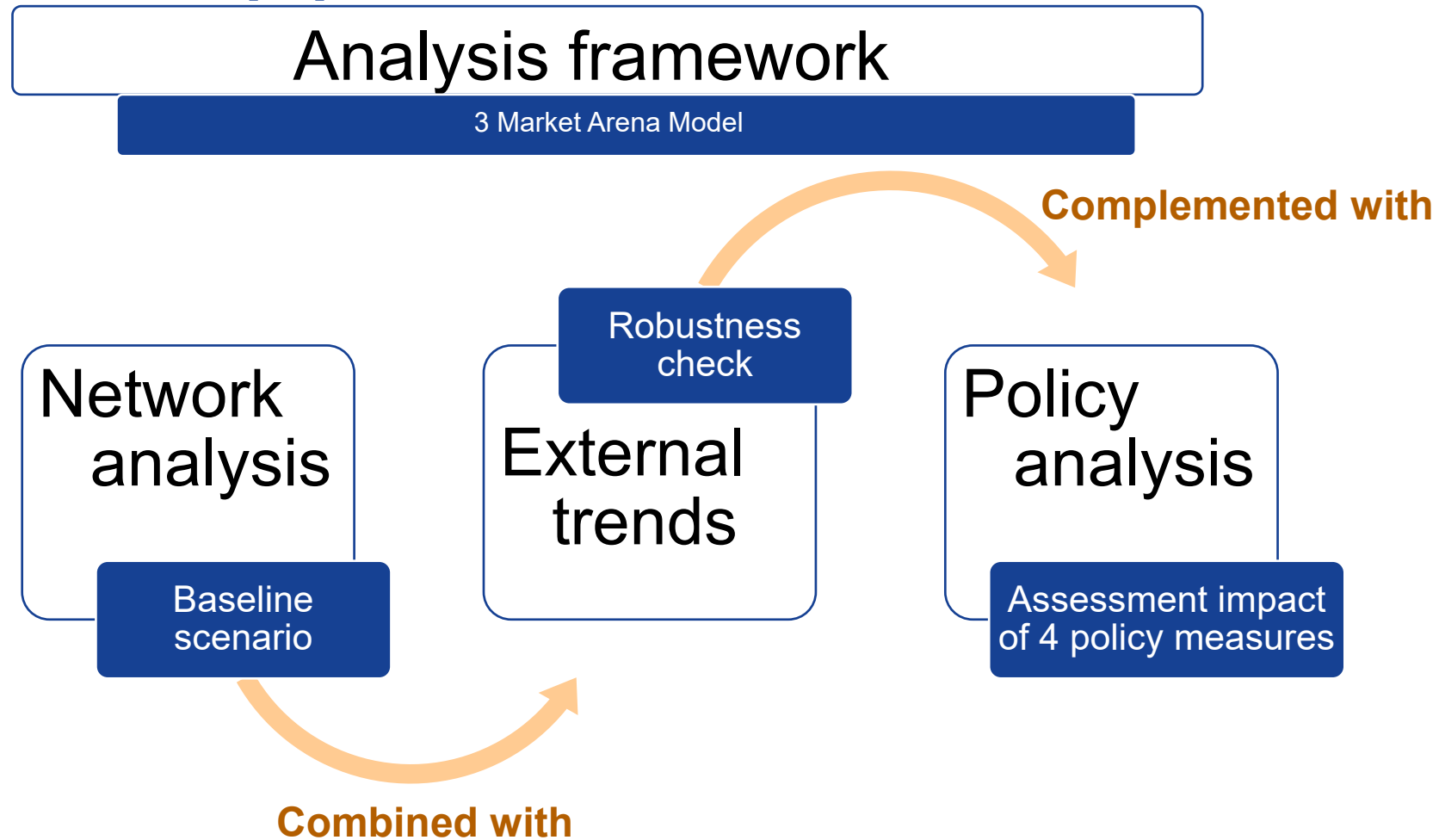
Main Components final report – Key results and main insights

# Context and objective STISE study

- **Moving up a gear in the Eurodelta** will be necessary to make the region more attractive and sustainable and to help achieve the targets set in European agendas. Bold **policy choices** will have to be made.
- The **main study objective** is to explore if, and to what extent, the Strategic Urban Region of the Eurodelta (SURE) is – and could be even more - moving towards greener mobility that contributes to the European sustainability goals.



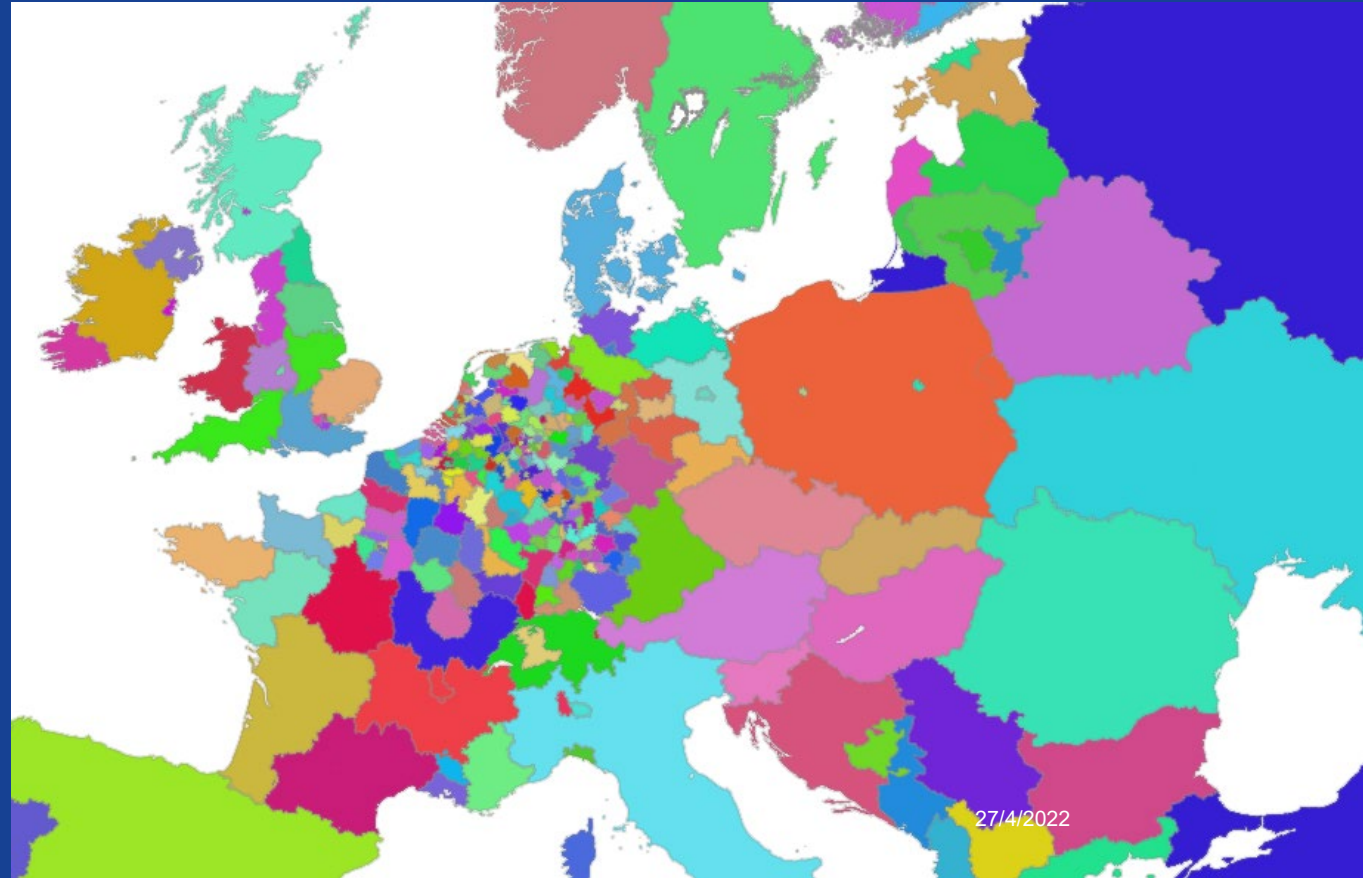
# Approach (1)



# Approach (2)

- In a first step **one consistent baseline scenario** was build, using the Transtools3 model, for understanding the existing development of transport towards 2050.
- The baseline scenario was combined with **external trends** (trend breaking developments) that will impact the estimated existing transport growth – in order to add some robustness by considering trends providing a margin of error around the baseline scenario and impacts of developments that have not yet been foreseen in the baseline scenario.
- The estimations in the baseline scenario were complemented with the **assessment of the (potential) impact of 4 ambitious policy measures** in the SURE area: (1) Aviation shift on short/mid-range distances, (2) Zero Emission Zones in all major cities, (2) Exploring the potential of MaaS, and (4) exploring improved regional cross-border public train transport. The policy measures were analysed to see if they make transport within the SURE area more sustainable and what margin still exists when comparing the impact of these measures towards the sustainability goals. For each of the policy measures high-level roadmaps were proposed.

# Network analysis - Baseline scenario



# Baseline scenario - methodology

## Transport flows

- Transtools traffic simulation software
- Prediction of the future based on inhabitants, economic growth, vehicle fleet and network developments

## Emission factors

- Factors translating transport flows into emissions
- Taking into account current policy & technological developments

## Emission indicators

- Multiplying flows with factors
- Combining growth trends transport, with reduction trend emission factors

## External trends

- Consideration of 6 external trends
- Taking into account current external developments not incorporated in the emission factors nor the transport flows yet

# Baseline scenario – overall observations

- The baseline scenario shows that, with the overall expected growth of transport, sustainability appears to be far out of reach. The share of road for both freight and passengers as a dominant mode is, although not surprising, striking. The combination of the transport flows with the expected developments in emissions, slightly changes the picture regarding the focus and the opportunities at hand.
- However, when looking at the overall sustainability goals, the predominance of the car as the main mode of transport - also from a social inclusion perspective - needs attention and combining various driving factors for this change might make it happen. Also, because the road network is congested, and significant investments are necessary to alleviate specific bottlenecks a focus on changing the way people travel is eminent.
- For freight, an additionally complicating factor is the connection of transport with the seaside of transport (not in scope of the STISE study). The emissions from the seaside are - combined with air - a large part of the overall transport emissions. From a SURE area perspective, focusing on intermodality and on long-distance freight transport by train could partly tackle these seaside emissions.



# Transport emissions: some numbers

## PASSENGER Transport emissions: CO<sub>2</sub>-, NO<sub>x</sub>-, PM<sub>10</sub>-emissions and energy use

	CO <sub>2</sub> [Mton]			NO <sub>x</sub> [Mton]			PM <sub>10</sub> [kton]			Energy [10 <sup>9</sup> MJ]		
	2018	2030	2050	2018	2030	2050	2018	2030	2050	2018	2030	2050
-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Rail</b>	-	-	-	-	-	-	-	-	-	3,3	2,7	1,9
<b>Road</b>	96,9	79,3	41,9	0,3	0,1	0,0	3,1	0,8	0,3	1.411	1.248	884
<b>Air</b>	13,1	12,2	10,5	18,7	17,5	15,1	108,6	101,5	87,5	222	207	179
<b>Total</b>	110,0	91,6	52,4	19,0	17,6	15,1	111,7	102,3	87,8	1.636,4	1.457,7	1.064,7

## FREIGHT transport emissions: CO<sub>2</sub>-, NO<sub>x</sub>-, PM<sub>10</sub>-emissions and energy use

	CO <sub>2</sub> [Mton]			NO <sub>x</sub> [Mton]			PM <sub>10</sub> [kton]			Energy [10 <sup>9</sup> MJ]		
	2018	2030	2050	2018	2030	2050	2018	2030	2050	2018	2030	2050
-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Rail</b>	0,7	0,6	0,5	0,0	0,0	0,0	0,2	0,0	0,0	10,5	9,2	7,4
<b>Road</b>	14,1	12,3	5,9	1,5	1,2	0,1	5,7	2,6	1,4	2.543,4	2.360,6	1.569
<b>IWW</b>	1,9	1,8	1,5	0,0	0,0	0,0	0,8	0,7	0,3	18,0	17,2	14,7
<b>Total</b>	16,6	14,7	7,9	1,6	1,2	0,2	6,7	3,3	1,7	2.572,0	2.387,0	1.591

# Overall impact of the external trends on the baseline scenario

- The external trend analysis indicates that the demand for freight transport in the SURE area is likely to decrease for all modes compared to the baseline scenario. This decrease is mainly due to growing circular economy and changes in the world freight routes (part of the further globalisation trend of the transport sector).
- For passenger transport the trends indicate a shift from air and road to rail compared to the baseline scenario, when the possible impact of autonomous vehicles (part of the trend on technical evolutions in the transport sector) is neglected. If autonomous vehicles became available on large scale, they might result in a large shift from public transport to car usage, depending on the implementation in the overall transport system.

# Impact external trends on baseline scenario

Qualitative estimation of the possible impacts of the external trends in the SURE area relative to the baseline scenario

External trend	Passenger road	Passenger rail	Passenger air	Freight Road	Freight rail	Freight inland waterways
Climate change & energy transition	--	+	-	-	+	+
Technical evolutions in the transport sector	++	+ / --	0	+	0	0
The future of growing globalisation in the field of transport	0	0	0	-	0	-
Growing Circular Economy	0	0	0	-	-	-
Health/economic crises/effects after Covid	0	--	--	0	0	0
Possible (Dis)integration in the EU	0	0	-	0	-	0

# Policy analysis

Aviation shift on short/midrange distances

Zero Emission Zones in all large cities

The potential of MaaS

Improving regional cross-border public train transport

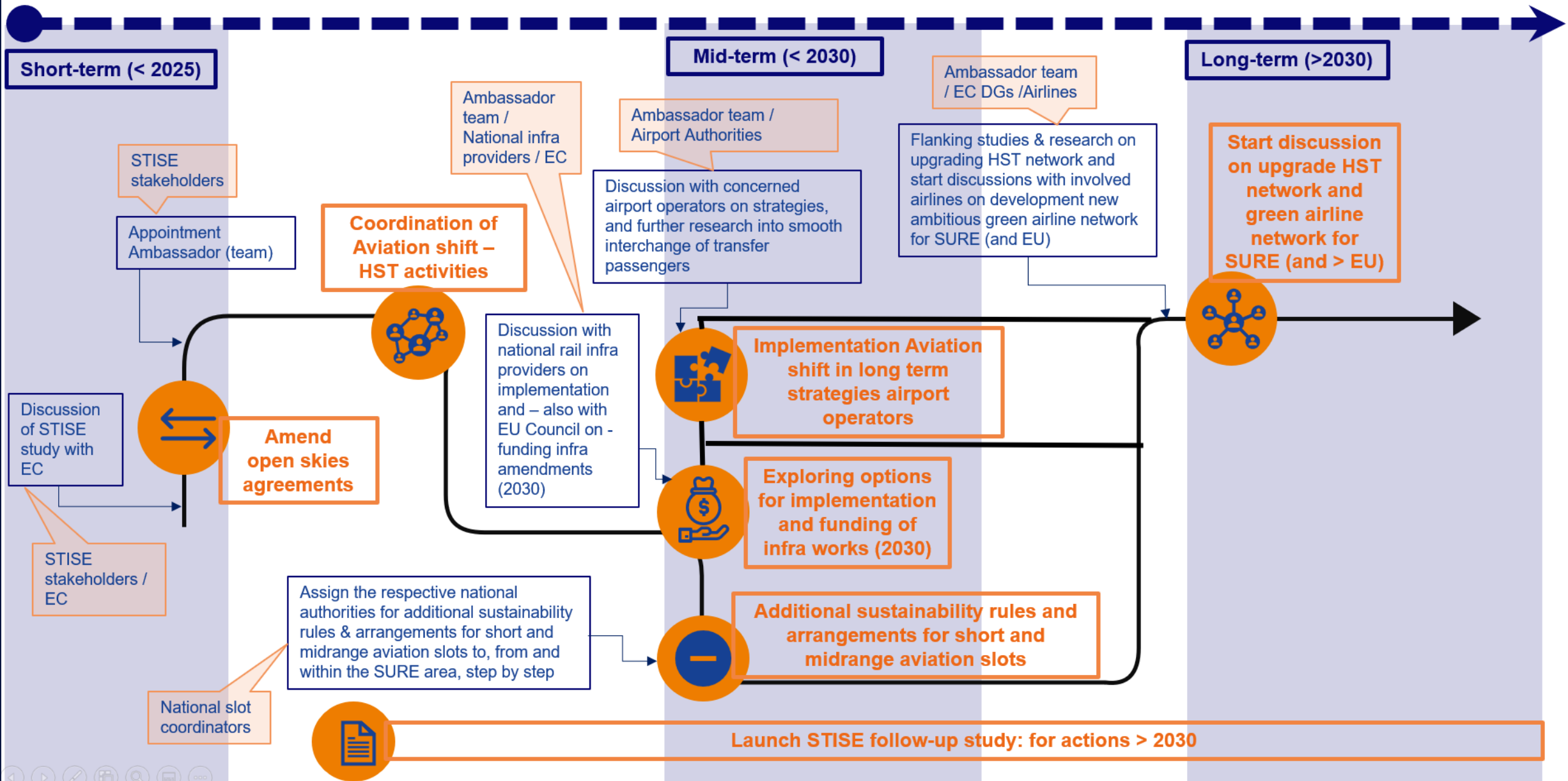
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# Aviation shift on short/midrange distances





# Policy Roadmap Aviation Shift – HST in the SURE aera



2

**ZEZ in all major cities  
in the SURE area**

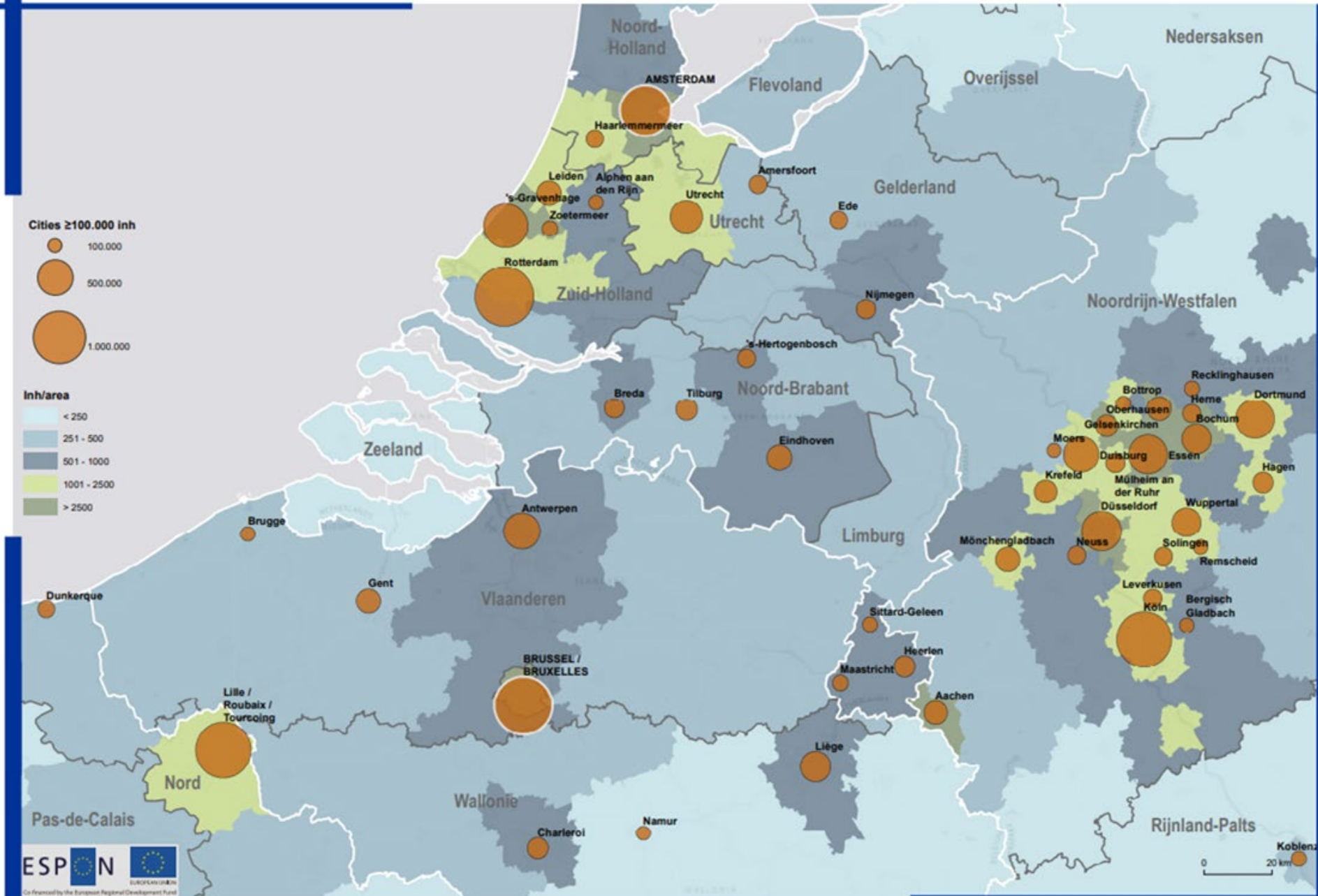




# ZEZ Definitior

Implementati  
of harmoniz  
Zero Emissi  
Zones (ZEZ

ZEZ cities (≥ 100.000 inhabitants) in SURE area



# ZEZ

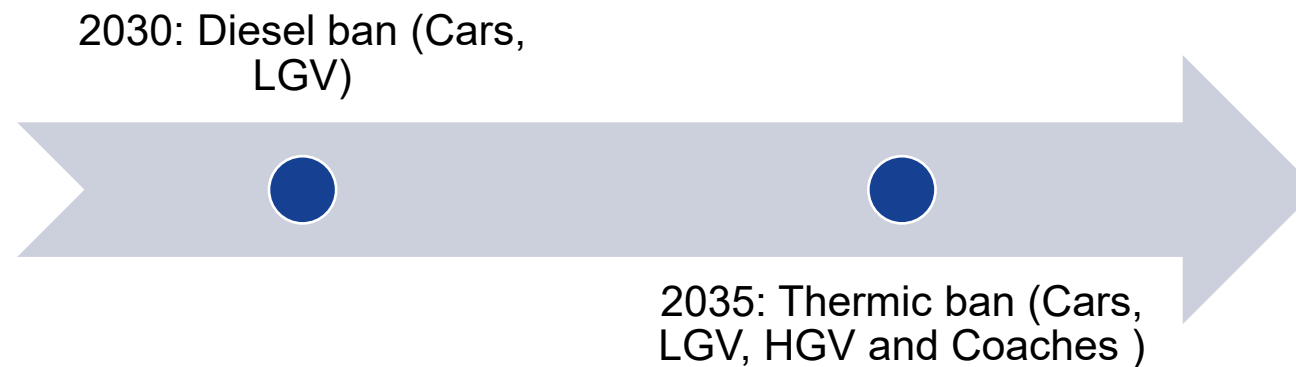
## Definition, scope and identification of impacts

- Rationale
  - Same type of ZEZ in all major cities in SURE => Level playing field, easier cross-border transport
  - 2035: Realistic time horizon to align different existing and planned LEZ and ZEZ
- Expected behavioural responses (Studies)
  - Main impact= “motor shifts”
  - Volume of travel: little effect on vehicle-km performed
  - Limited impact expected on modal shift

# ZEZ

## Identification of impacts

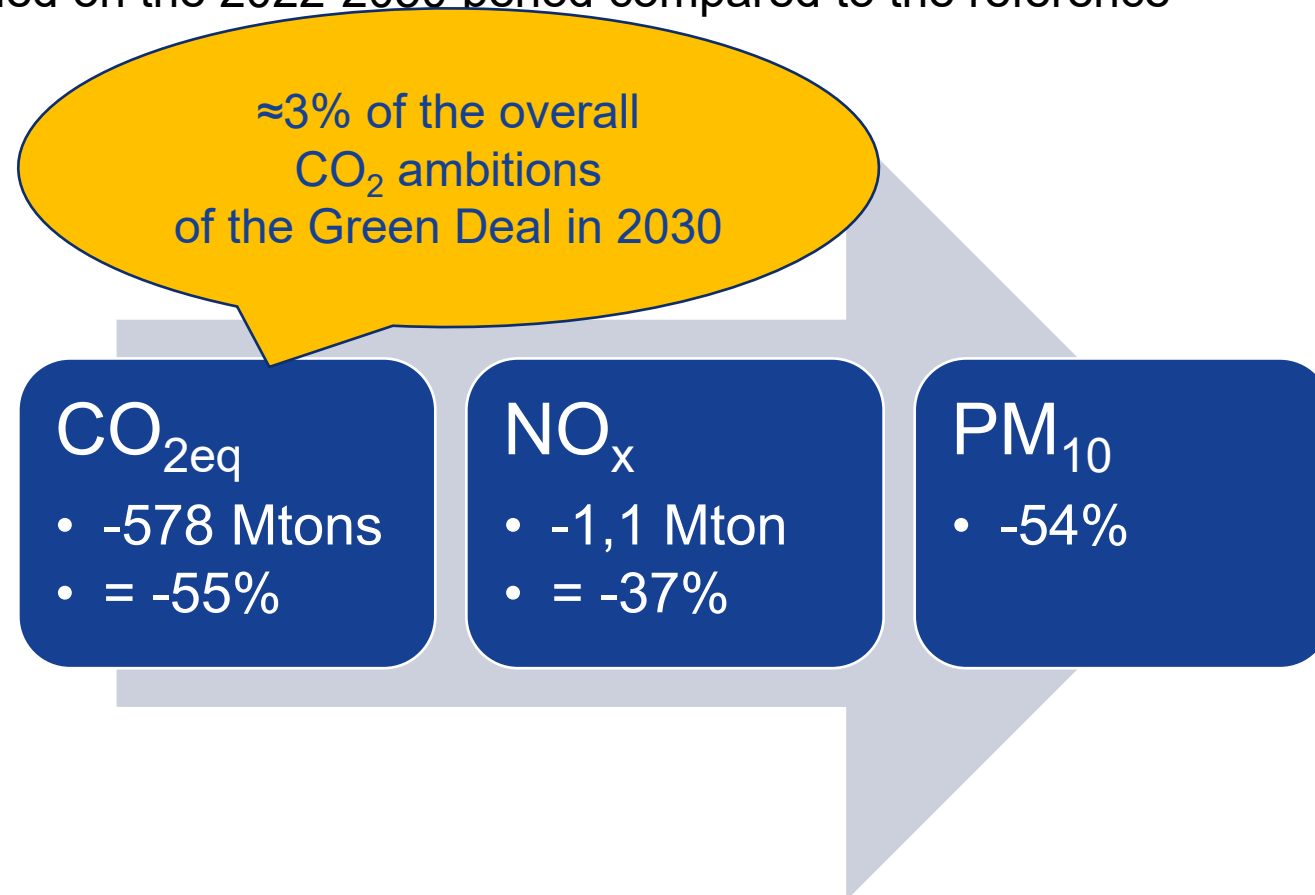
- Evaluation of environmental impact
  - Reference= Baseline scenario
  - Starting point: Brussels Capital Region LEZ/ ZEZ (Progressive ban by Euro category) → SURE



# ZEZ

## Identification of impacts

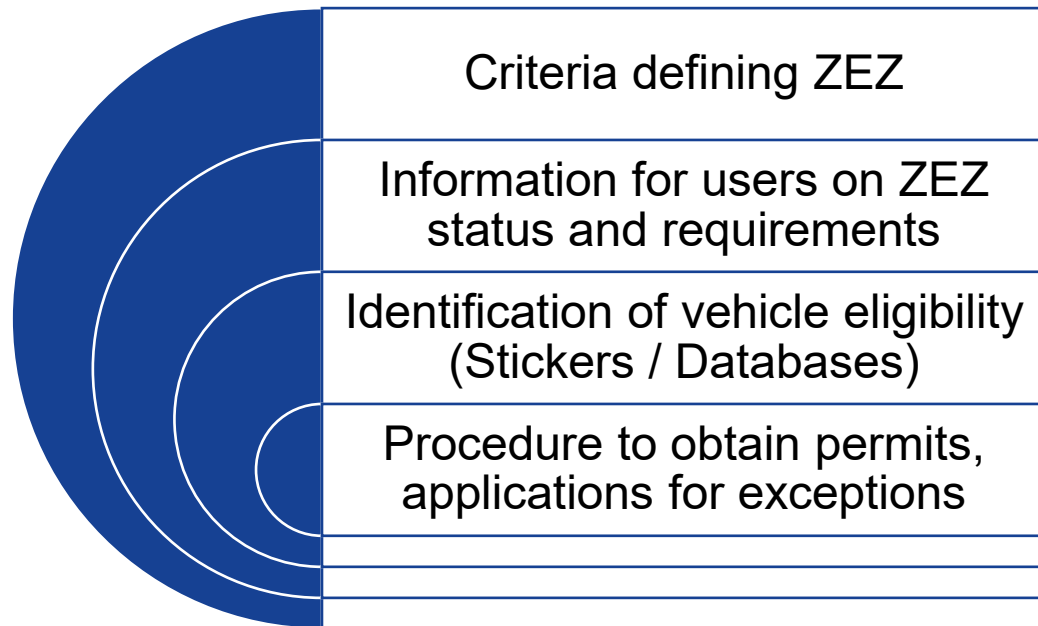
- Emissions avoided on the 2022-2050 period compared to the reference



# ZEZ

## Towards implementation

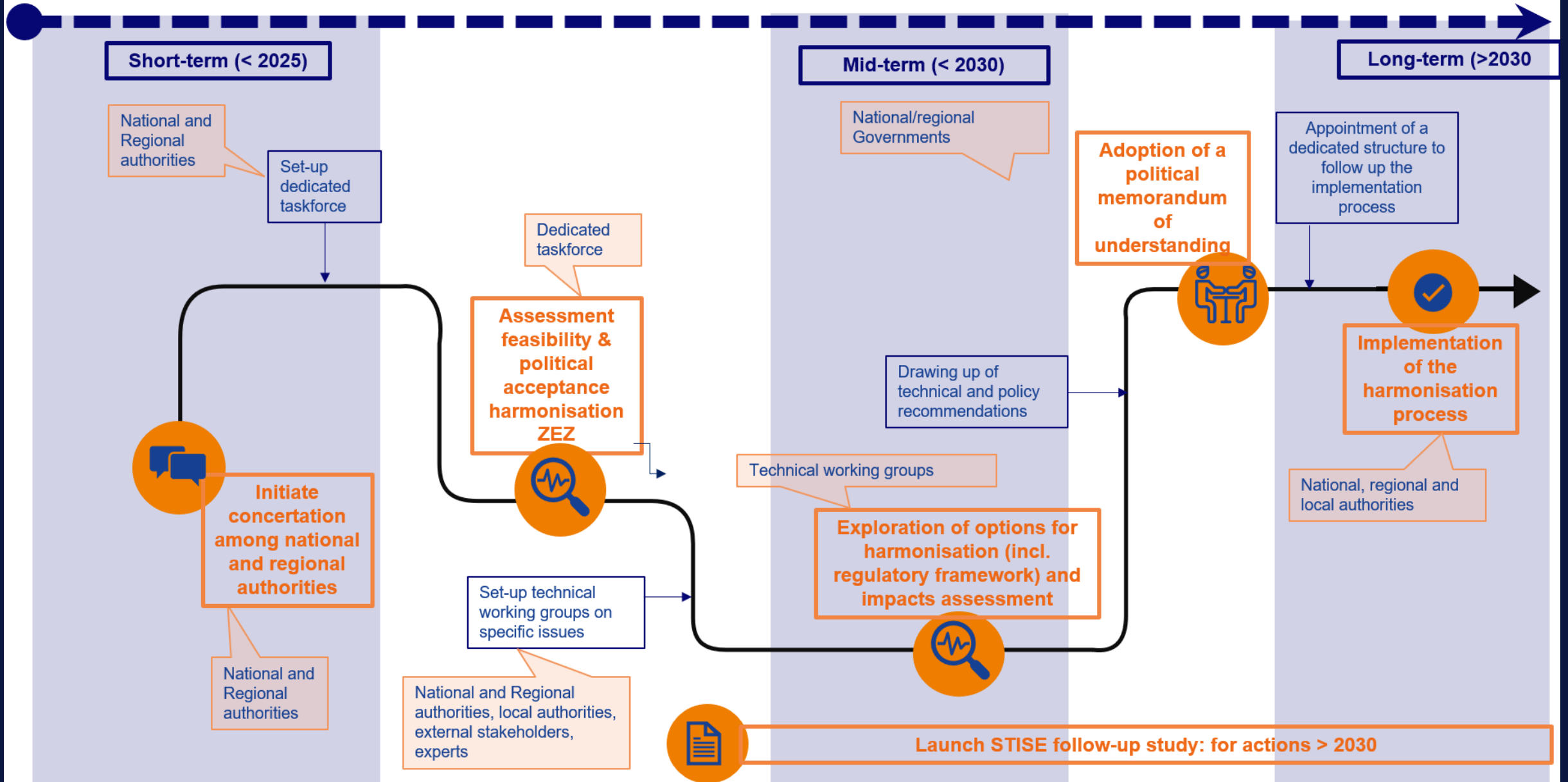
- Possible areas for harmonisation



- Possible accompanying measures



# Policy Roadmap ZEZ in all major cities in the SURE area





3

# The potential of MaaS



## Description policy measure

Exploring Mobility as a Service (MaaS) – with focus on passenger transport - from the public authority's perspective: defining the role public authorities have in this development, how can they operate and what the potential benefit is they can realize if the measure is effective - considering the required accompanying measures in order to realize this benefit.

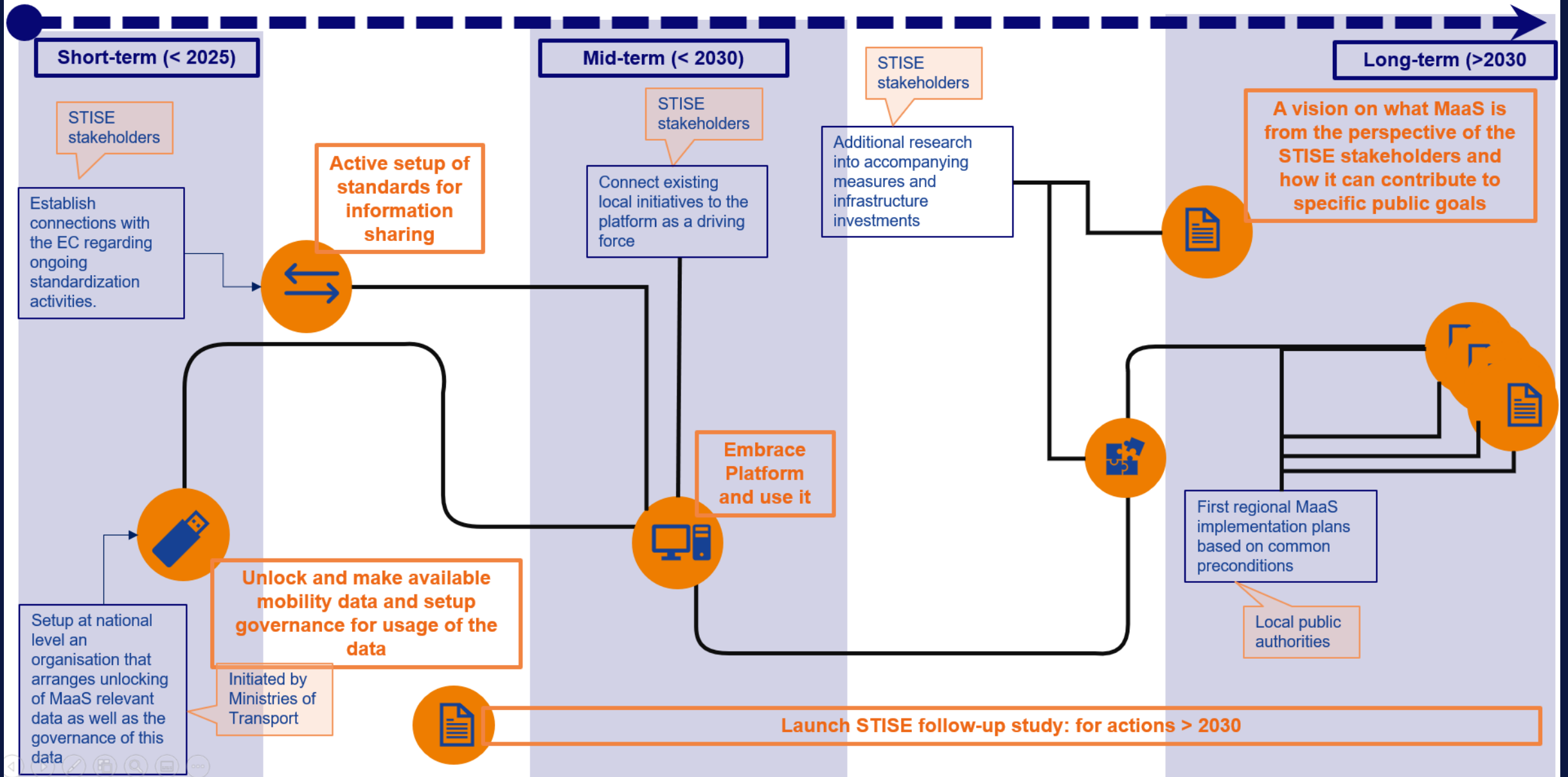
## Impacts of the measure

The Potential of MaaS measure shows a potential in realising more sustainable transport, however this potential is largely uncertain, strongly depends on the position public authorities take and the necessary investments in both digital and physical infrastructure that need to be done to facilitate a larger modal shift. The prerequisites as defined (regarding standardisation and & sharing of data and information) are no-regret measures that can be started immediately. Furthermore, development of a vision and implementation plan for MaaS and how it can contribute to the relevant societal goals is essential to grasp the potential at hand.



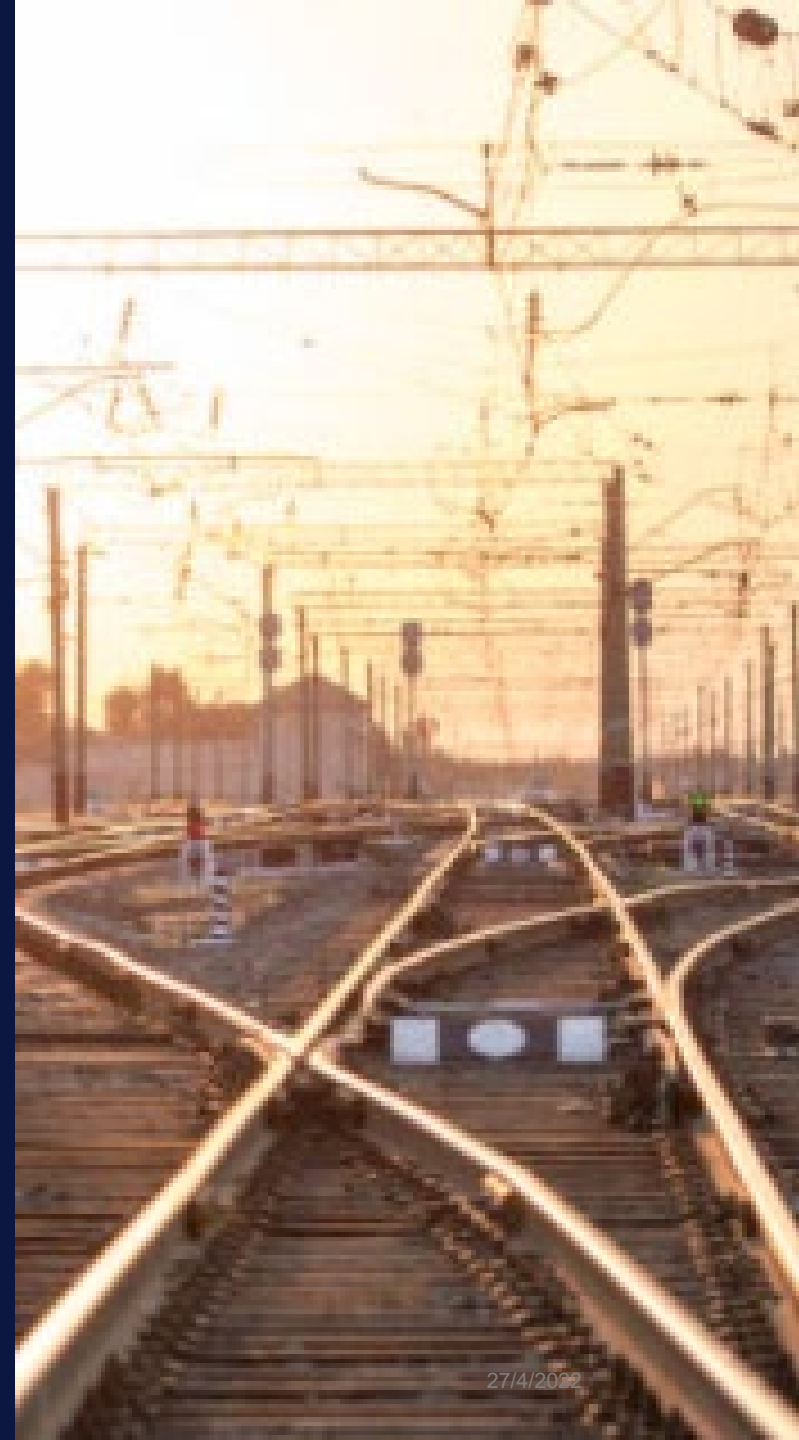


# Policy Roadmap Exploring MaaS in the SURE area



# 4

## Improving regional cross-border public train transport

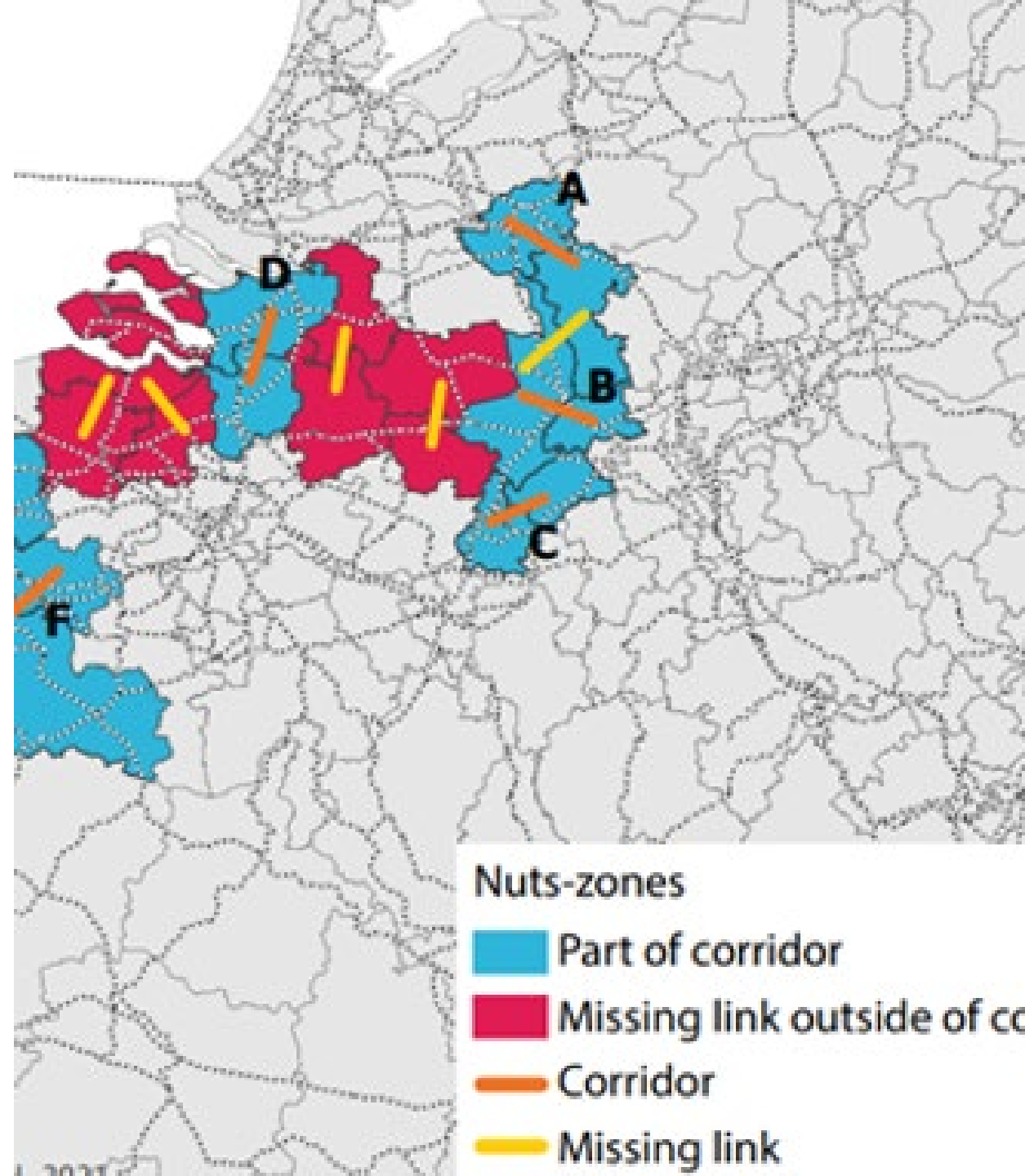


## Description policy measure

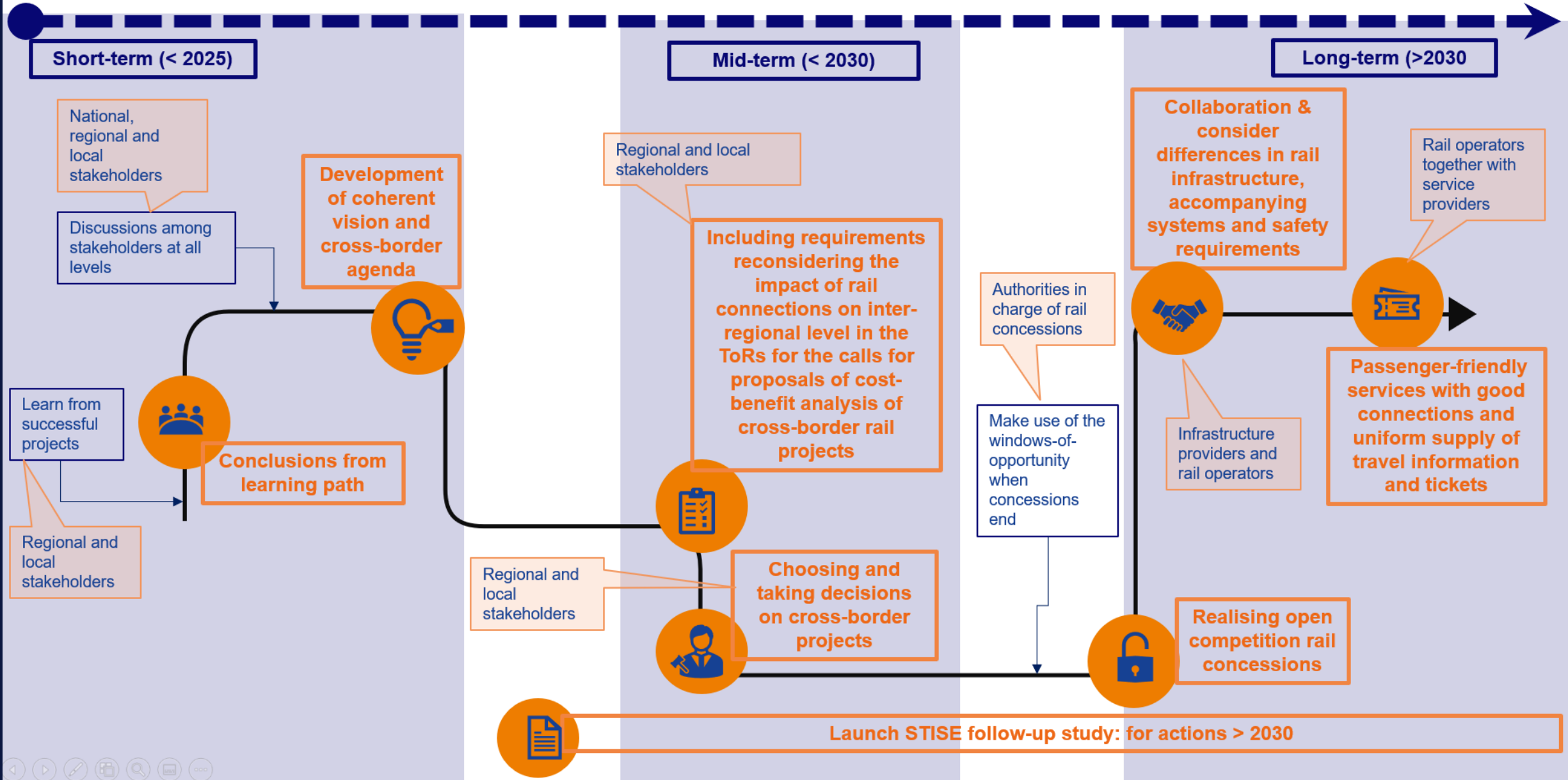
This policy focuses on the improvement of regional cross-border public train transport in the 3 STISE project corridors Rhine-Waal, Rhine-Scheldt and Lille-Brussels. The goal of this measure is to result in a shift from road to rail transport for regional cross-border passenger travel.

## Impacts of the measure

The assessment of the policy ambition to improve cross-border rail transport has shown that a shift from road to rail could be realised for several cross-border corridors in the SURE area. There is sufficient demand to operate profitable rail services, if the cross-border connections are well integrated with the national rail and bus services and passenger-friendly services are provided. The measure has the potential to contribute to more sustainable transport and is in-line with plans of the European Green Deal. Compared to the overall emissions in transport, the potential emission reduction of this measure is limited, since the regional cross-border passenger segment is rather small. However, the policy should be seen in the broader context of a shift from road to rail.



# Policy Roadmap Improving cross-border public train transport in the SURE area



# Overall policy analysis and conclusions

## Summary table with key figures of the impact of each of the 4 assessed policy measures (\*each measure with its own scope and assessment approach)

Estimated impacts of development / policy measures	Impact on modal shift	Environmental impact (Comparison with the situation without the policy measures)						Other impacts (socio-econ, fin...other)	Implementation (involved stakeholders, ease of implementation, time scale, replicability...)	Cooperation required (cross-border, inter-municipalities...)
		CO <sub>2</sub> emissions		NO <sub>x</sub> emissions		PM <sub>10</sub> emissions				
		2030	2050	2030	2050	2030	2050			
Units		Mton (TTW)	Mton (TTW)	Mton (TTW)	Mton (TTW)	kton (TTW)	kton (TTW)			
Estimated impact of (extra) measure <b>Aviation shift</b>	Modal shift of aviation to, from and within the SURE area on short and midrange distances.	-0,94 Mton	-0,86 Mton	-0,002 Mton	-0,002 Mton	-0,03 kton	-0,03 kton	A further noise reduction of 10-20% around the selected airports. A further energy reduction of approximately 11.000 10 <sup>6</sup> mega-joule/per year. An extra boost to economic development around the HST nodes, and a better accessibility to jobs also for domestic travel	It needs an additional investment of some 0,5-1 billion € in the period 2022-2030, 7,5 billion € in the period 2030-2040 and 21-22 billion € beyond 2040	There is a need to come up with a principal statement of all the involved SURE public stakeholders, including the relevant EC directorates on the short run, and the instalment of an Ambassador Team to further roll out the measure
Estimated impact of (extra) measure <b>Zero Emissions Zones (ZEZ)</b>	ZEZ schemes primarily aim at accelerating vehicle fleet renewal. They have very limited impacts on modal shift, unless they are coupled with additional modal shift policies and measures.	-25,9 Mton	-15,3 Mton	-0,06 Mton	-0,01 Mton	-0,95 kton	-0,60 kton	Harmonizing ZEZ could have substantial efficiency and societal cost savings benefits, but specific population groups and economic actors could be adversely impacted if no targeted accompanying measures are implemented.	Experience shows that it is very difficult to harmonize access criteria due to the subsidiarity principle, while harmonizing other aspects could appear to be very challenging due to the high number of actors to be involved and to the absence of institutional framework to carry out such process at Euro-delta level.	Appropriate forum for policy dialogue should be set up to assess political feasibility, options for harmonization and their impacts. If areas for consensus are identified, a structured concertation process involving national and local authorities shall be launched to design, plan and implement the harmonization process.
Estimated impact of (extra) measure <b>Potential of MaaS</b>	MaaS, with the right prerequisites can create a modal shift of up to 10%	-0,59 Mton	-2,59 Mton	-0,001 Mton	-0,001 Mton	0,006 kton	0,019 kton	MaaS if implemented like Scenario 2 ("MaaS as a new form of public transport") can enhance quality of living, realize societal goals but requires investments in both digital and physical infrastructure	The described prerequisites are no-regret measures to profit from digitalization of transport. A strong public vision and policy framework is needed to grasp the benefits.	Standardization is essential to allow MaaS to grow, but this requires cooperation on all levels. On national level, cooperation in data sharing is essential to realize economies of scale for data access points.
Estimated impact of (extra) measure <b>Improving Regional Cross-border public train transport</b>	In the border regions with sufficient traffic a shift from road to rail can be realized	-0,014 Mton	-0,007 Mton	+0,000017 Mton	+0,000002 Mton	-0,002 kton	-0,003 kton	Improving cross-border connectivity especially for commuters, students and inhabitants without cars, positive effect on the labour market and cohesion between SURE countries	Clear vision required to integrate cross border rail connections in national rail networks and local bus services. Construction of new rail infrastructure and reactivating closed lines are long-term projects; on short term services on existing infrastructure can be improved.	Challenging cooperation with multiple stakeholders from local, regional and national authorities together with rail infrastructure providers and rail operators.

# Conclusions and potential of STISE

- The Eurodelta has a great potential to set an example in Europe in the ambitious pursuit of achieving sustainability goals. Given its location, its corridors full of challenges and the drive of many involved stakeholders in this region, this region can be an interesting and promising pilot area to try to implement ambitious policies and concepts and thus demonstrate the sustainability gains that can be made. If this could be achieved in the Eurodelta, it could serve as inspiration for other regions – only imagine the potential effect at larger, even EU, scale.
- This study could only be the tip of an iceberg:
  - The inspiration and willingness – to cooperate at SURE level, to dream big and to make things happen - of the involved STISE stakeholders is high.
  - Many other ambitious policy measures could be explored - and just as many challenges examined - in detail as well.
  - In addition, the policy roadmaps of the 4 policy measures show that additional research is needed - so there is potential in that too. This research can and should be a booster; an incentive to initiate and look for funding for subsequent research in order to facilitate actual implementation of the measures.

# New insights from STISE (1)

In addition to the usual desk and literature research, consulting stakeholders and experts... certain tools and approaches were proposed and used that are novel in the context of such re-search. Also, specifically for the (geographical) scope of the Eurodelta, a series of aspects were assessed in this STISE project that had not yet been examined.

- The structured way to categorise involved stakeholders and research tasks via a Market Arena model - with an actor analysis approach - was applied to a study at this level (Eurodelta)
- An in-depth stakeholder and institutional mapping for the Eurodelta was carried out, which showed that the institutional context in the Eurodelta is a challenging context to work in.
- A European transport network model (Transtools3) was applied at the scale of the STISE study, resulting in a first-time network analysis at the Eurodelta level. The study revealed that insight in transport flows, especially cross-border, is complex to harmonise. It also showed that a slightly outdated European transport model makes analysis on these kinds of topics complex. A more accessible and more up to date model would be beneficial for harmonised analysis of cross-border transport flows, similar to the alignment that is done at national level already between transport models of different geo-geographical scales.



# New insights from STISE (2)

- The policy measures – as they are scoped in this study – have been studied for a first time, not only from a content point of view (cross-border policy analysis), but from a geographical viewpoint (SURE area):
  - With regard to the Aviation shift - HST measure, e.g.: existing studies only went into logistics, not into the alternative of trains, the shift, the social, economic and policy impacts, not about the needed investments etc. etc.
  - Regarding the ZEZ measure, e.g.: research into (more) harmonized ZEZ at international (mega region) level, not at national/regional or city level.
  - Regarding the MaaS measure, e.g., the focus on preconditions for new technologies has been looked into.
  - The improvement of regional cross-border train transport measure: The focus is on the 3 STISE project corridors, however the potential is shown of reducing the emissions from passenger transport and of contributing to the further integration within the SURE area reducing the barriers of its four internal national borders.