

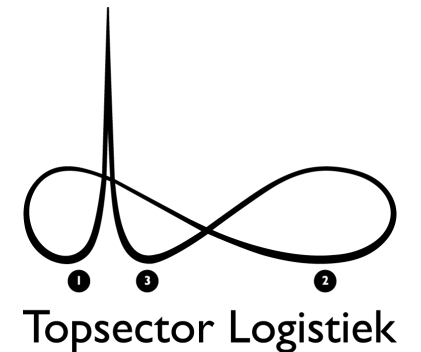
CO₂NGESTION

Collaborative mechanisms in the fresh logistics chain

Rotterdam, November 2022

Maurice Jansen

Rosanne van Houwelingen



Learning objectives

- To achieve the **Paris climate goals**, it is important that sectors commit to making production, transport and other aspects where greenhouse gases can be reduced more sustainable. The horticultural sector also needs to work hard on this. **Cross-sectoral collaboration** between the horticultural sector and port logistics sector is needed to make fresh logistics more sustainable.
- Part of the transition to sustainable transport is a **modal shift** from road transport to more sustainable alternatives such as inland shipping and rail. In the past, several initiatives and innovations have been set up to realize this modal shift.
- Examples are Coolrail, Greenrail and Greenbarge. However, these initiatives do not lead to a **structural, sustainable modal shift**. Erasmus UPT recently completed a study 'Accelerating modal shift in fresh produce logistics; on the road together on reliable and sustainable fresh corridors for SmartPort.
- We now want to translate the findings and research recommendations into an **educational case**, with which we want to show the importance of chain collaboration and integration.

What's the challenge?

Why don't the initiatives to organize multimodal transport in fresh-fresh corridors lead to a structural modal shift?

What does it require to accelerate innovations towards a modal shift and zero emission transport on European transport corridors?

What does the literature tell us about this issue?

Negative Modal Shift

- Blok et al (1990)
- Jonkeren (2020)
- Bagchus & Kuipers (1993)
- Filarski (2004)

Modal shift potential

- Jonkeren (2020)
- Kennisinstituut Mobiliteit (2019)
- TNO (2021)

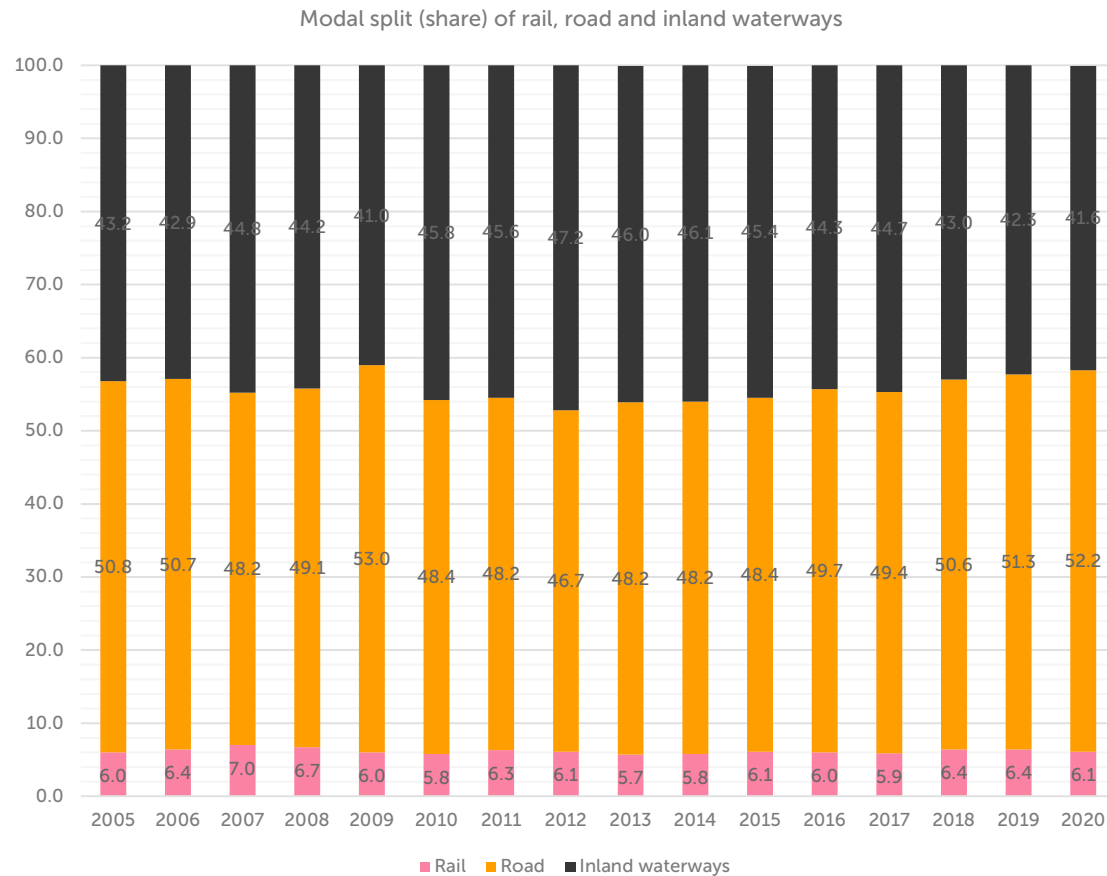
Cool chain and reefer transport

- Castelein (2020)
- De Leeuw van Weenen et al (2020)

Coordination mechanisms in port logistics chains

- De Langen en Vander Horst (2008)
- Van den Berg (2014)
- Van Tulder et al (2012)

What are reasons for dominance of road transport?



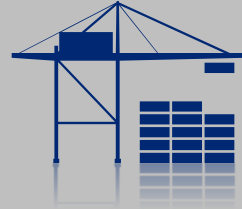
- Dominance of road transport in Europe is persistent.
- Despite decades of national and European policies, the share of inland waterways and rail transport compared to road is fairly unchanged.

Many bottlenecks in logistics operations

Peak volumes lead to long discharging time

Scarcity of equipment (i.e. reefer containers)

Unreliability of ship arrivals



Congestion (long dwell times terminals)

Fragmented organisation of inland transport at deepsea side



Frequency

Punctuality of schedules

Reliability of lead times



24 hr rhythm of fresh supply chains

Late planning

Lack of corridor organization and flow orchestration



Range of barge corridors limited to Netherlands



Rail corridors attractive for European markets, but needs upfront commitments



European Roads increasingly congested and increasing shortage of drivers

There is a sense of urgency

Congestion
across supply
chain

Pragmatic

Climate
adaptation
(Paris agreement)

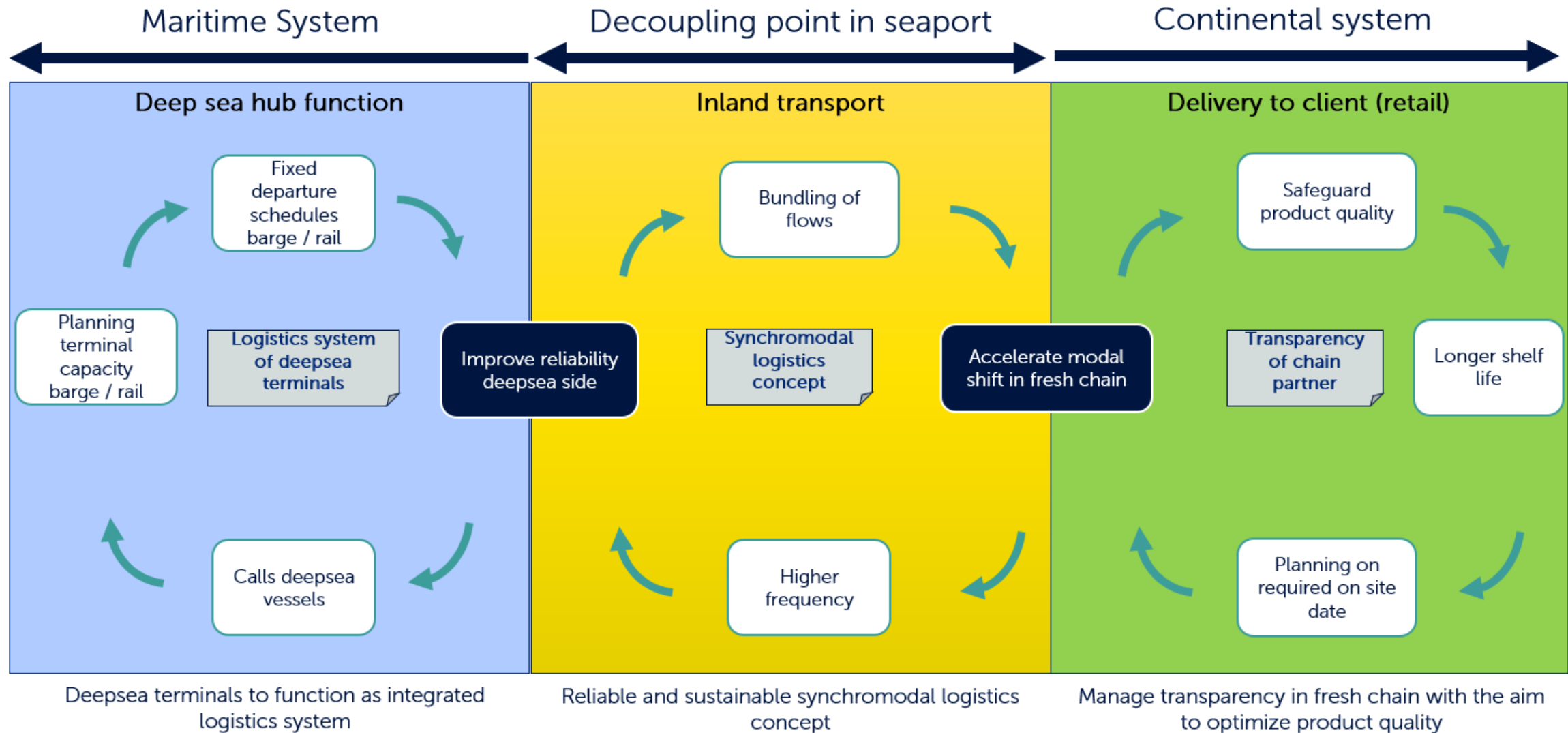
Planet

Consumer
demand eco-
friendly
logistics

People

These issues necessitate supply chain partners to collaborate more intensively, both horizontally as well as vertically

Multiple feedback loops



Play the game!



CO₂NGESTION
TOGETHER EXCEL ON FRESH CORRIDORS

Playing field



West Corridor

Rotterdam → Harwich → London → Birmingham → Glasgow



South Corridor

Valencia → Barcelona → Toulouse → Dourges → Rotterdam



North Corridor

Rotterdam → Osnabrück → Copenhagen → Malmö → Oslo



East Corridor

Rotterdam → Duisburg → Venlo → Basel → Milan

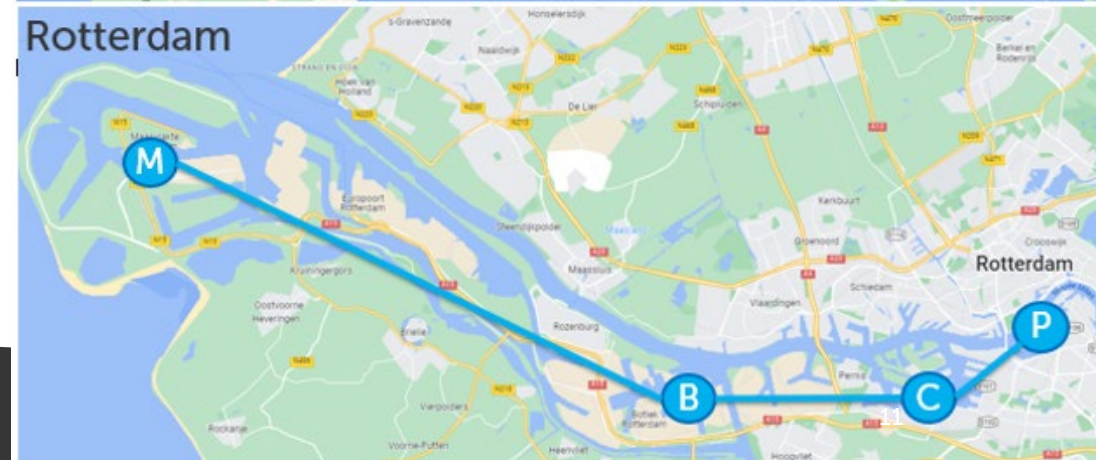
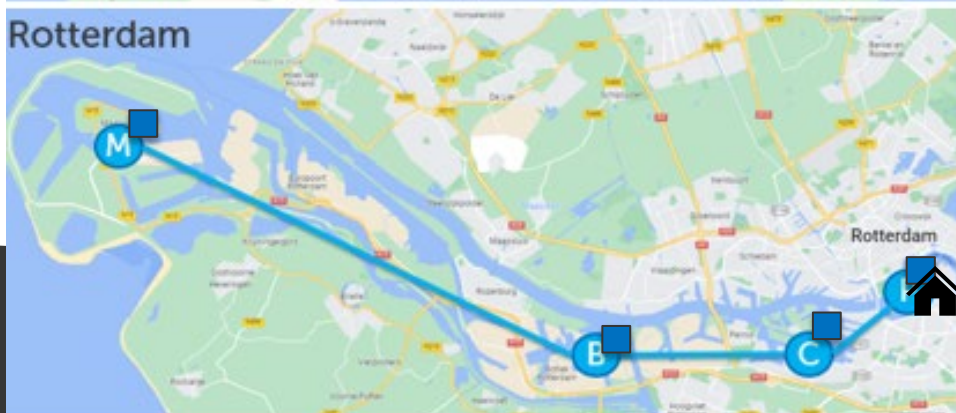
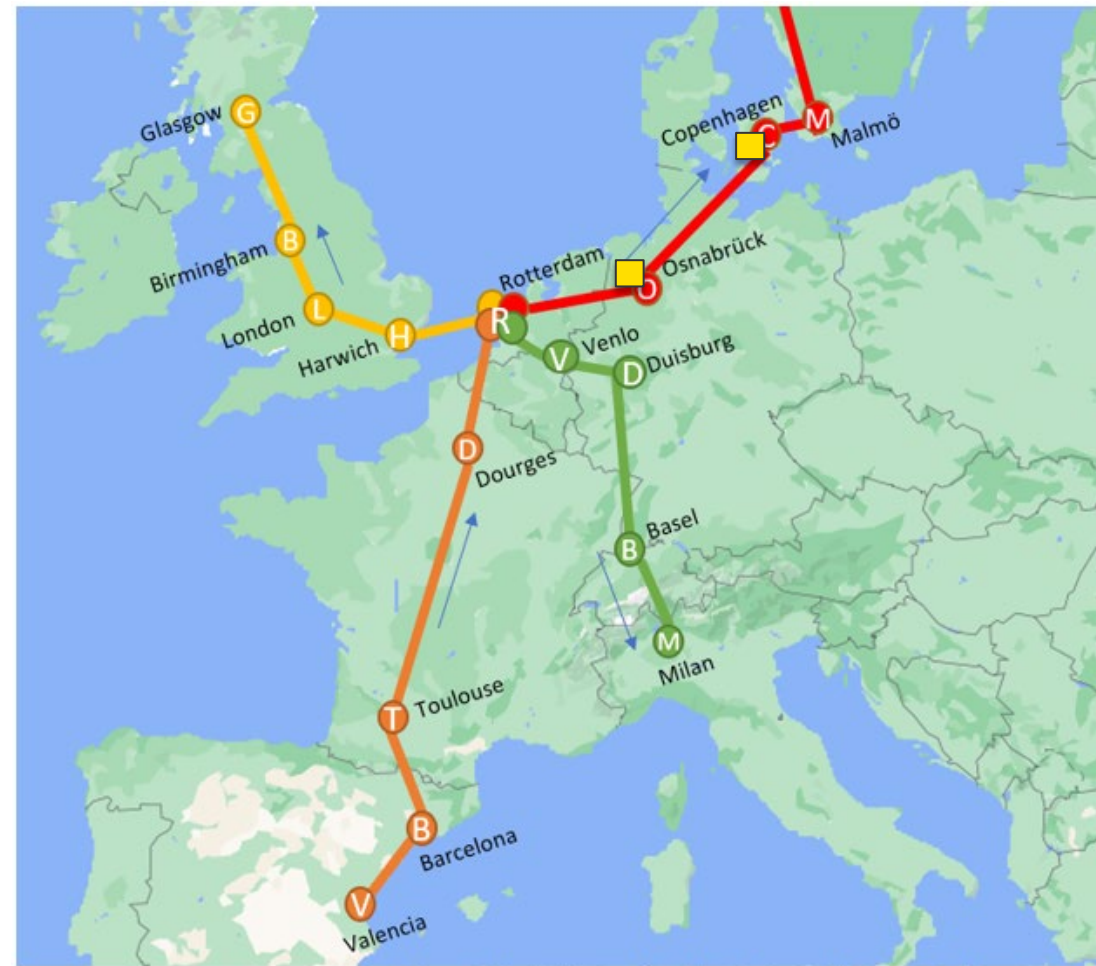
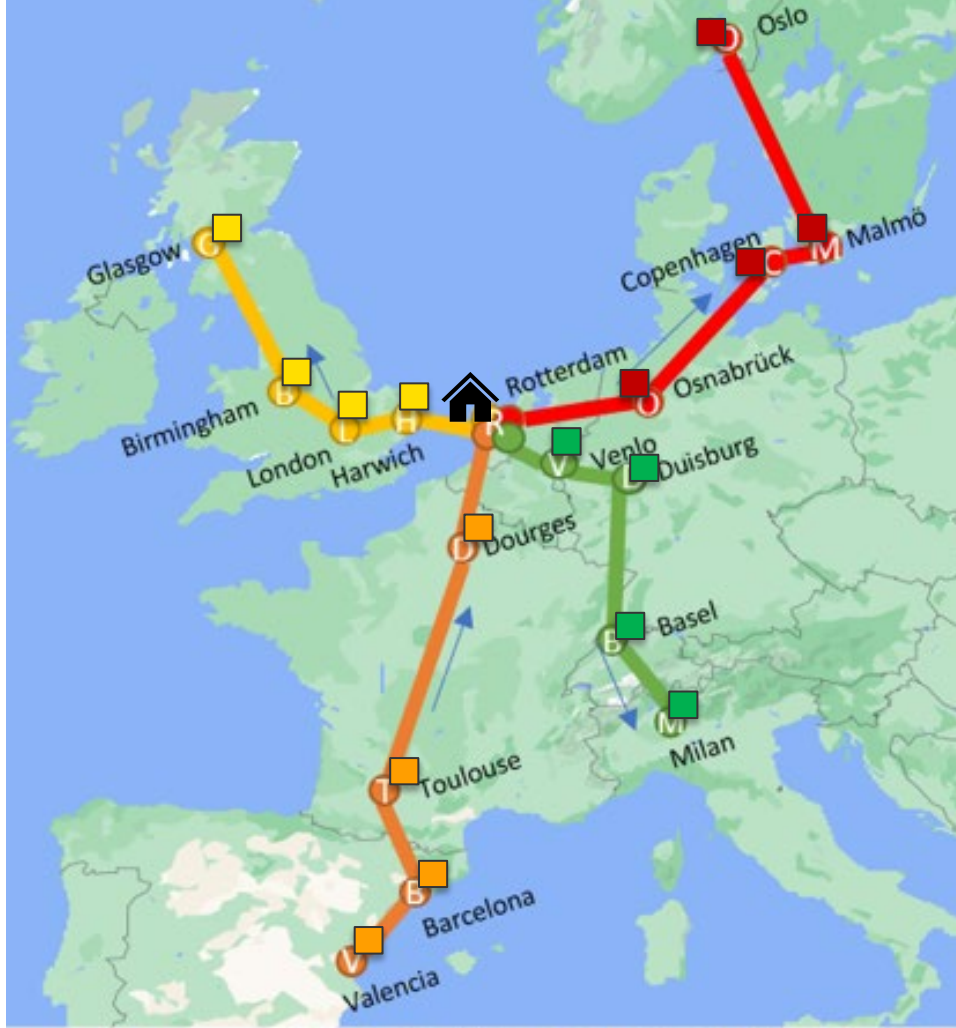


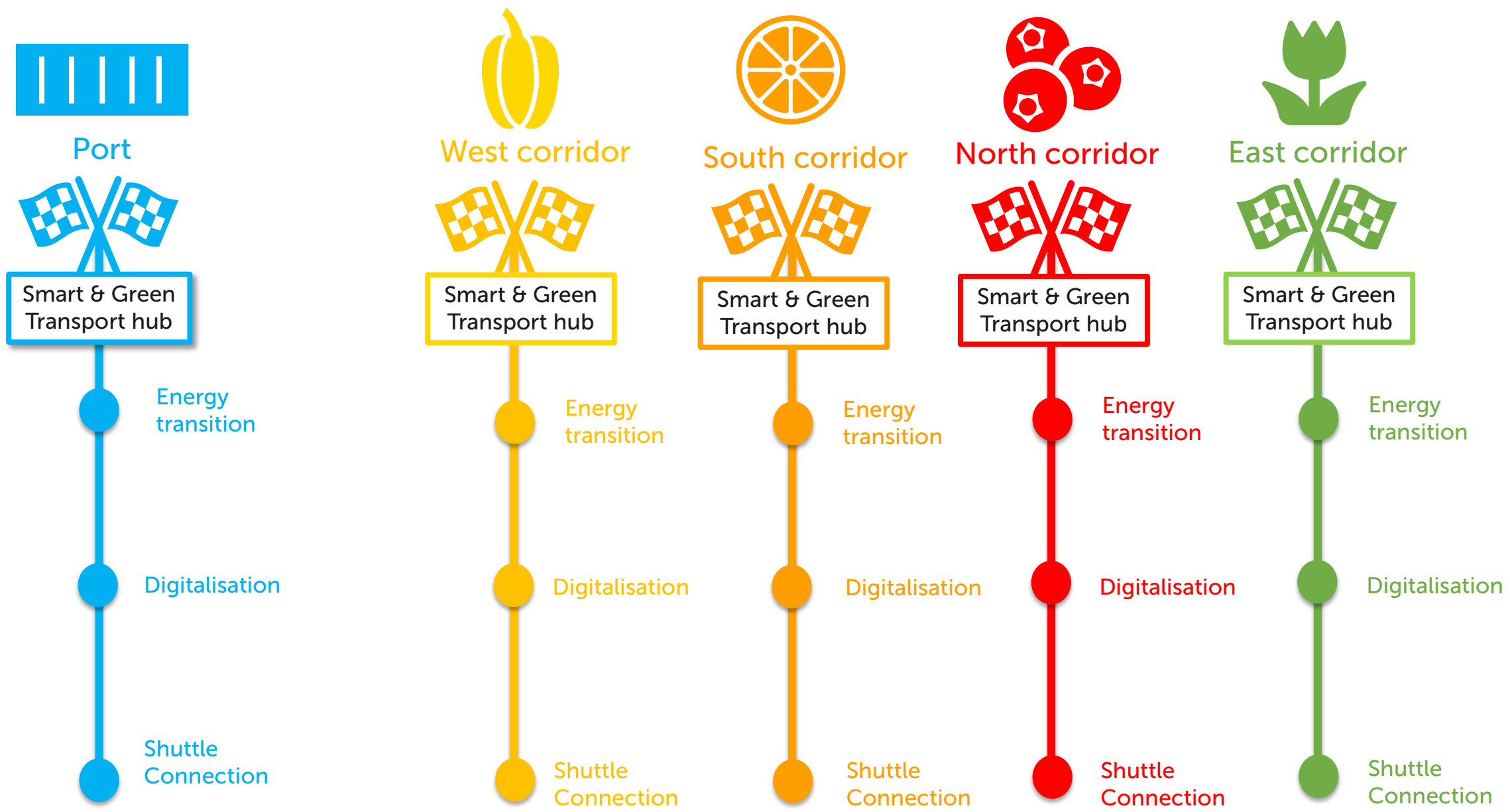
Rotterdam

Rotterdam → Maasvlakte → Botlek → Coolport → Portbase

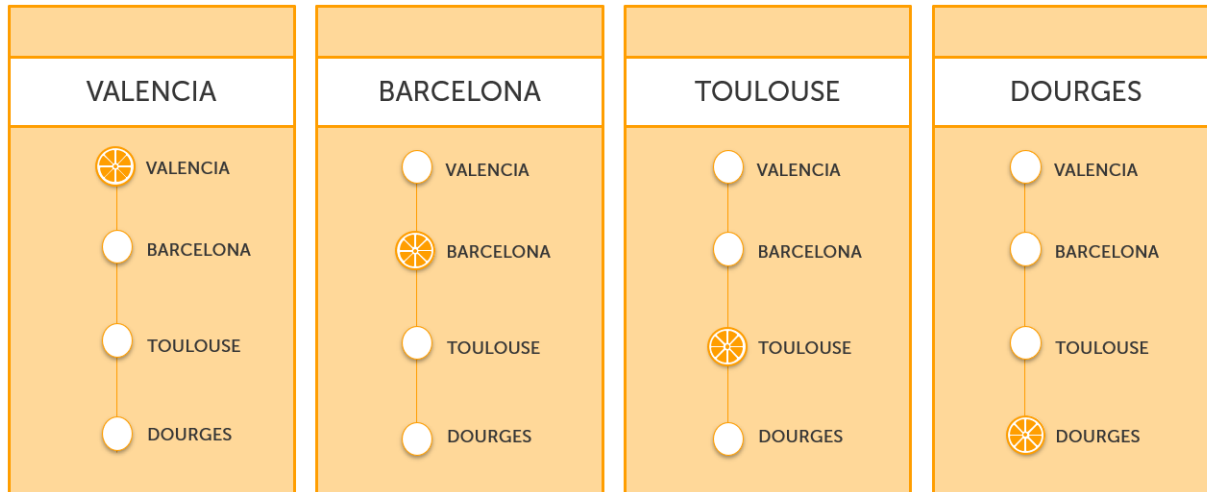


Erasmus





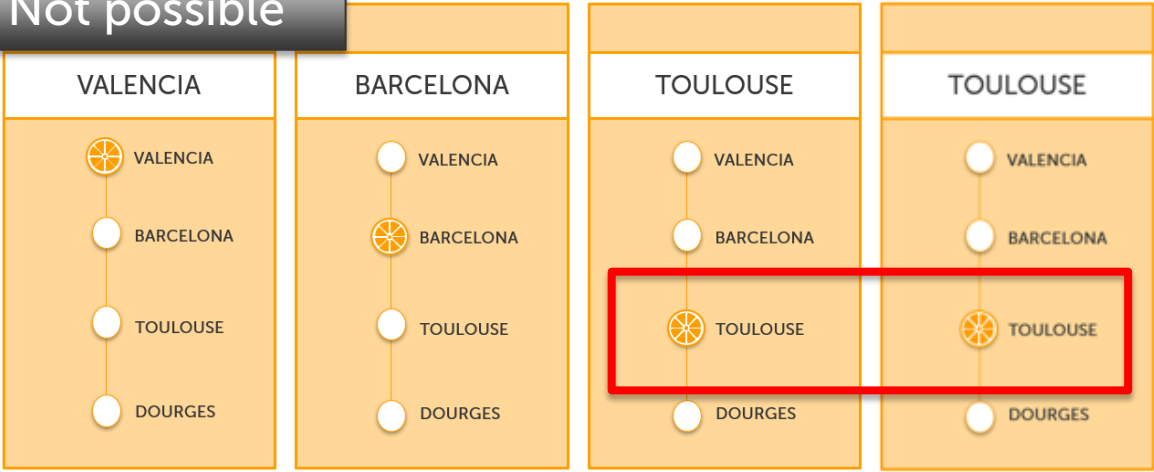
Transport node cards



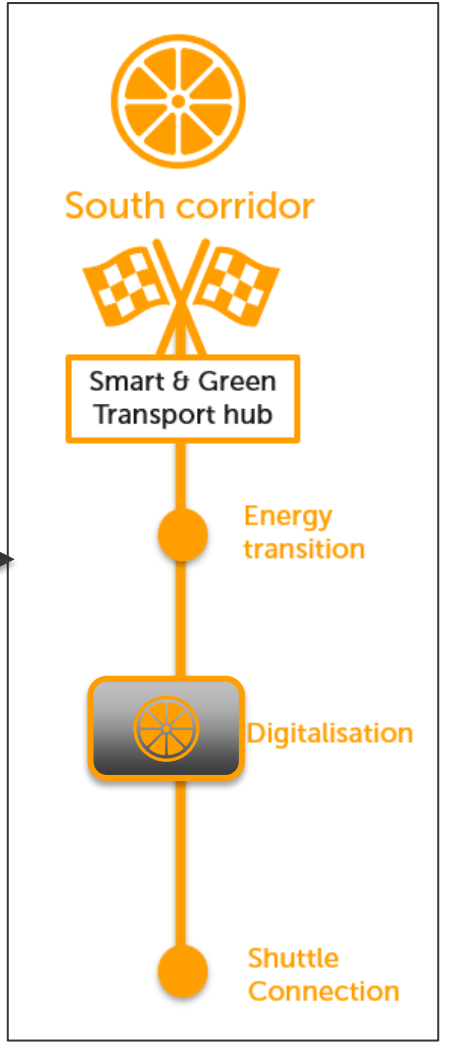
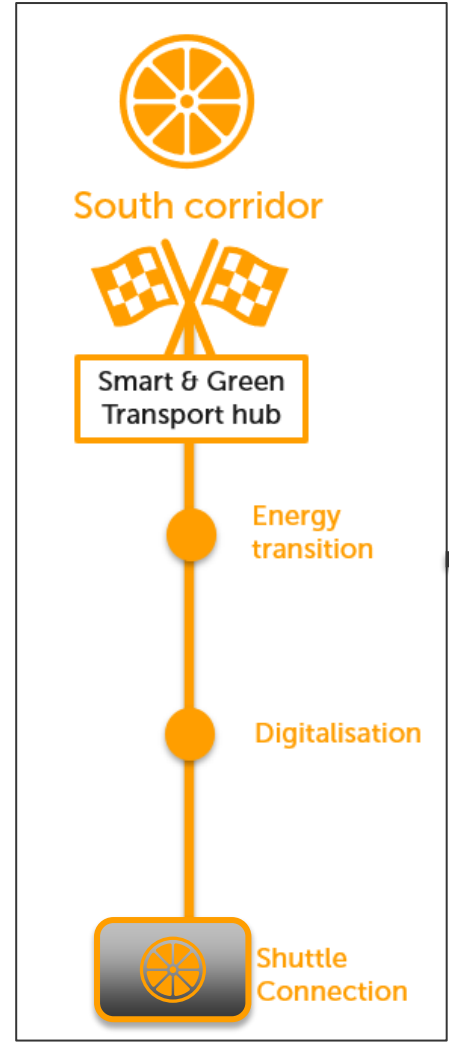
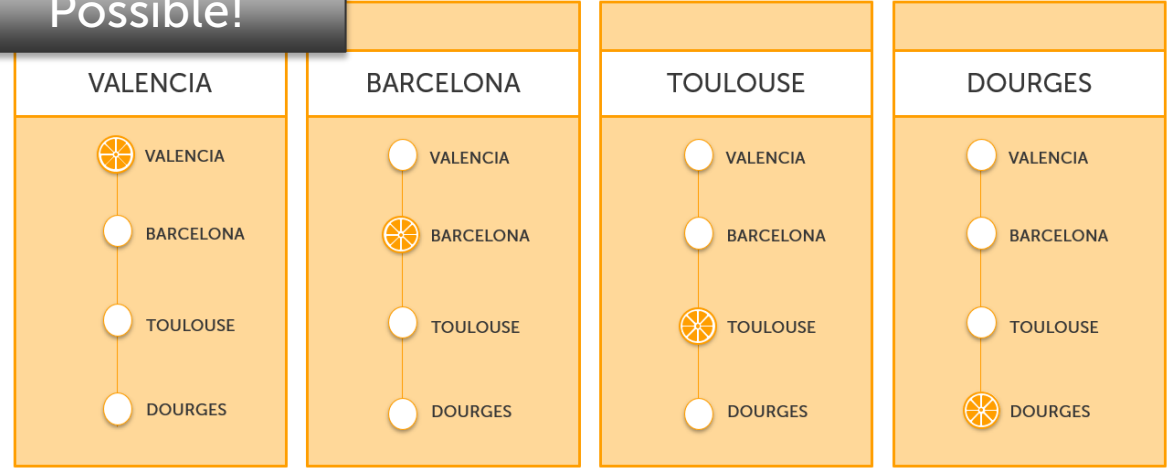
- Every transport node is needed to build a solution
- Collect a 'Kwartet' to build a solution!
- First the solution in the port should be built and then the solutions can be built in the rest of the corridors (see next slide)

Transport node cards

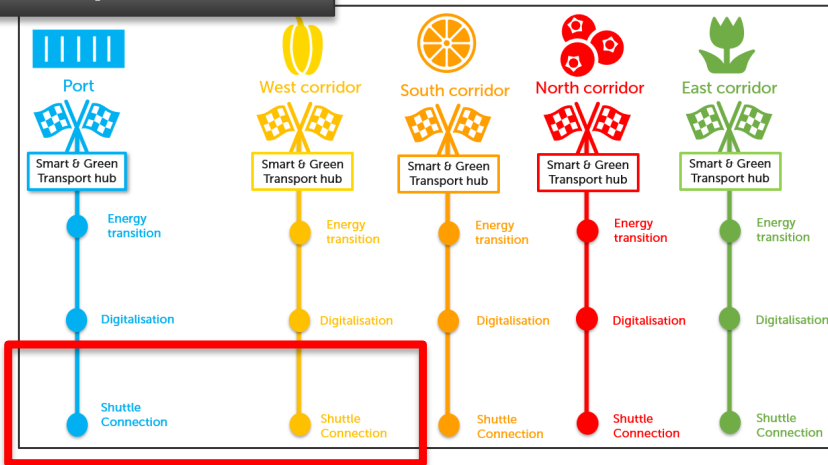
Not possible



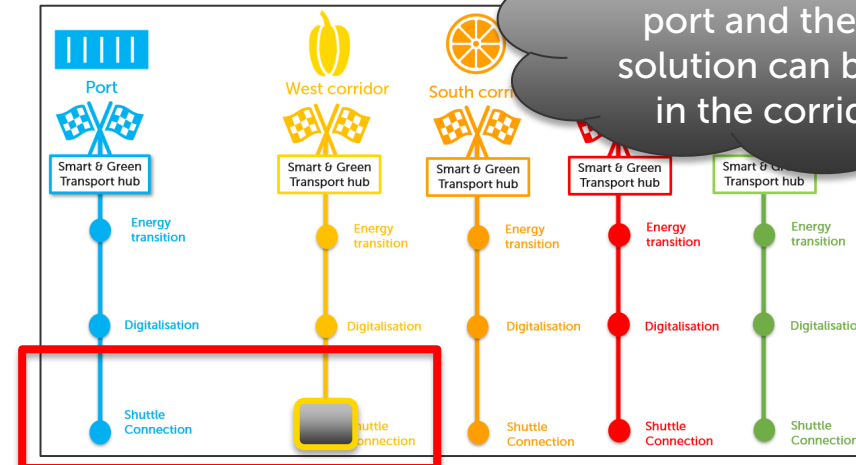
Possible!



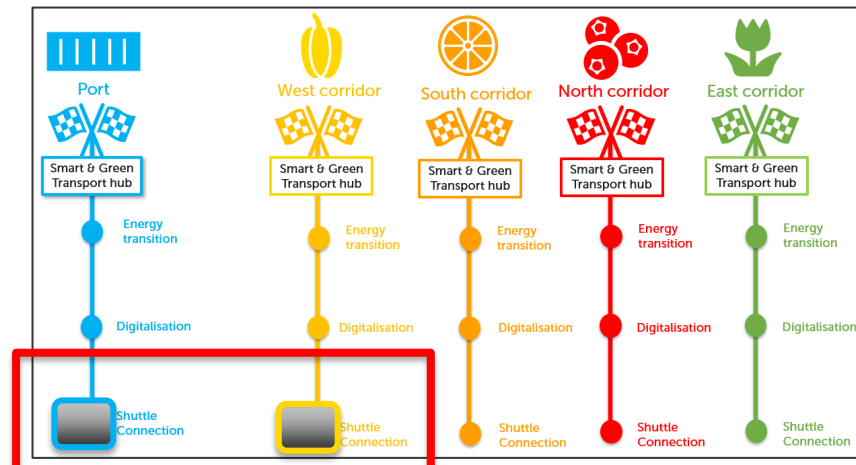
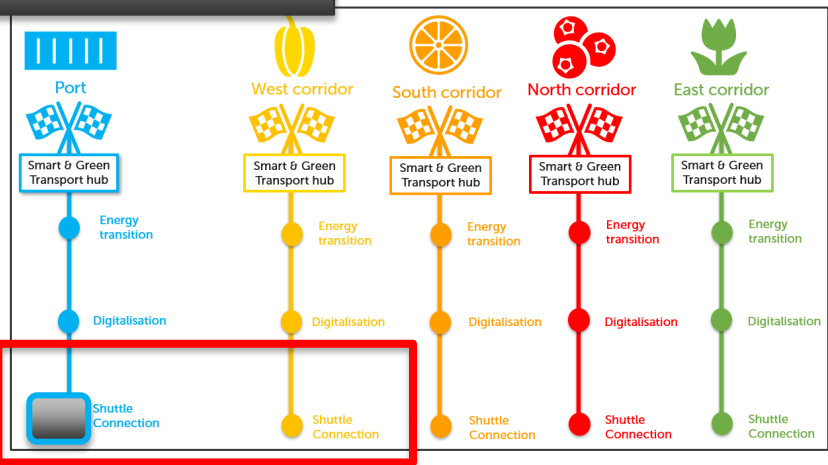
Not possible



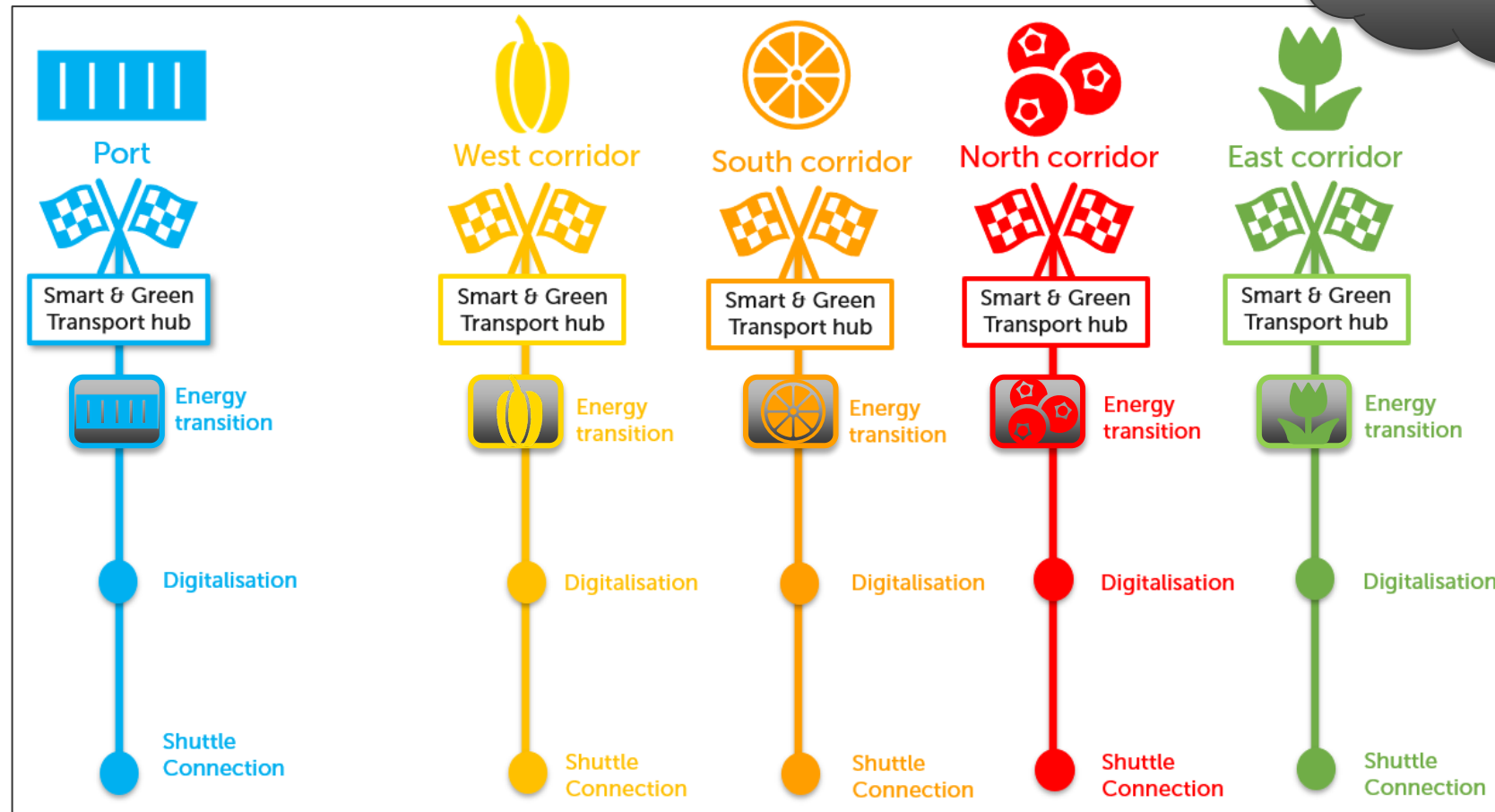
First the solution should be built in the port and then the solution can be built in the corridors!



Possible!



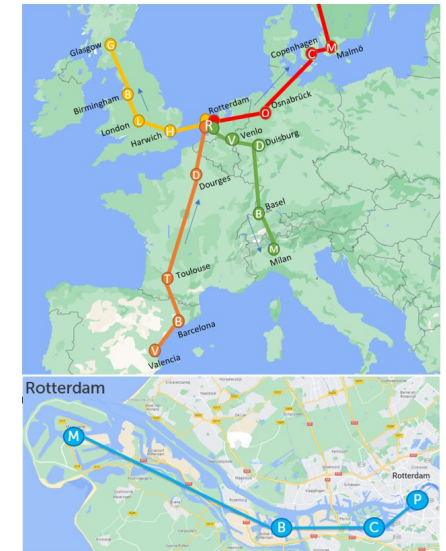
COMPLETED THE GAME



All solutions are built!


AND

No CO2 units in the corridors

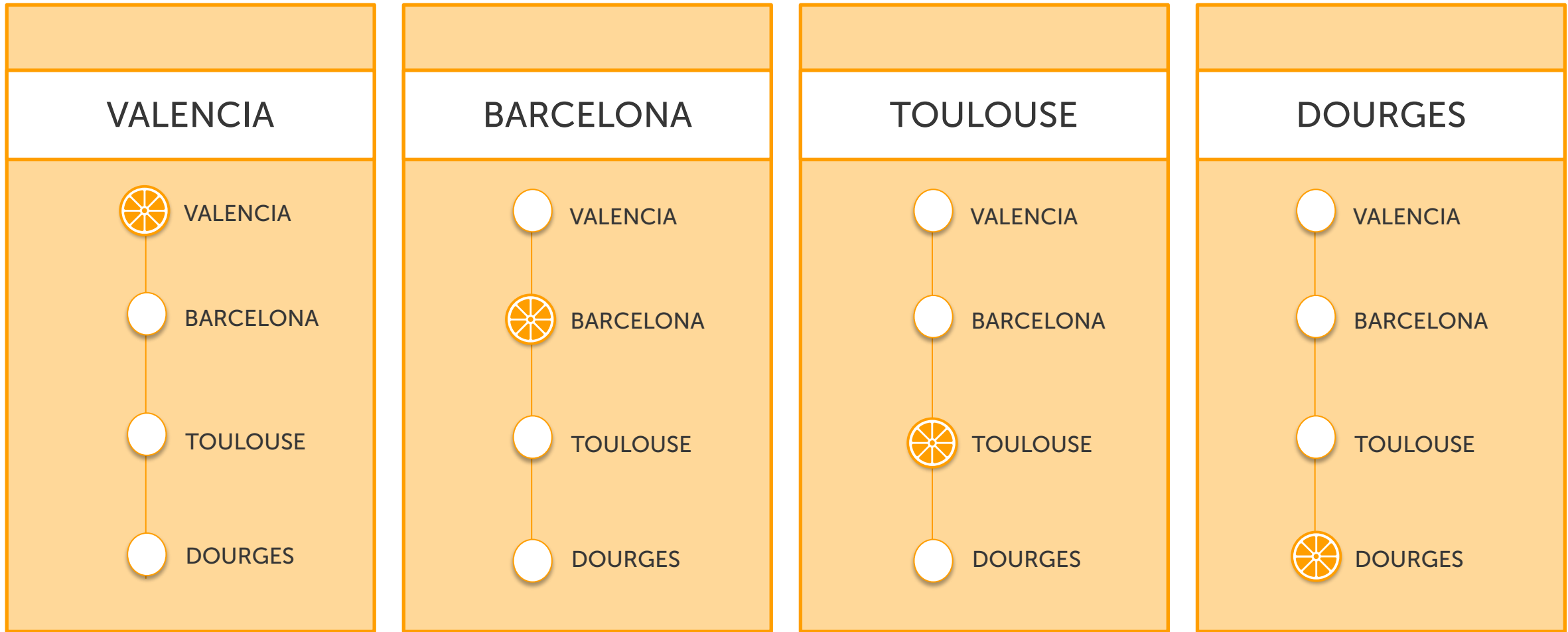


Role cards

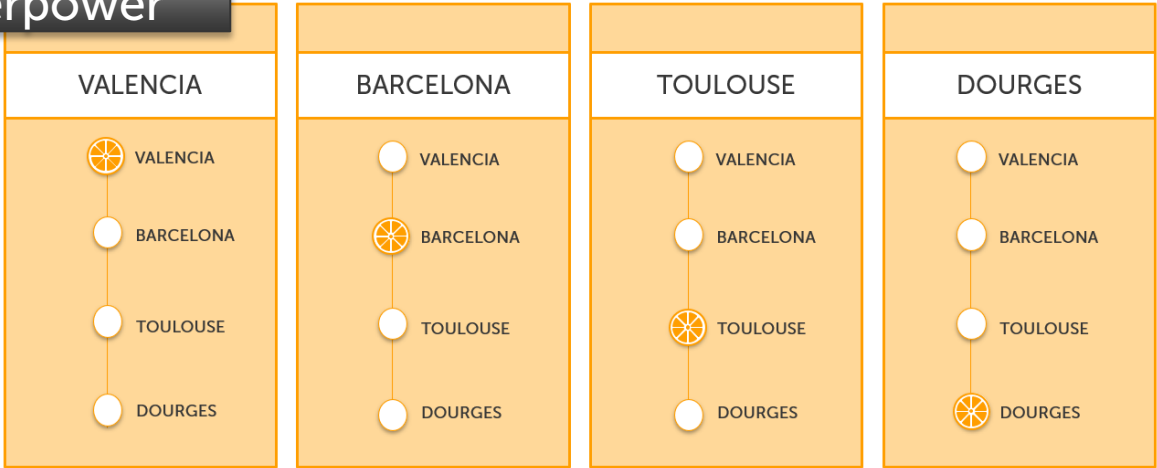
- Every player receives a role card in the **beginning**
- The role card determines your **starting point**
- Every role has a **superpower** which enable you to build **solutions** in the corridor faster

MANAGER LOGISTICS	MANAGER LOGISTICS
<p>You are Maurice, a seasoned professional at a freight forwarding company.</p> <p>You want to shake up the transport industry with innovative, revolutionary logistics solutions. Whenever bottlenecks arise you offer workaround solutions</p>	<p>SUPERPOWER</p> <p>The logistics manager brings together different stakeholders in the supply chain.</p> <p>You only need two cards of the <u>same corridor</u> to build the <u>shuttle connection</u> for the</p>
	n.
DIGITAL MANAGER	DIGITAL MANAGER
<p>You are Diane. As a port manager at the Port Community Company, you coordinate across the port logistics chain</p> <p>Your challenge is to prevent the port from getting congested, while at the same time push the transport industry to use cleaner and renewable fuel solutions.</p> <p>You initiate modal shift projects, both related to renewable energy and digital solutions.</p>	<p>SUPERPOWER</p> <p>As a digital manager you create visibility on the corridor. Only needs two cards of the <u>same corridor</u> to build <u>digital solutions</u> for the supply chain.</p> 

Example: Transport node cards - SOUTH



Without superpower



With superpower!



With superpower for a specific solution!

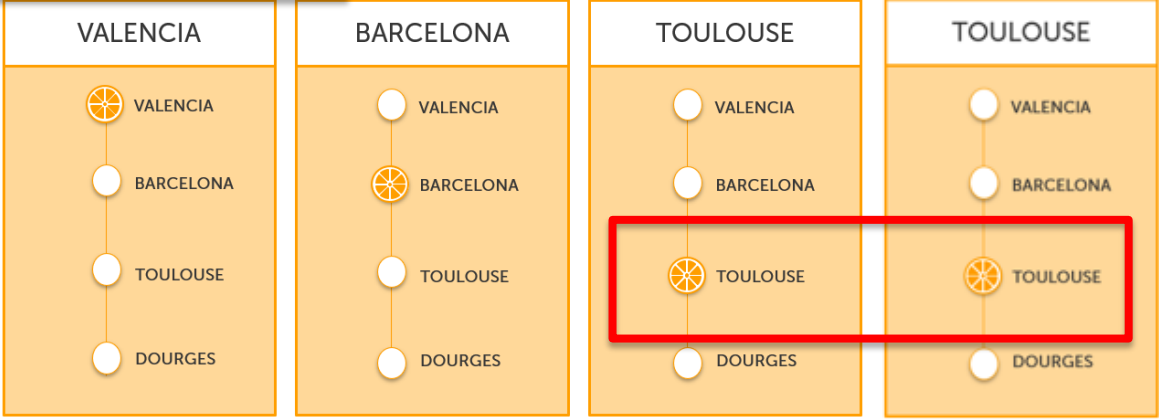
- Only two different transport node cards are necessary for building the solution!

Example: Transport node cards - SOUTH

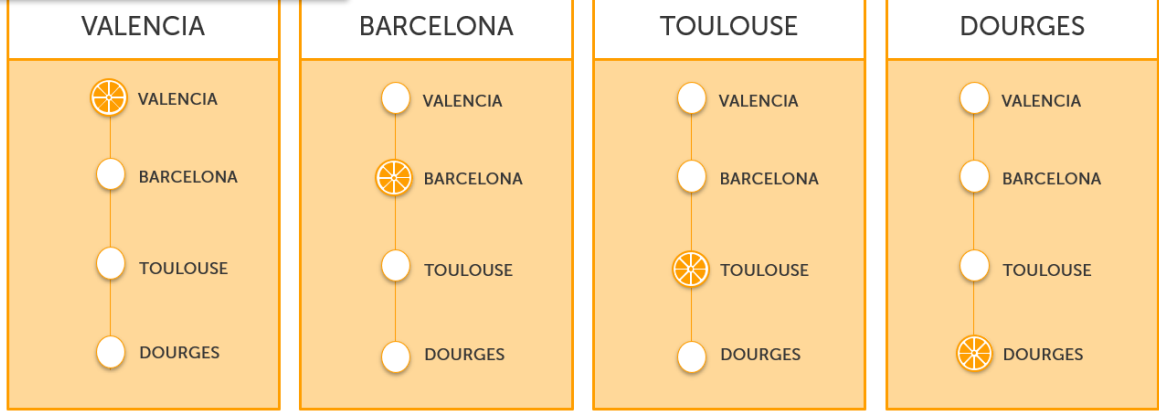


- Only two different transport node cards are necessary for building the solution!

Not possible



Possible!

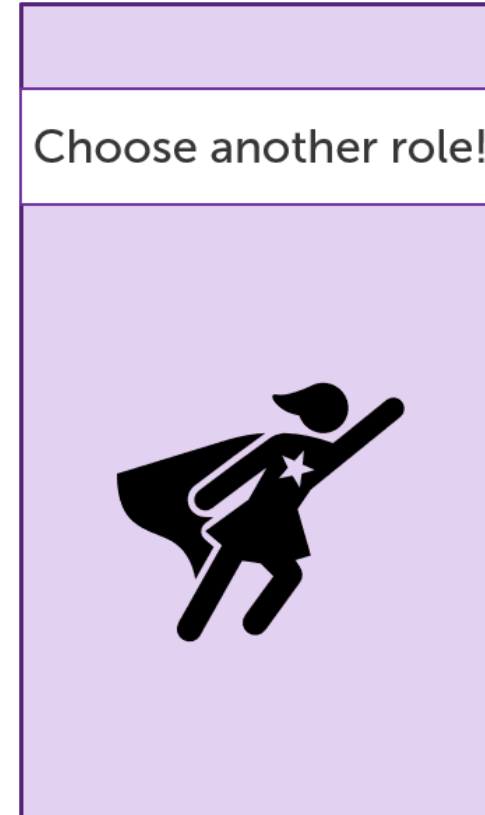


Transport node cards – Special cards in the pile!



Joker!

Choose the transport node the card represents



Change roles!

Choose another stakeholder with a superpower

Congestion cards

- At the end of your turn, you have to draw **two congestion cards**
- On the transport node that is shown in the congestion card you must put one **CO2 unit**

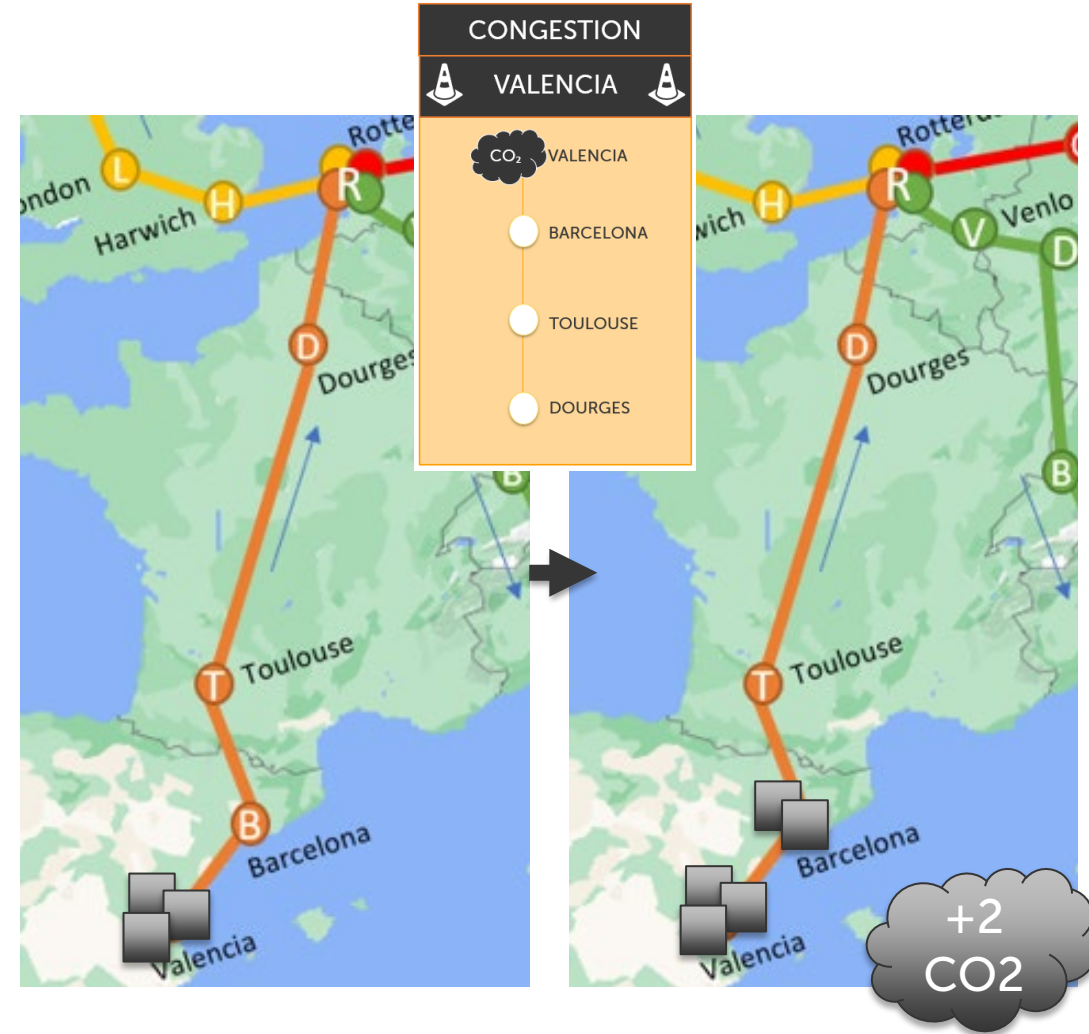
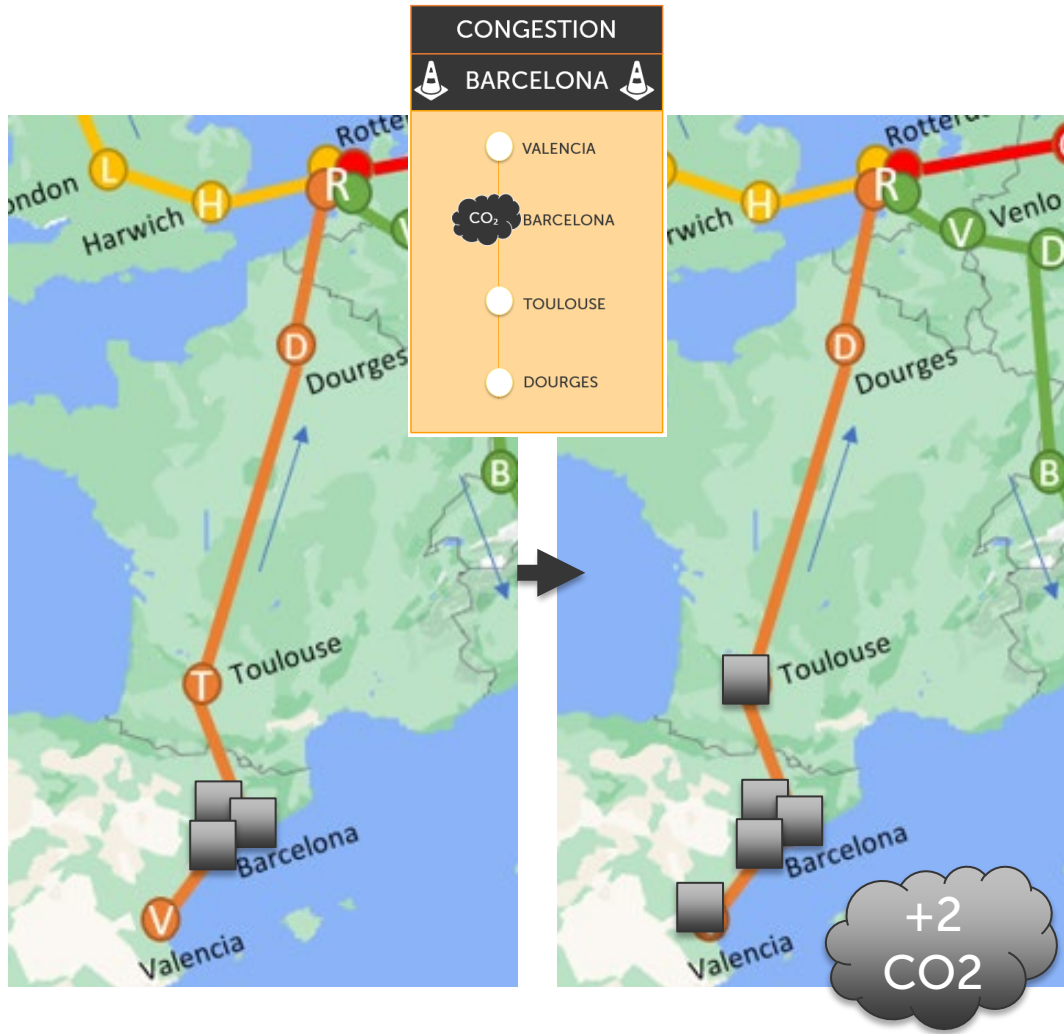


Congestion cards

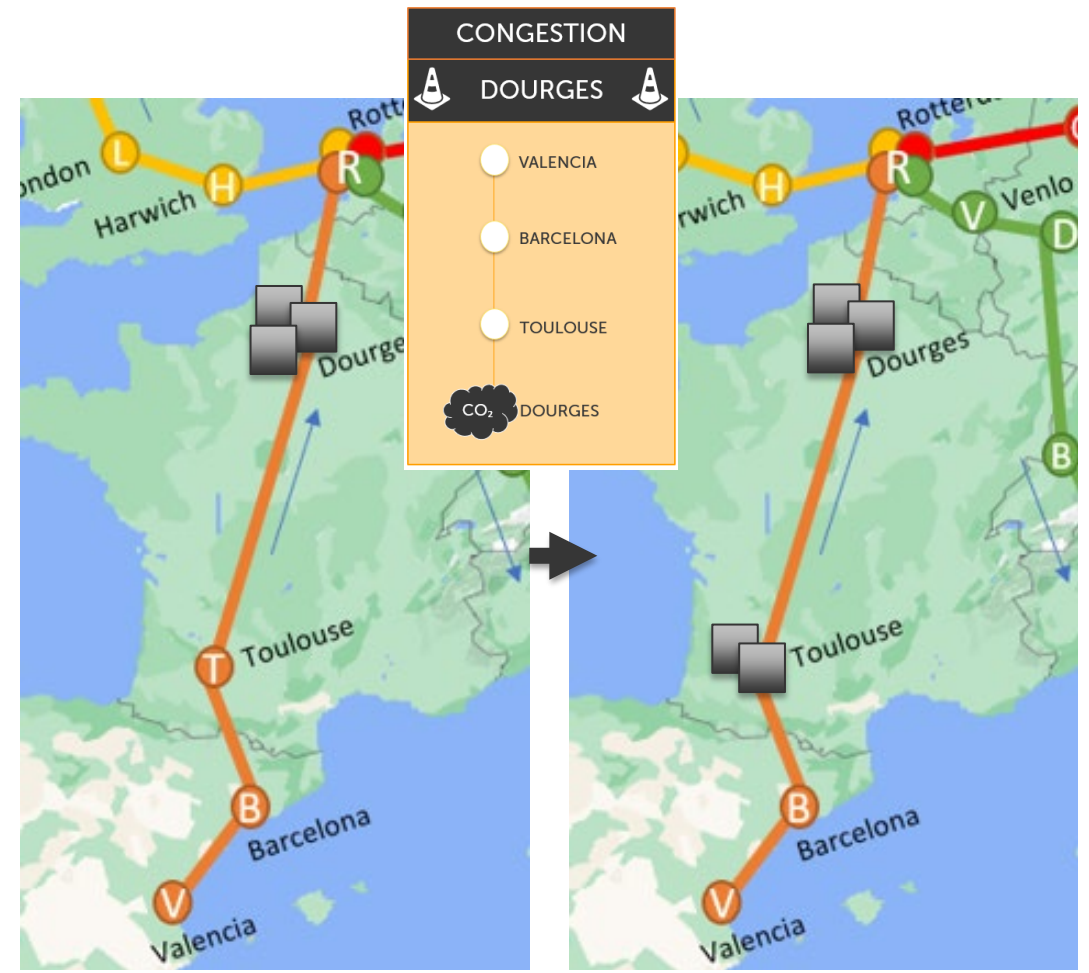
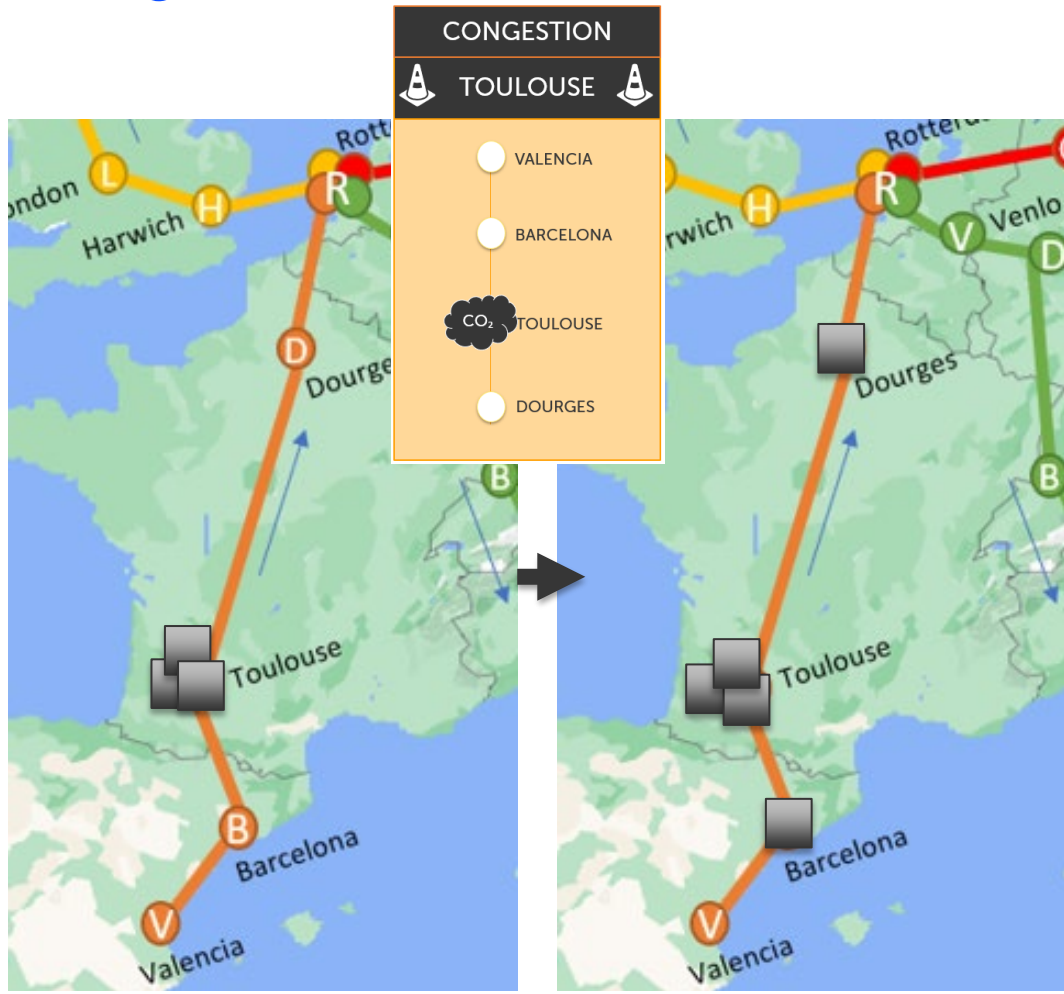
- If there are already **three congestion points** in one transport node and you draw another congestion card.
- Not one CO₂ unit is added to the corridor, but **two CO₂ units!** The congestion spills over the corridor.
- The **spillover effect** depends on the location of the transport node in the corridor what happens (see next slide for examples)
- Only **10 CO₂ units** per corridor available



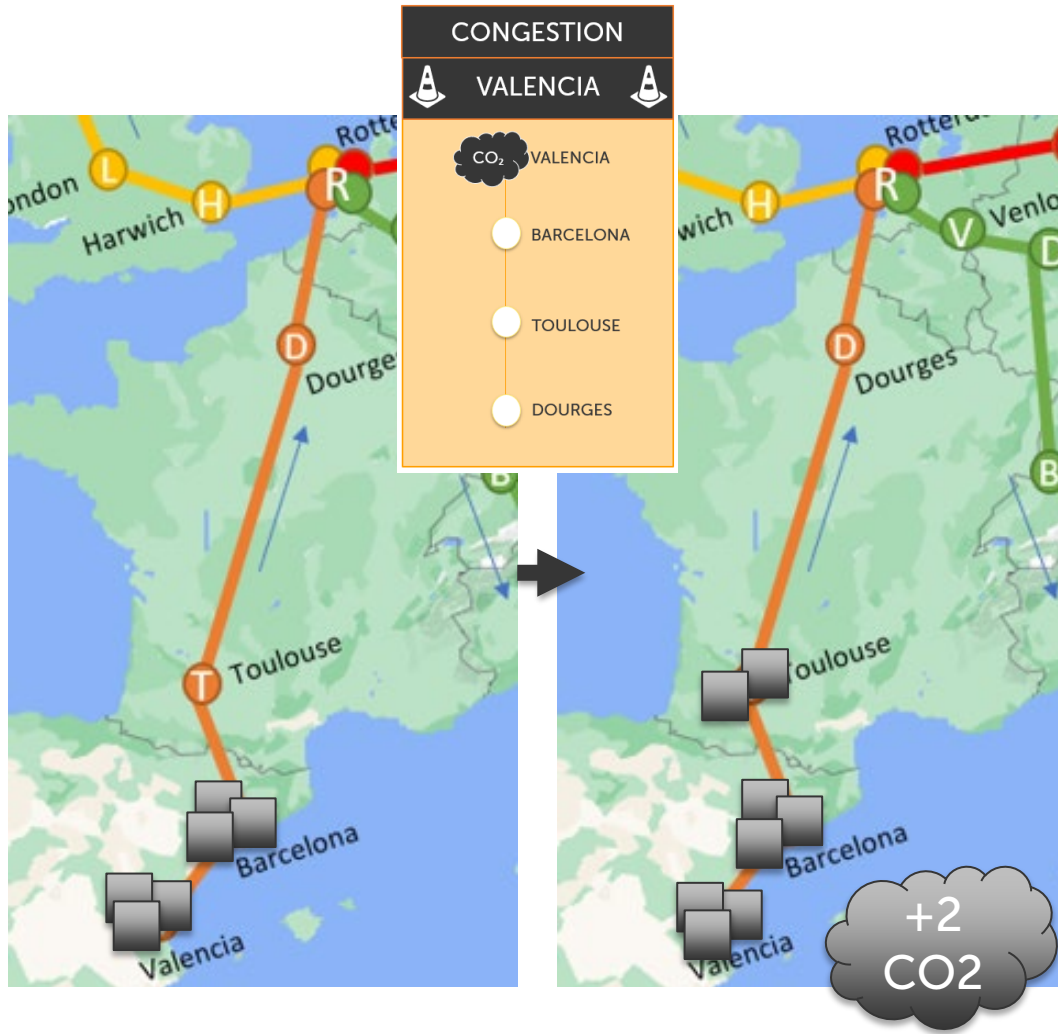
Congestion scenario's



Congestion scenario's



Congestion cards



GAME OVER

- The game is over if there are no CO2 units available anymore for one corridor
- The corridor is completely congested and does not function anymore...

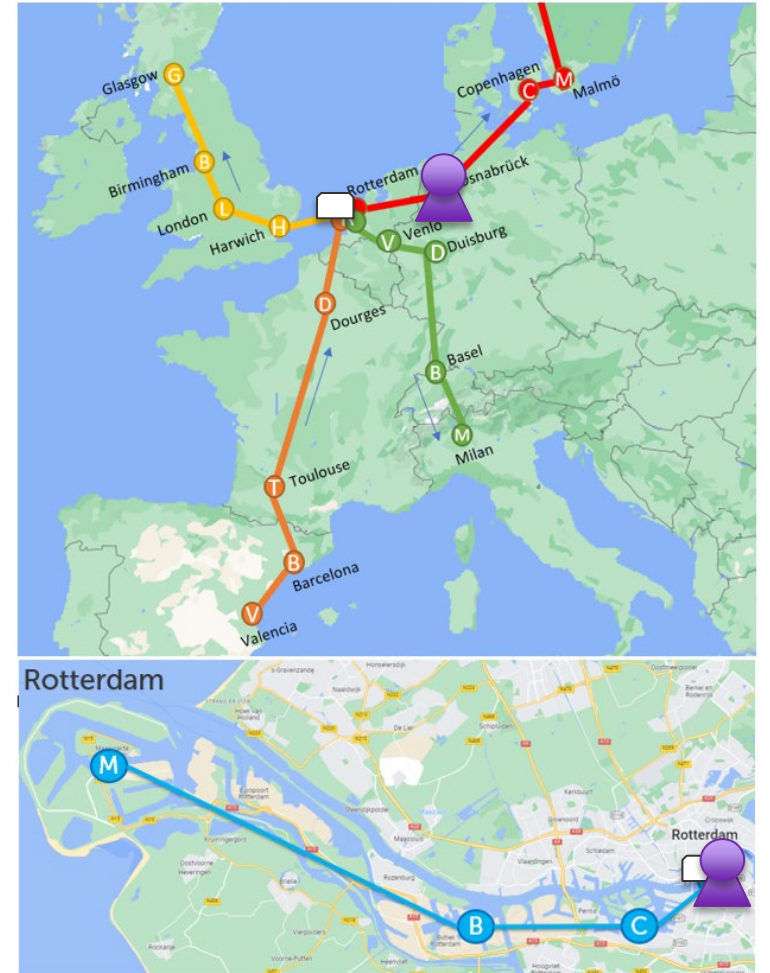
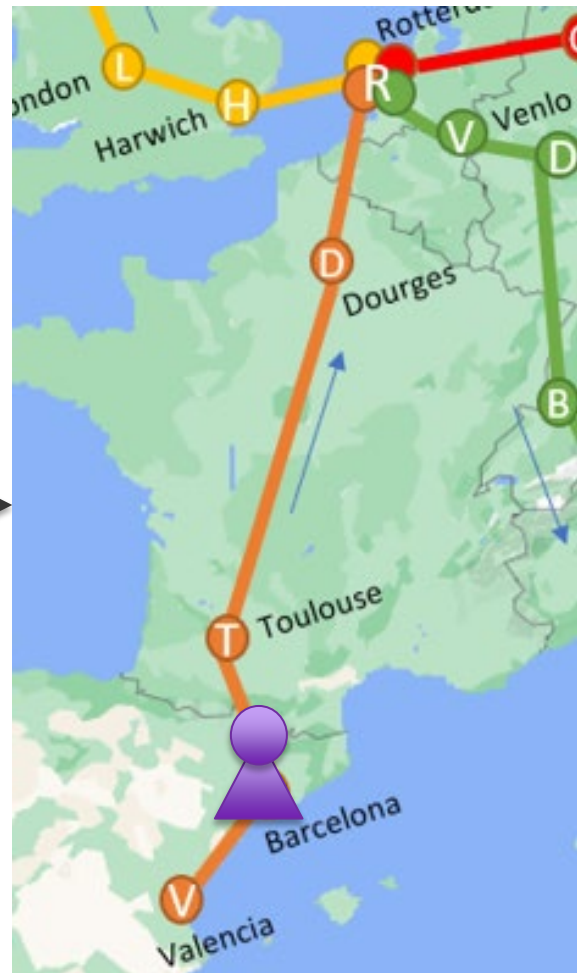
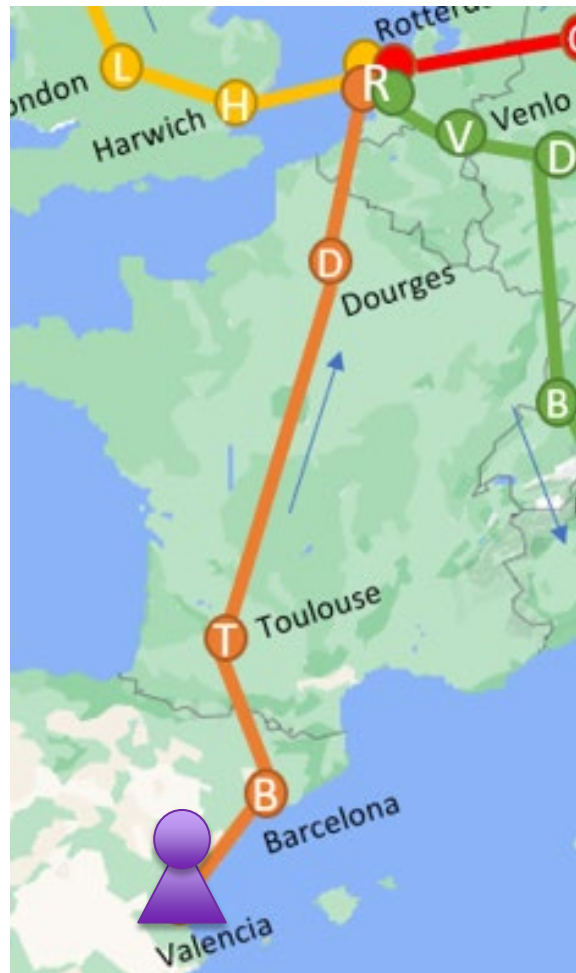
ACTIONS PER TURN

ACTIONS	
1.	MOVE TO NEIGHBOURING TRANSPORT NODE
2.	VISIT A TRANSPORT NODE BY FLYING
3.	REMOVE A CO2 UNIT
4.	SHARE INFORMATION
5.	DEVELOP A CORRIDOR SOLUTION

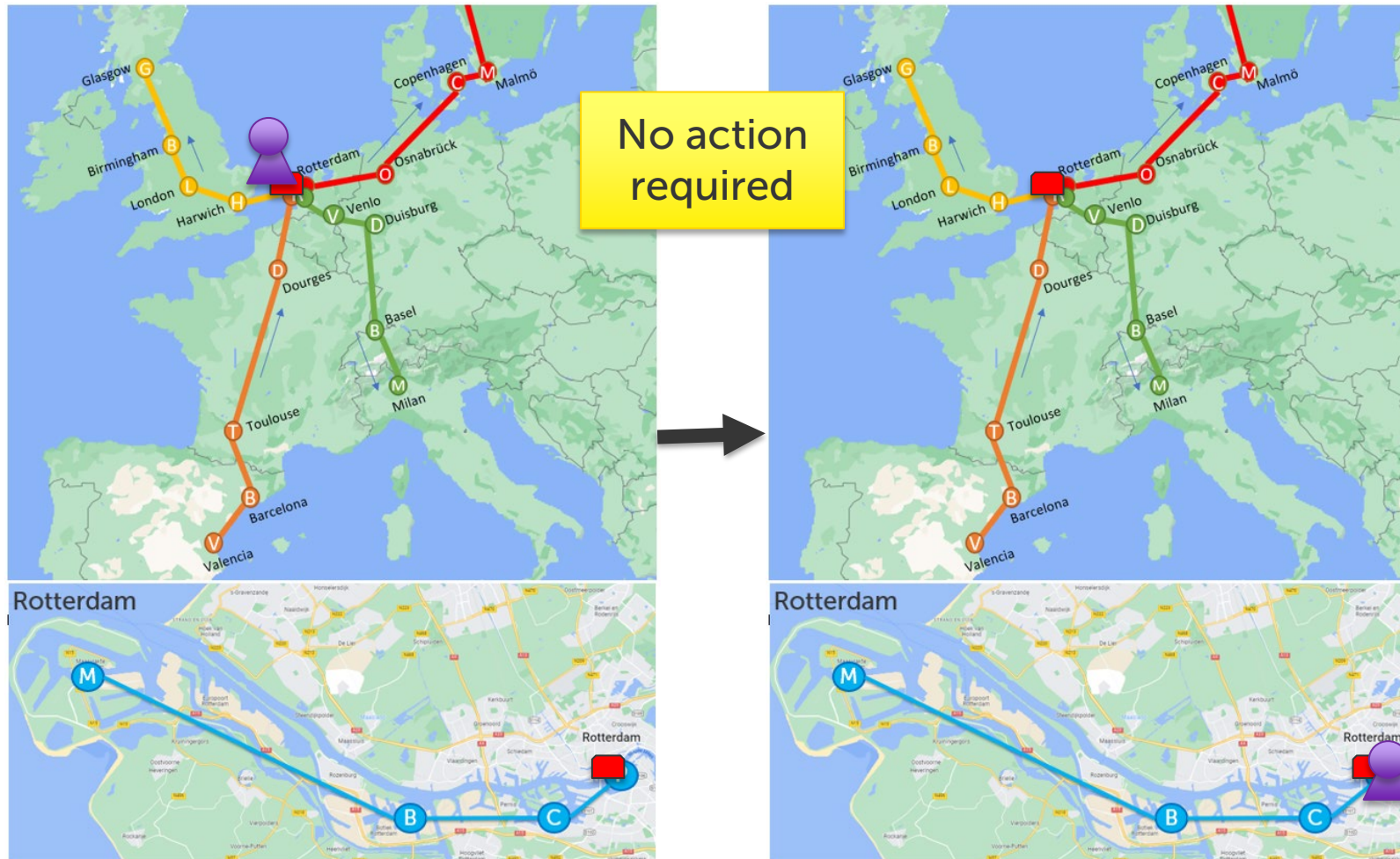
You can play the following actions:

1. **Move to a neighbouring transport node;** the player moves to a neighbouring transport node (1 action).
2. **Visit a transport node;** the player plays the card of the transport node and **moves the pawn to this transport node**. Afterwards he places the transport node card on the discard pile.
3. **Removing a CO2 unit in the corridor;** the player removes 1 CO2 unit and places the stone on the pile next to the board. When the last **congestion stone is removed**, the corridor is cleared from congestion.
4. **Share information with your supply chain partner;** the player gives the transport node card of his/her choice to another player or receives a transport node card from another player. Both players have to be on the **same transport node**. If the player has more than 7 cards, he/she either immediately discards a card or plays a Congestion Card.
5. **Develop a corridor solution;** the player has to be in a transport node and have 4 cards of the same colour (=corridor) in order to implement a corridor solution. Once you develop a corridor solution, you can move the **Milestone on the Corridor Dashboard**.

ACTION 1 - Move to a neighbouring transport node



ACTION 1 – Special move scenario Rotterdam



White house is zooming into the port and zooming out to the hinterland.

Moving to Rotterdam is one move. Zooming in and zooming out is no move!

ACTION 2 - Visit a transport node



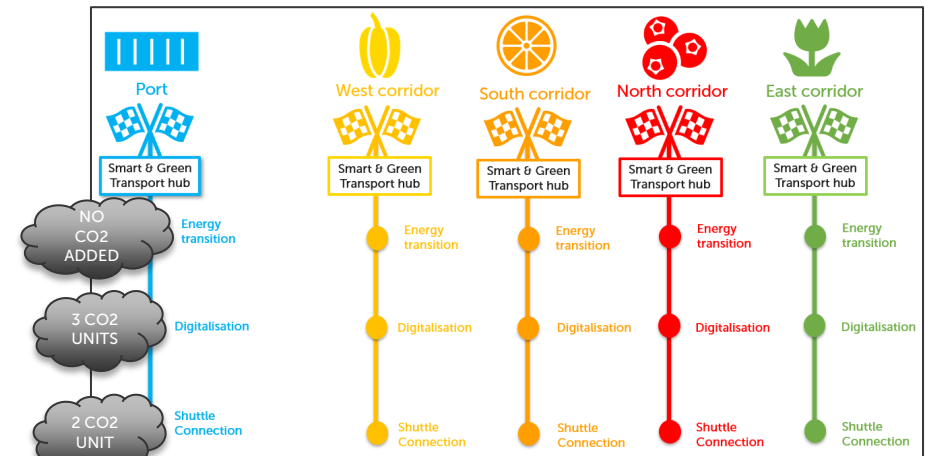
The transport node card is used and should be put on the discard pile!

Add two CO2 units: Departure and Arrival transport nodes

ACTION 3 – Eliminate a CO2 unit in the corridor

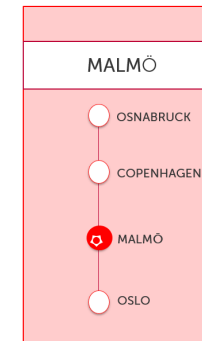
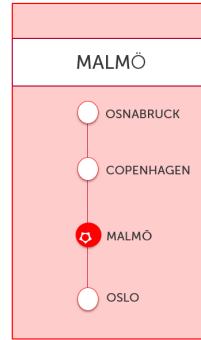
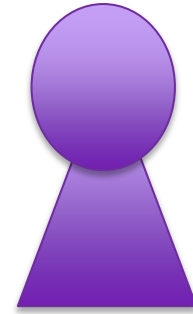
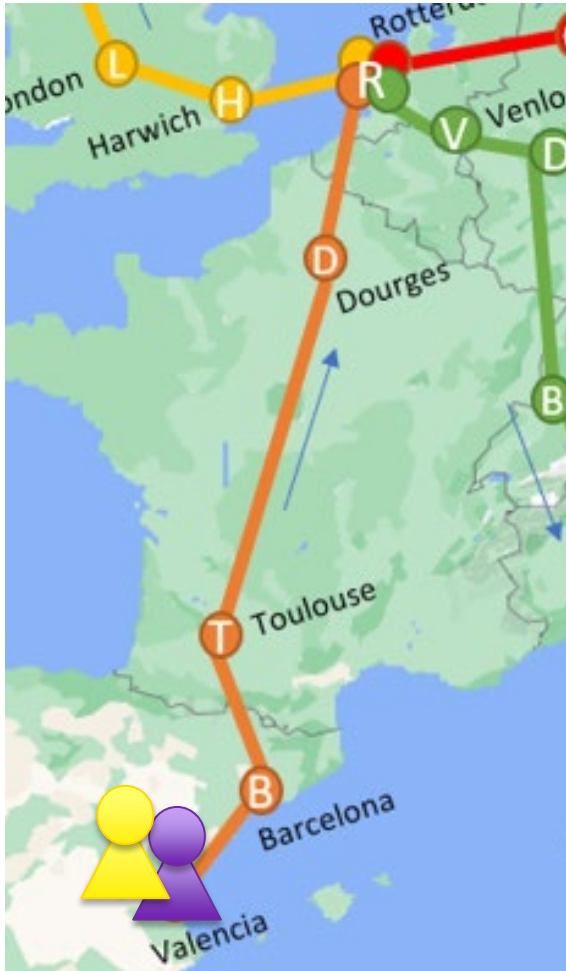


Elimination structure of CO2 units on corridor solutions dashboard



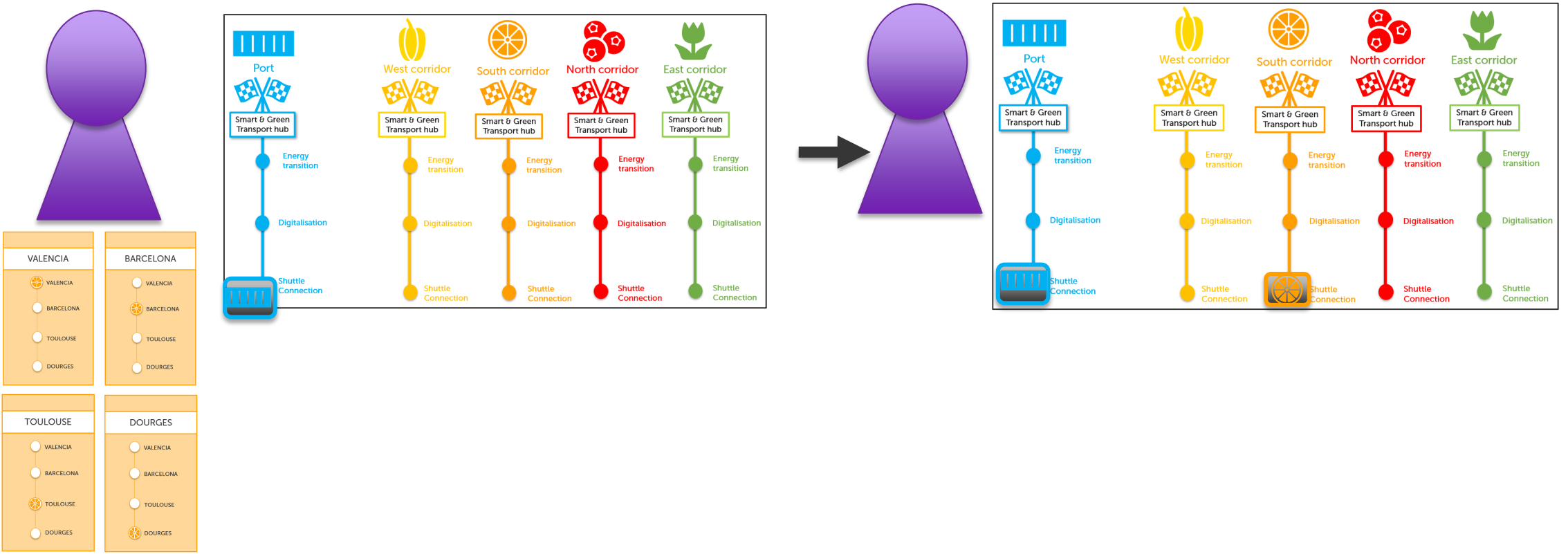
1 CO2 UNIT Without a corridor solution, you can only take away 1 CO2 unit

ACTION 4 - Share information with your supply chain partner



You need to be in the same transport node to share information!

ACTION 5 – Develop a corridor solution

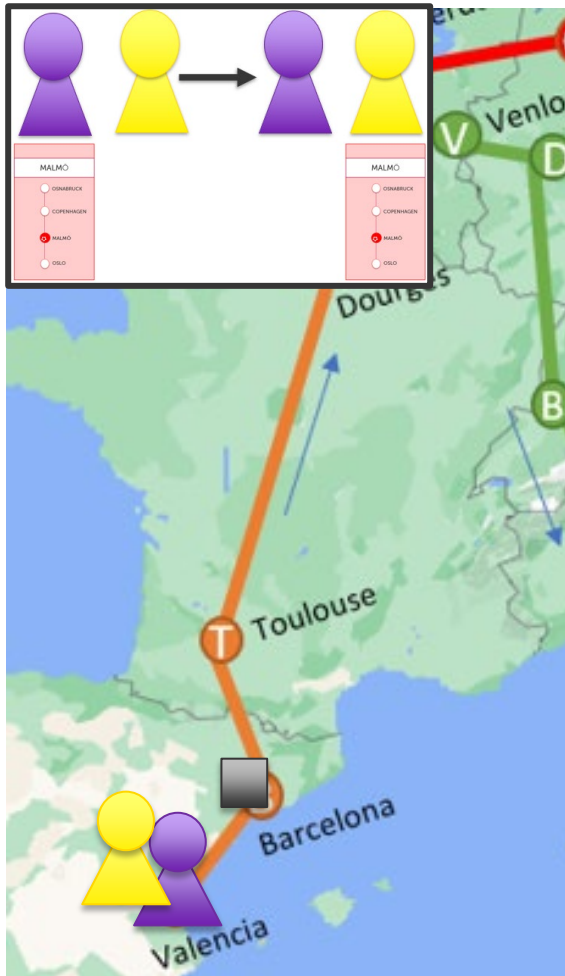


Every turn!

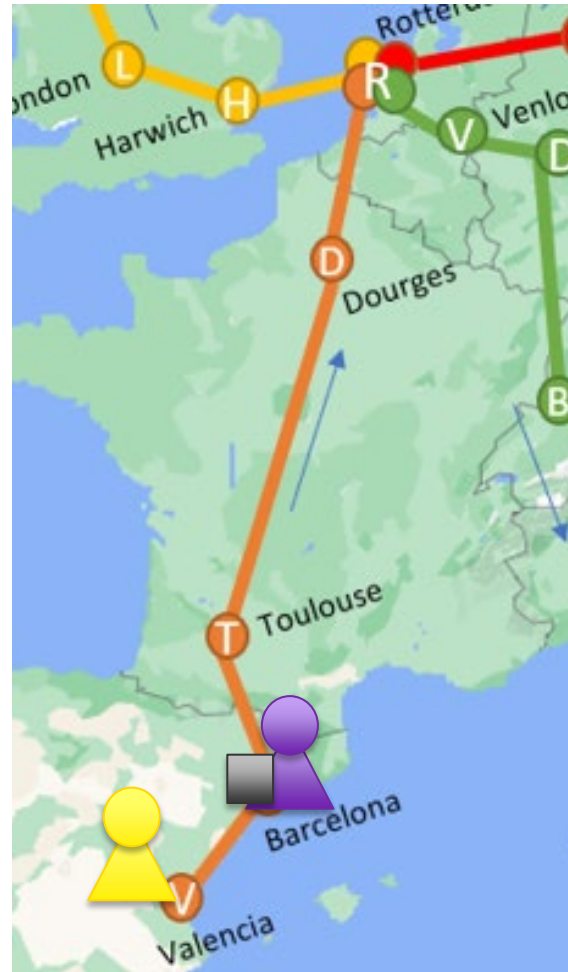
1. Draw two transport node cards
(more than 7 cards in your hand; choose cards to remove from your hand)
2. Play four actions
3. Draw two congestion cards

Example four turns

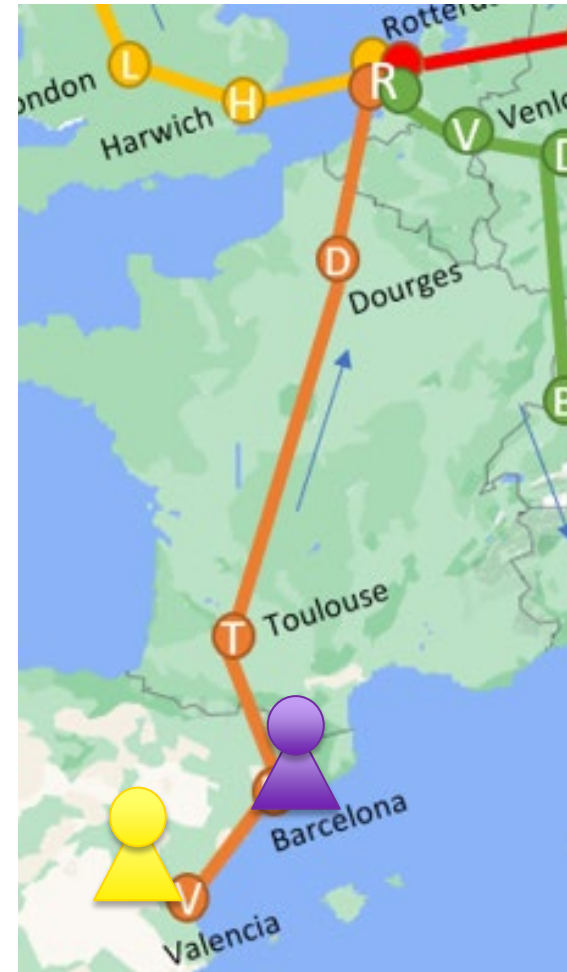
1st ACTION Share info



2nd ACTION Move to Barcelona



3rd ACTION Remove CO2



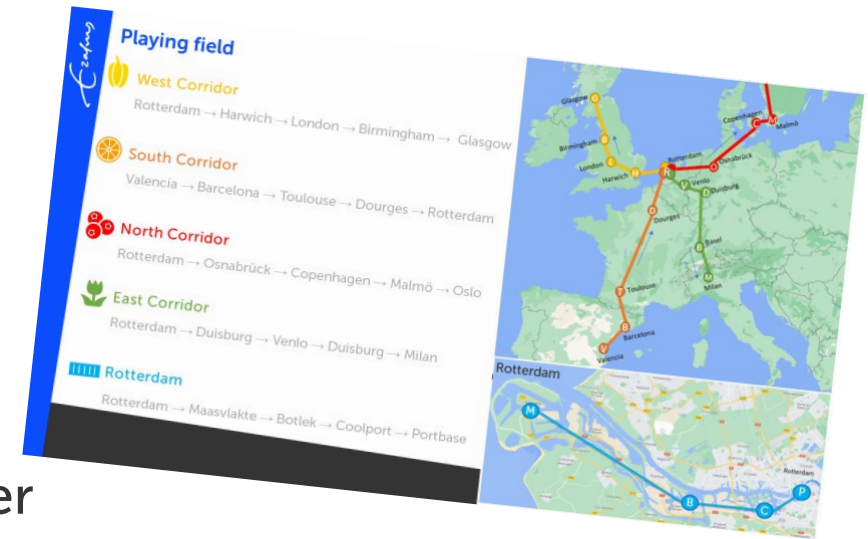
4th ACTION Visit Venlo



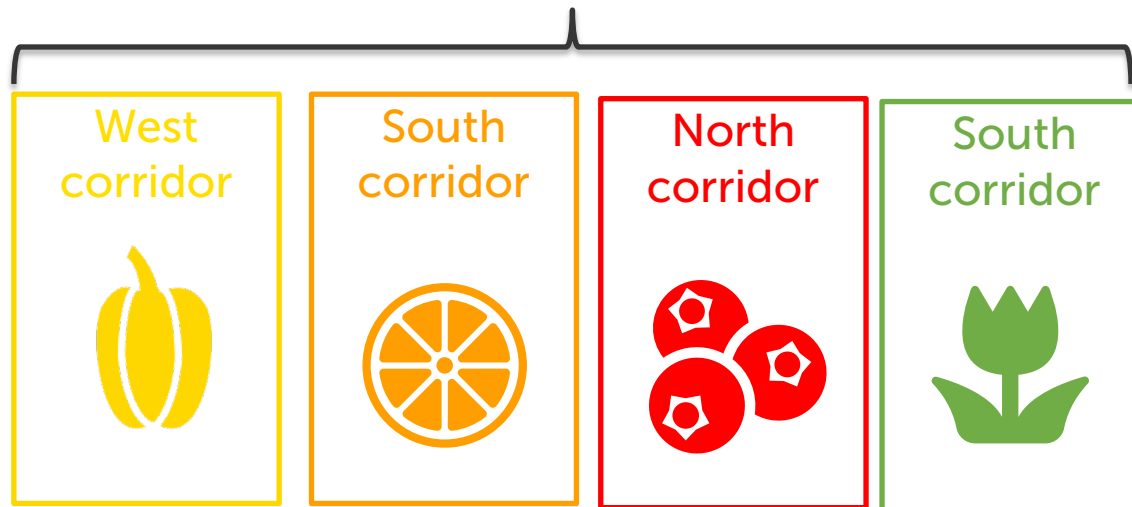
Increase difficulty level of the game

Add competition between corridors

- Together you are responsible for the Rotterdam corridor.
- Each player gets a corridor card and also starts on this corridor.
- The player is responsible to keep control over the CO2 emissions in your corridor.
- For advanced players, CO2 units can be maximized to 8 per corridor.



Individual responsibility per corridor



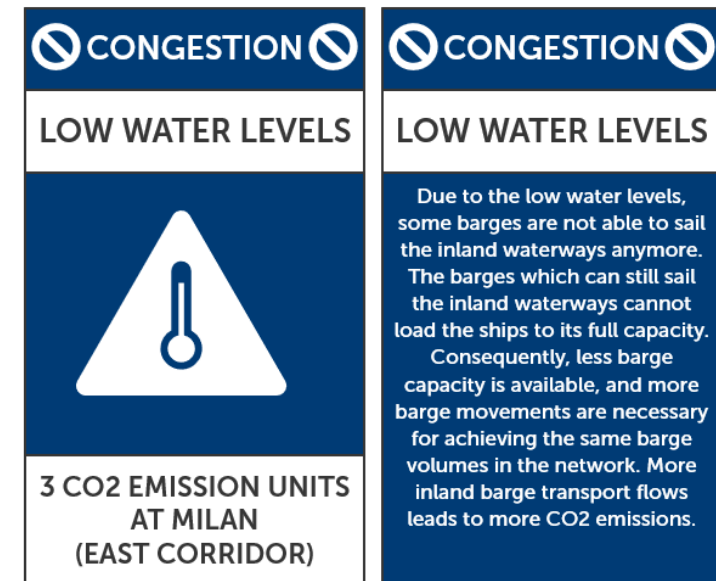
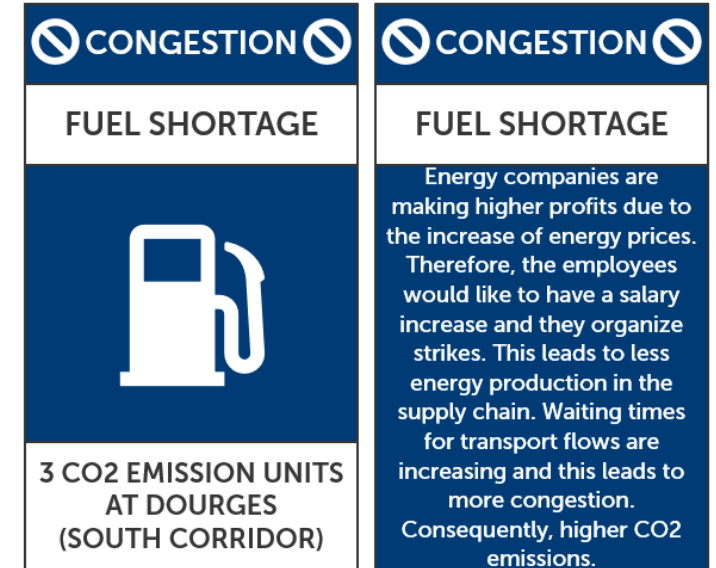
Joint responsibility for Rotterdam



Increase difficulty level (2)

Add congestion outbreak cards to the game

- To increase the difficulty level, players can decide to add 3 or more outbreak cards in the congestion pile.
- When a player draws an outbreak card, then player has to add 3 CO2 units to a transport node.



Play the game!

Feedback round!



Fill in the solutions
dashboard!





Port



Smart & Green
Transport hub



Energy
transition



Digitalisation



Shuttle
Connection

Filling in the form of solutions!

Solution Energy Transition in the port:

Solution Digitalisation in the port:

Solution Shuttle Connection in the port:



West corridor



Smart & Green
Transport hub



Energy
transition



Digitalisation



Shuttle
Connection

Filling in the form of solutions!

Solution Energy Transition in the port:

Solution Digitalisation in the port:

Solution Shuttle Connection in the port:



South corridor



Smart & Green
Transport hub



Energy
transition



Digitalisation



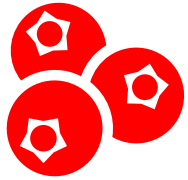
Shuttle
Connection

Filling in the form of solutions!

Solution Energy Transition in the port:

Solution Digitalisation in the port:

Solution Shuttle Connection in the port:



North corridor



Smart & Green
Transport hub



Energy
transition



Digitalisation



Shuttle
Connection

Filling in the form of solutions!

Solution Energy Transition in the port:

Solution Digitalisation in the port:

Solution Shuttle Connection in the port:



East corridor



Smart & Green
Transport hub

● Energy
transition

● Digitalisation

● Shuttle
Connection

Filling in the form of solutions!

Solution Energy Transition in the port:

Solution Digitalisation in the port:

Solution Shuttle Connection in the port: