15 May 2018 | Brussels | EEAC workshop

What actions need to be taken to ensure a successful industrial transformation process?

Sascha Samadi, Wuppertal Institute

Five key options for reducing GHG emissions in the industrial sector

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1. **Increasing energy efficiency**
   E.g. by utilizing waste heat

2. **Increasing emission efficiency**
   E.g. by substituting coal with gas; higher electrification; CCS

3. **Increasing material efficiency**
   - In production, e.g. by reducing material loss during production
   - In use phase, e.g. by increasing recycling rates

4. **Increasing product use efficiency**
   E.g. through more intensive use, as in the case of car sharing

5. **Making consumption patterns more sustainable**
   E.g. by travelling less or switching from car use to public transport

demand side (should not be neglected)

Further research as well as intelligent policy mix needed to enable industrial sector decarbonization

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- **Identification and (multi-criteria) assessment of potential "breakthrough" technologies/processes capable of contributing to deep decarbonisation**
- **Identification and implementation of adequate economic, infrastructural and institutional framework conditions required for developing innovative technologies, processes and products**
- **Identification and implementation of adequate market structures for creating investment dynamics, while ensuring a level playing field across countries**
- **Support for the development of individual mitigation roadmaps for companies and industrial clusters, based on broad stakeholder participation**

  → Roadmaps for NRW and for the Port of Rotterdam as examples

Structure of the participatory process for the preparation of NRW's climate protection plan

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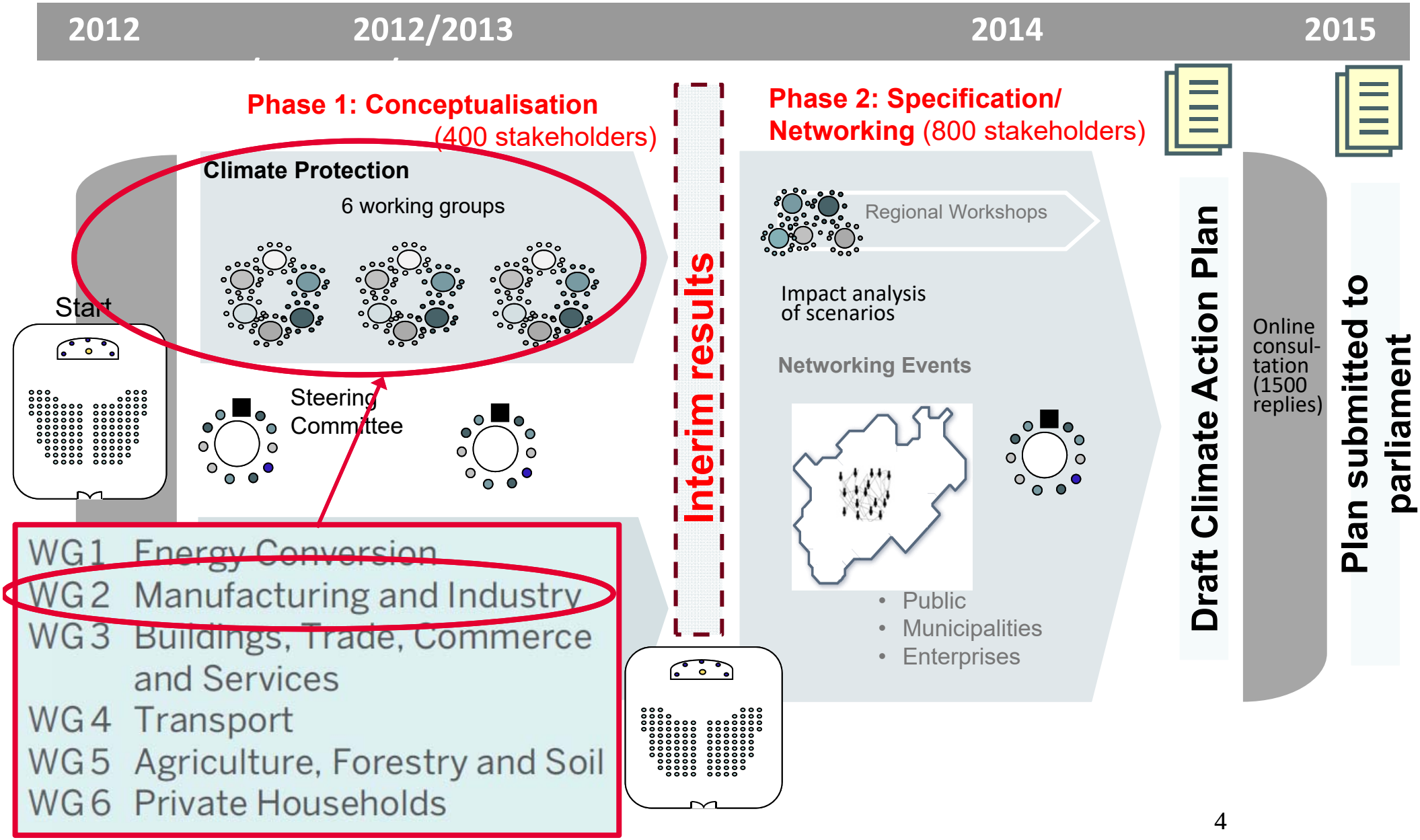

Study for the Port of Rotterdam industrial cluster: Stepwise approach to scenario definition

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Global

- Global GHG mitigation effort level
  I 4° I 2° I

EU

- EU GHG emission reduction target & policy
  I BAU I -80 % I -90 to -95 % I

Port economy

- Economic strategy of the port's industrial cluster
  I BAU I Technological Progress I Bio & CCS I Closed Carbon Cycle I

Development of scenarios and discussion of scenarios with stakeholders

Further research as well as intelligent policy mix needed to enable industrial sector decarbonization

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- **Support for the build-up of new infrastructure (e.g. for hydrogen, power-to-x and – if necessary – CO_2)**
- **Strengthening the cooperation between industry and science for advancing the knowledge about ambitious transformation pathways**
- **Intensifying the debate and the exchange with civil society to help obtain the required support for investments and infrastructure build-up**

At the WI we focus on the basic materials processing industries due to their high shares in overall GHG emissions

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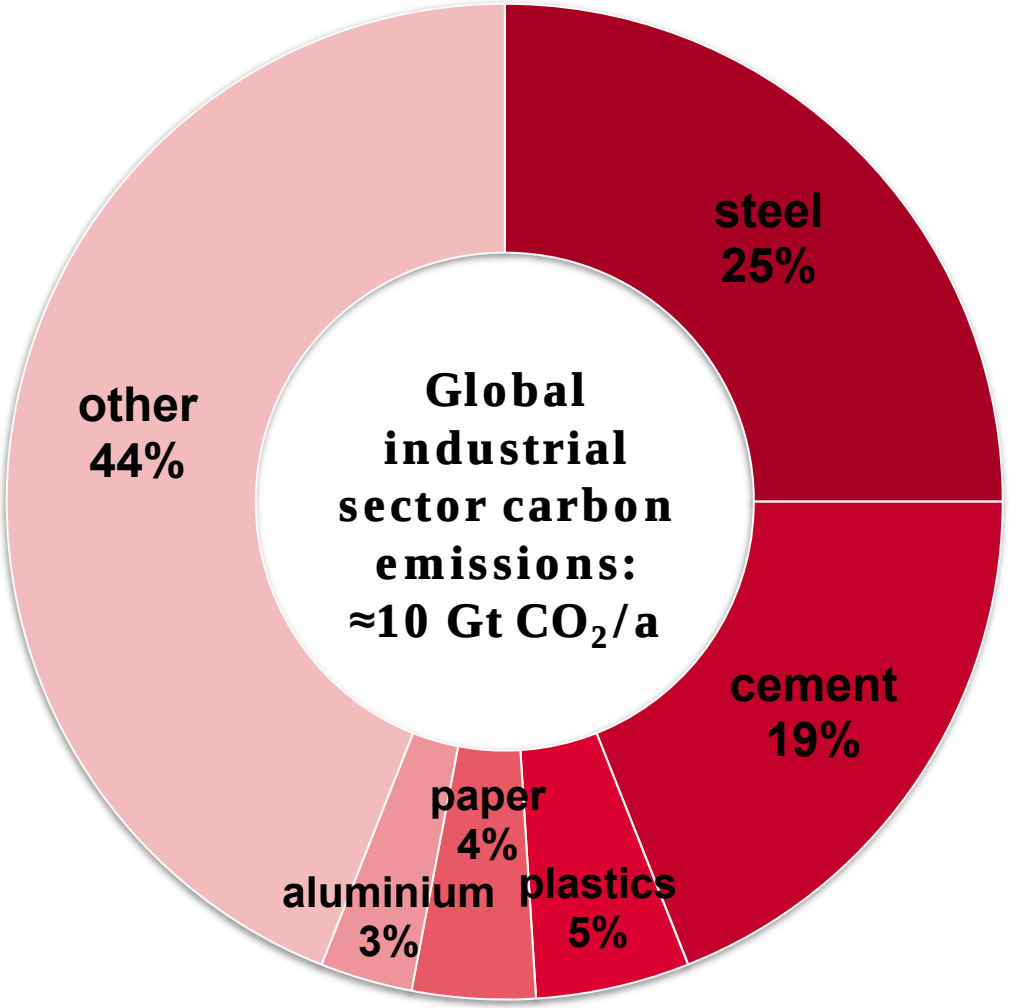
Five basic materials are responsible for 20 % of global GHG emissions



Source: Own figure based on ETP 2017 (IEA 2017)

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Thank you for your attention

More information about our work on industry decarbonization can be found at:
https://wupperinst.org/en/topics/economy/energyintensive-industry/
and
https://www.researchgate.net/project/Low-Carbon-Basic-Industry

Back-up slides

Examples of long-term mitigation roadmaps prepared in recent years for two industrial regions in Europe

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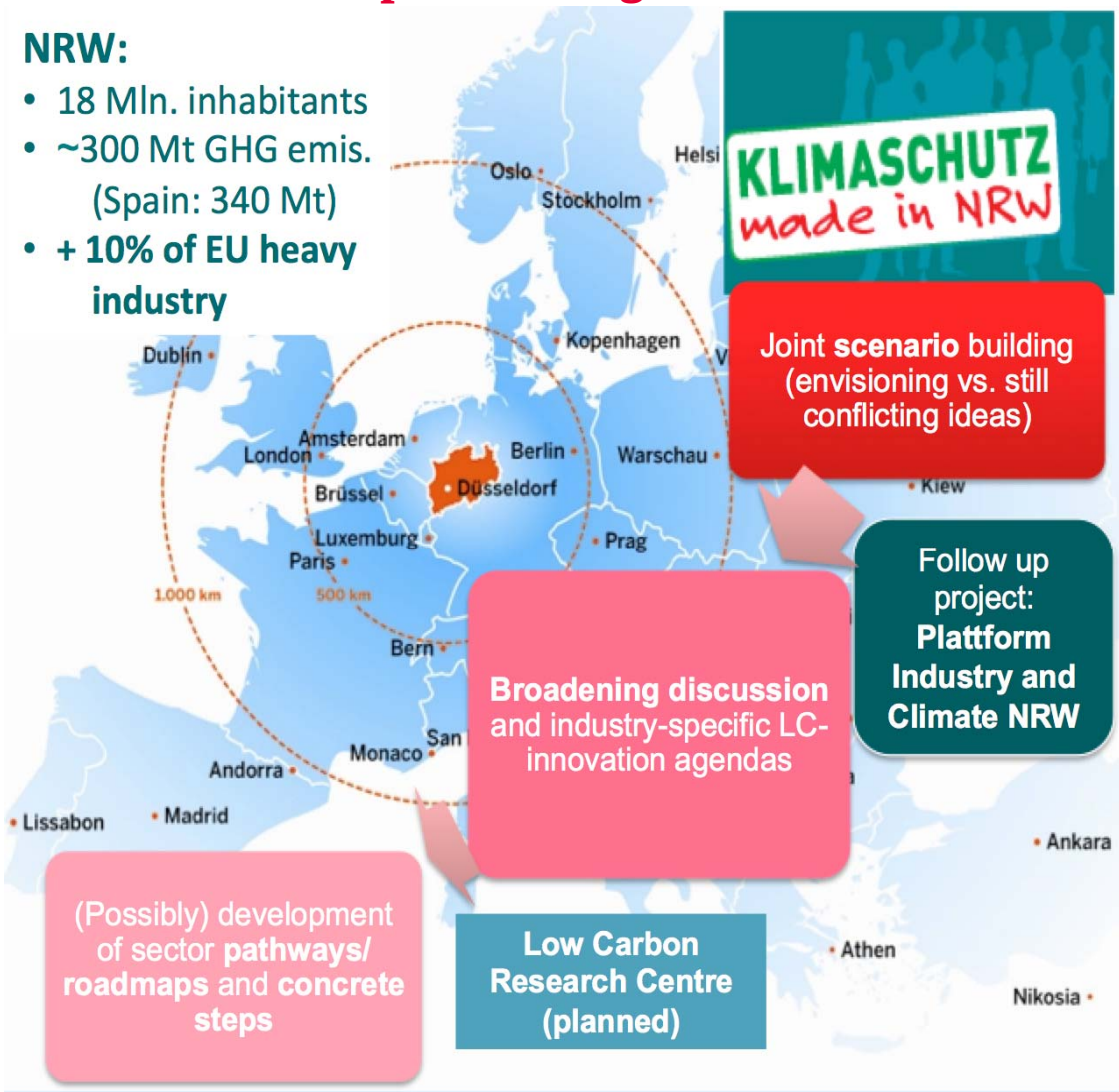
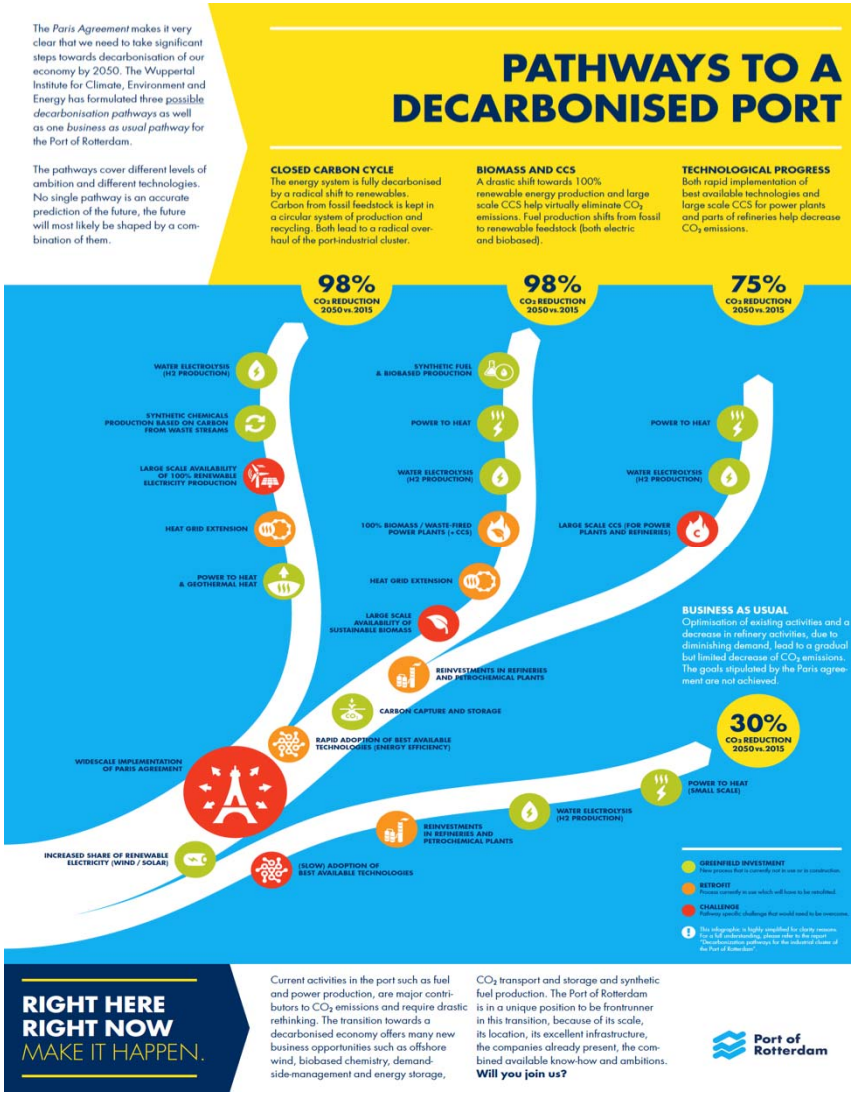
NRW (2012/2013): Broad actor engagement for climate protection with focus on processing industries



Port of Rotterdam (2017): Ambition to become European Front Runner Region



Some of the roughly 400 stakeholders involved...

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Lessons learned from the participatory process

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Positive

- Highly productive discussion culture achieved in working groups
- Stakeholders gained awareness for different perspectives
- Confidence built between stakeholders and ministries
- Policymakers learnt about the different positions of stakeholders
- Probably higher chances for successful implementation of mitigation measures
- Starting point for further dialogue with stakeholders

Negative

- Process is time-consuming and requires plenty of resources and expertise
- Stakeholders generally opposed to climate protection may be uncooperative

Lessons learned from the participatory process (II)

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Preconditions for a successful participatory process

- Government needs to provide a clear framework for the process
- Enough time is needed for thorough discussions
- Scientific expertise important before, during and after the process

Petrochemical cluster NRW/Flanders/NL

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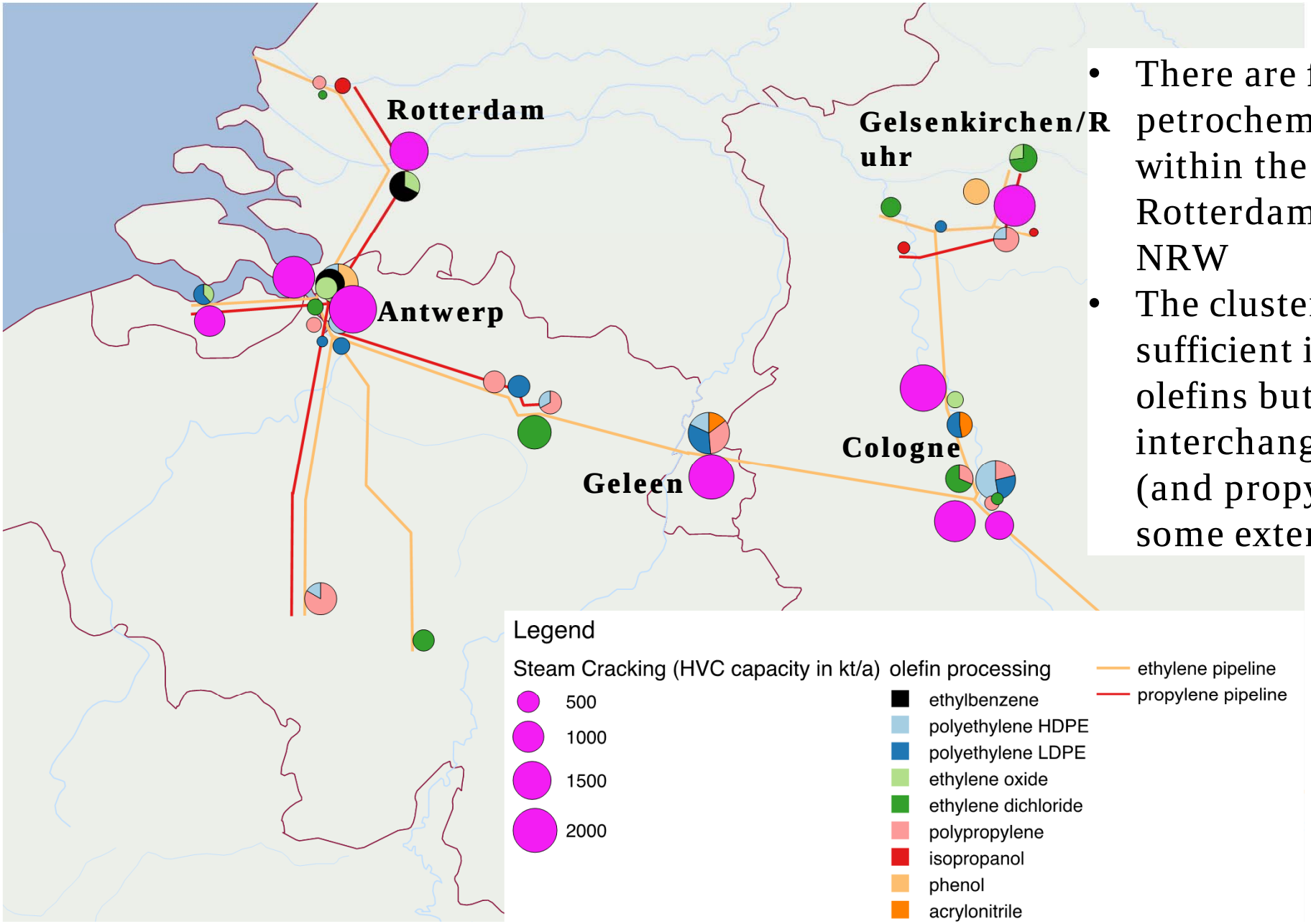
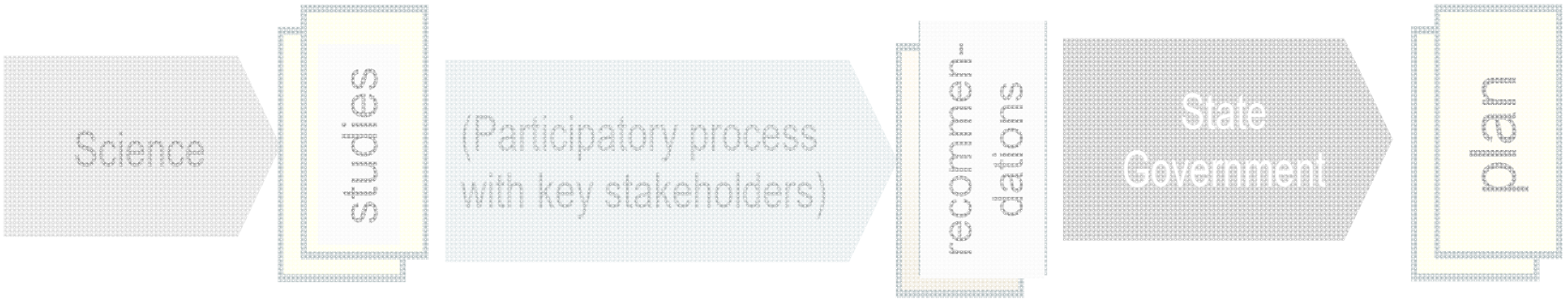
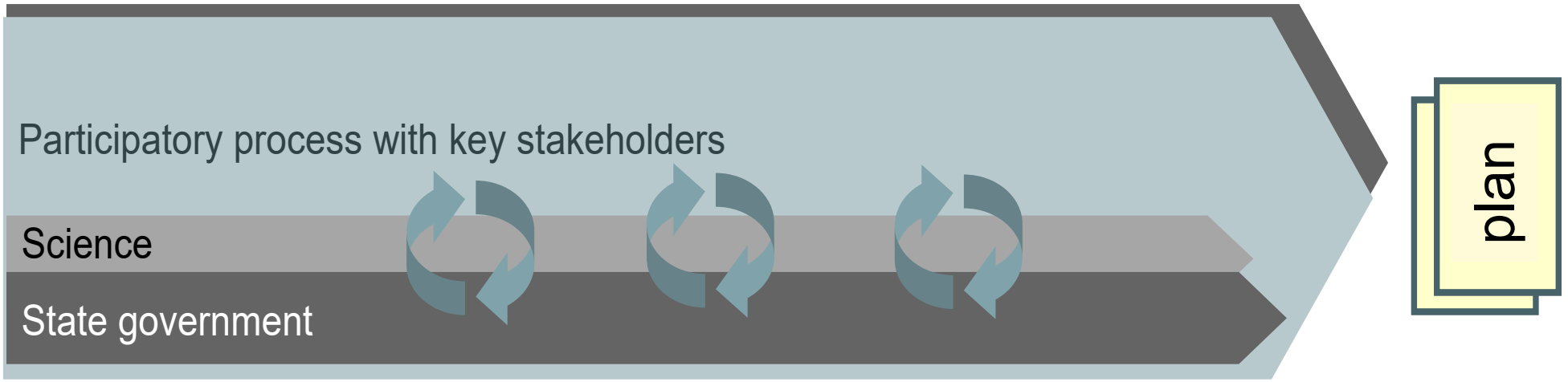


- There are five petrochemical clusters within the region of Rotterdam/Flanders/NRW
- The clusters are self-sufficient in regard to olefins but can interchange ethylene (and propylene to some extent)

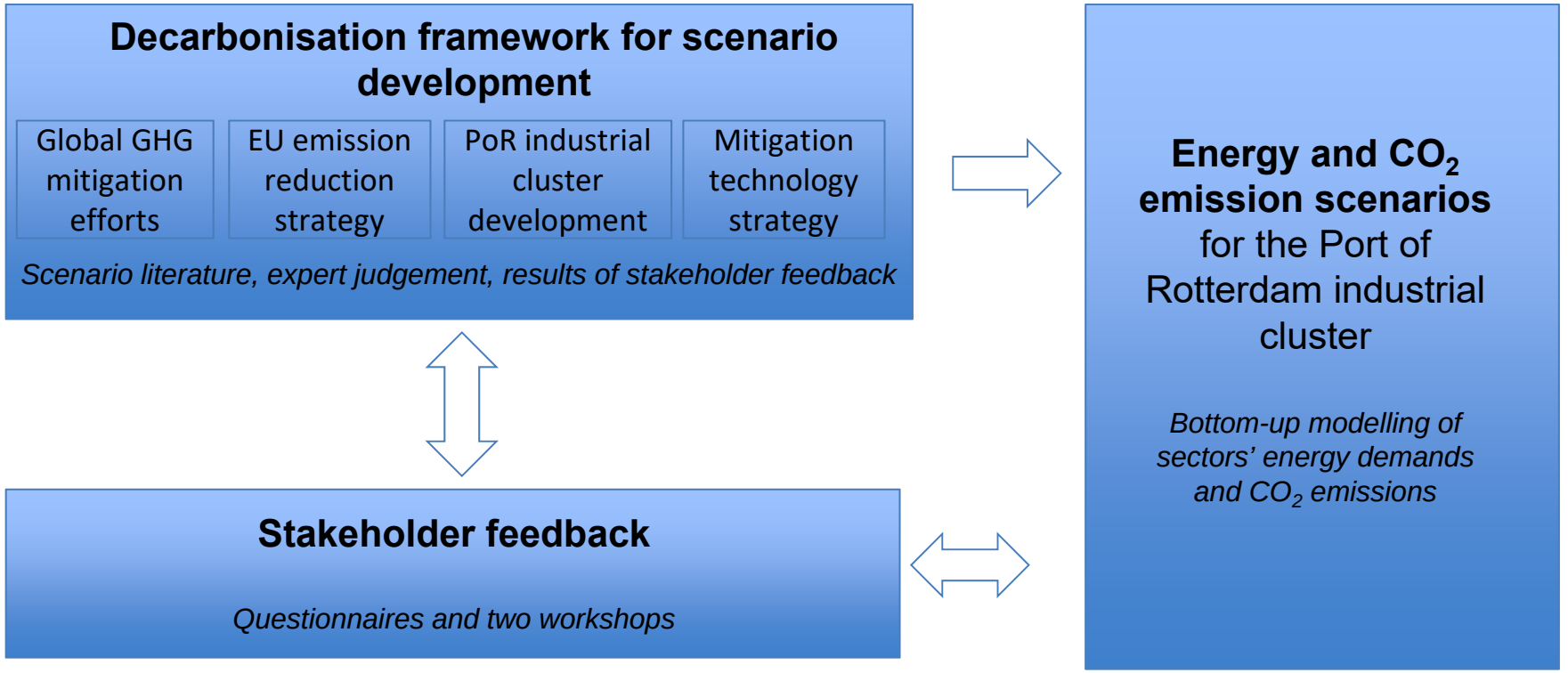
Idea of co-creation of long-term climate policy



Aim: Explore an open, iterative process that empowers stakeholders, science & policy to co-create a new position



Steps taken in developing the scenarios for the port's industrial cluster



The challenge of decarbonisation for the Port of Rotterdam industrial cluster

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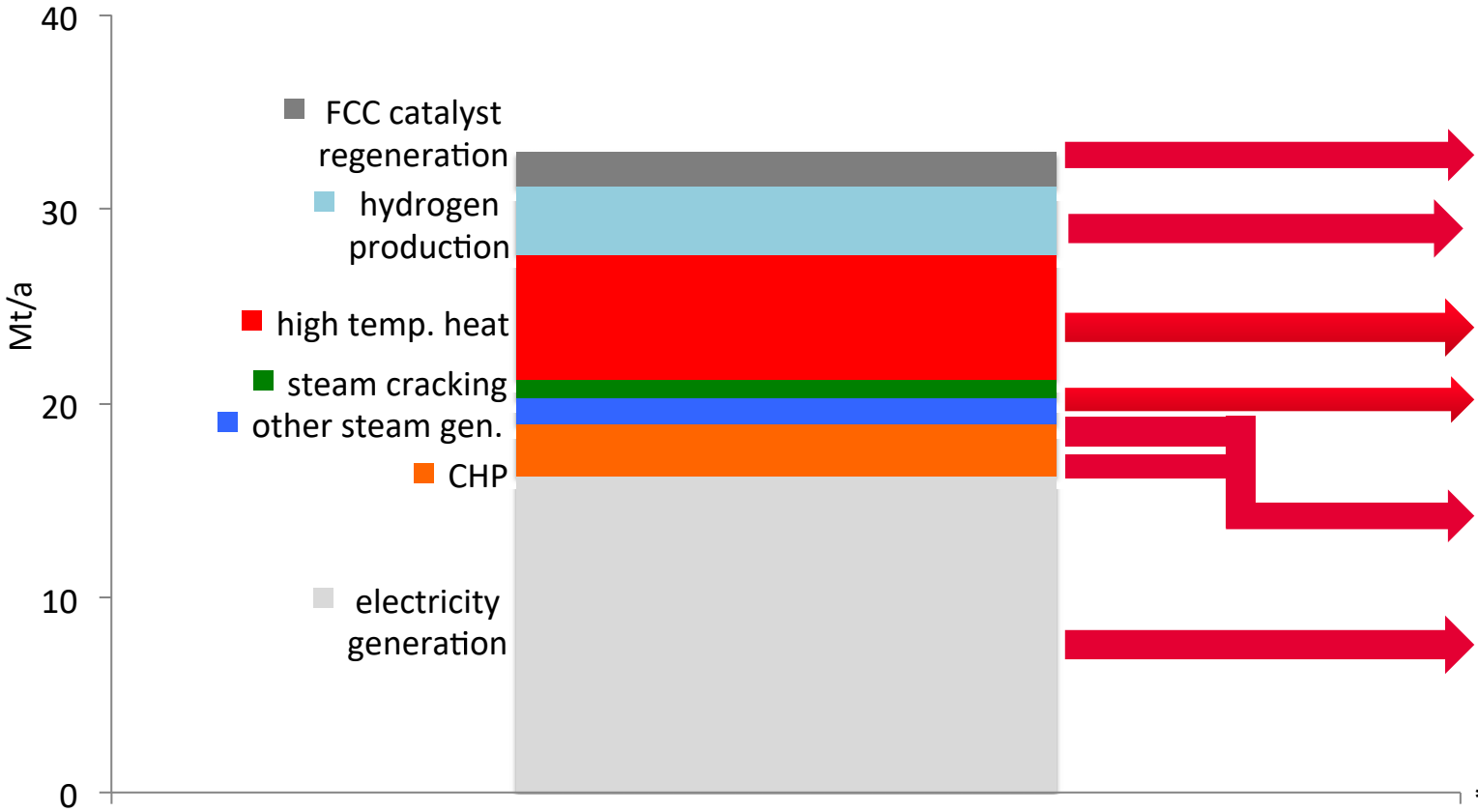
Today's CO_2 emissions* of the port's industrial cluster



Main mitigation options
CCS
electrolysis, CCS/CCU
electric ovens, synfuel fired ovens
CCS or electric ovens
electric boilers, geothermal heat
renewable electricity (partly from outside the port area), CCS

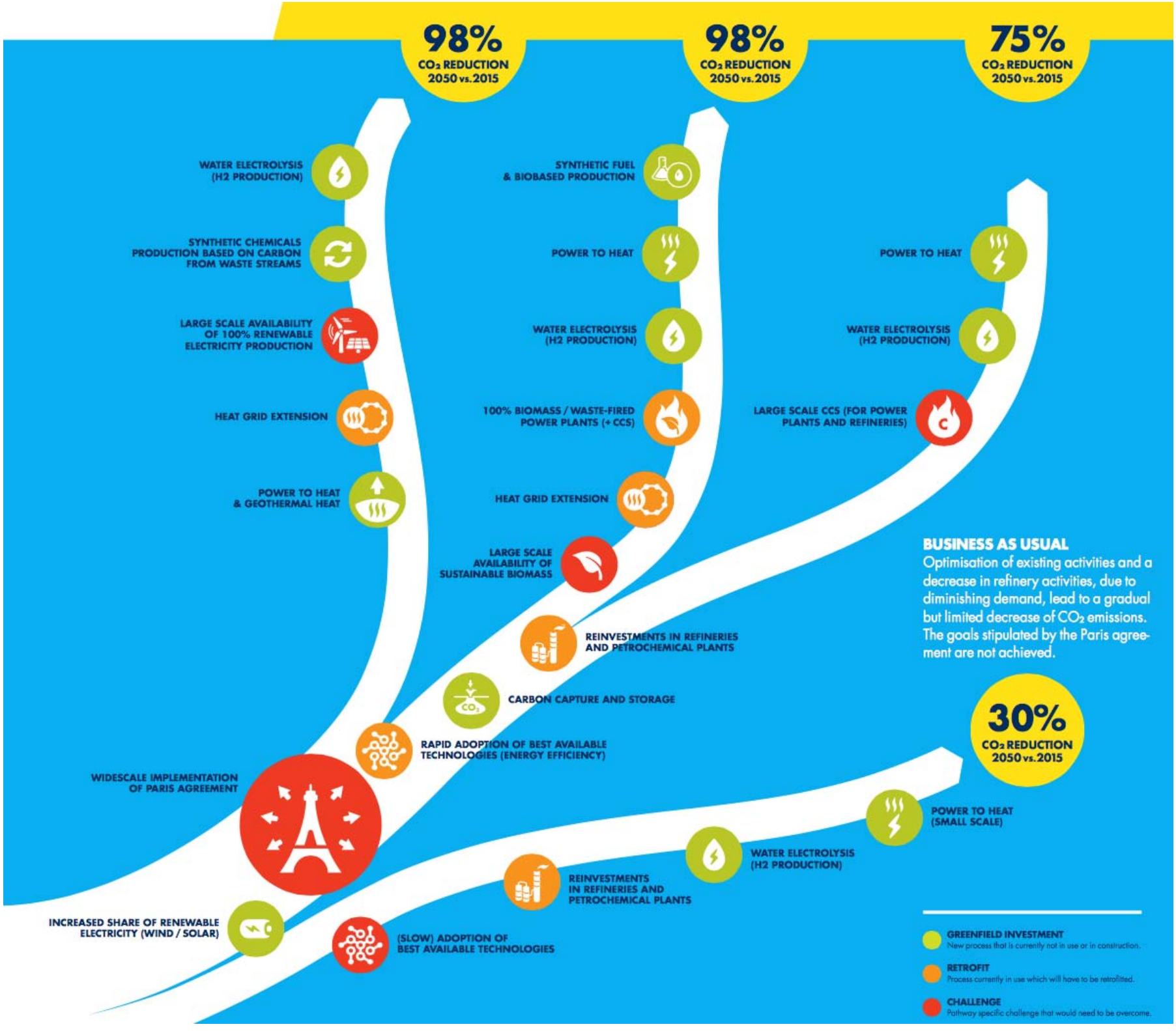
* modelled values, 2016

Source: WI (2016)

Additional key strategy in all areas:

- energy efficiency

Pathways and opportunities for the Port of Rotterdam industrial cluster



Comparison of cumulative CO_2 emissions of the port's industrial cluster in the four scenarios

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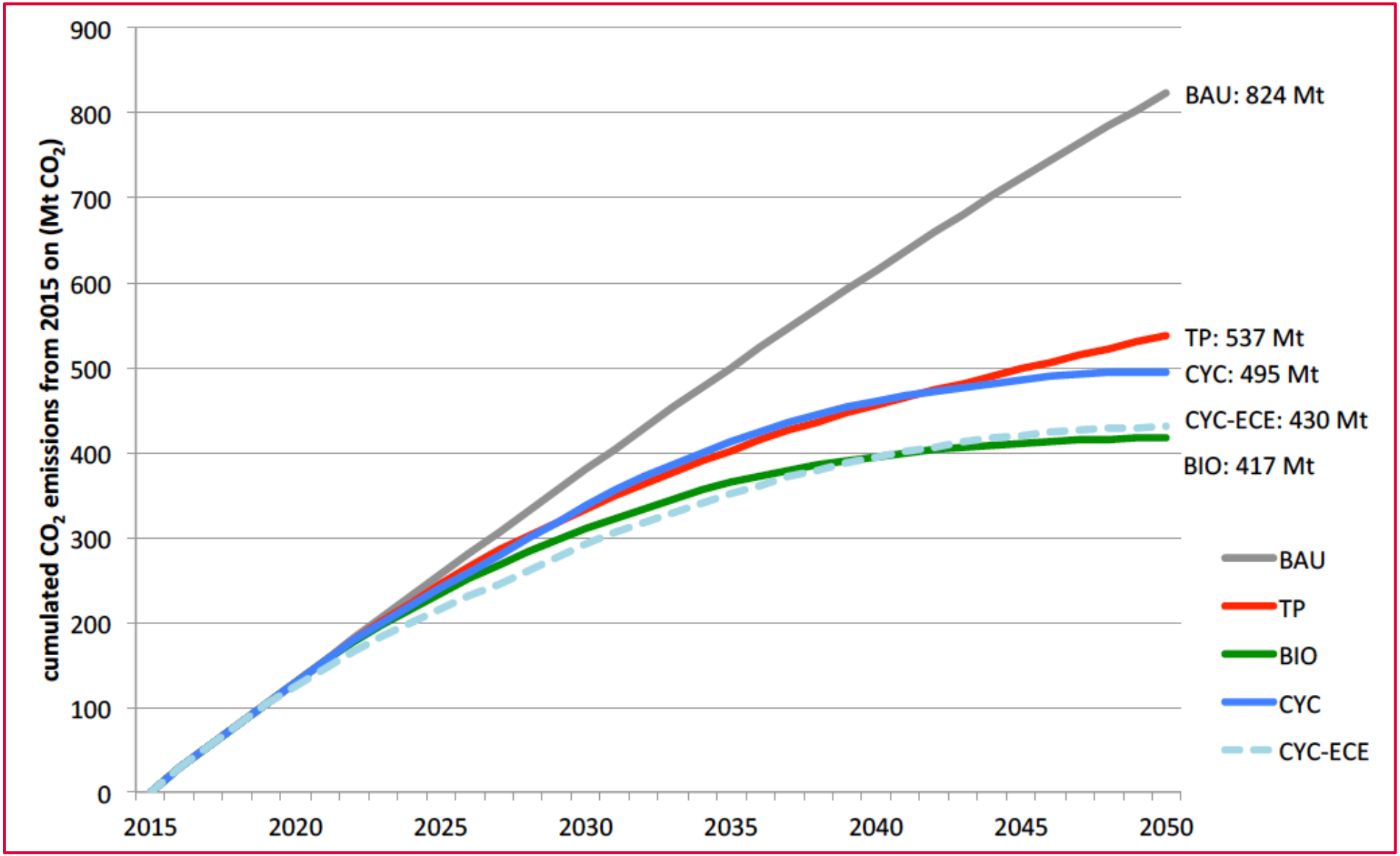
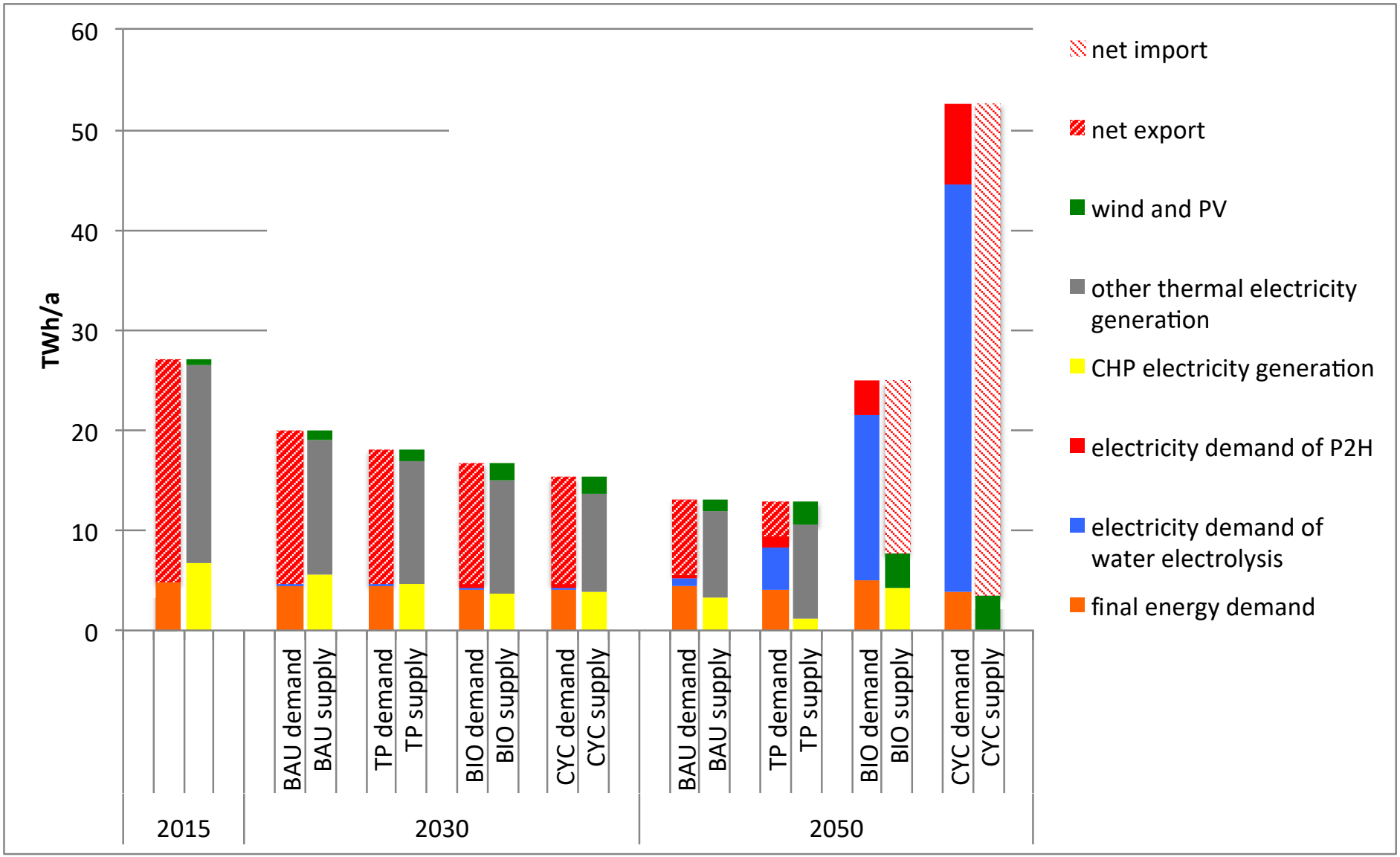


What does deep electrification mean for the port's electricity balance?



Where could net electricity imports come from?

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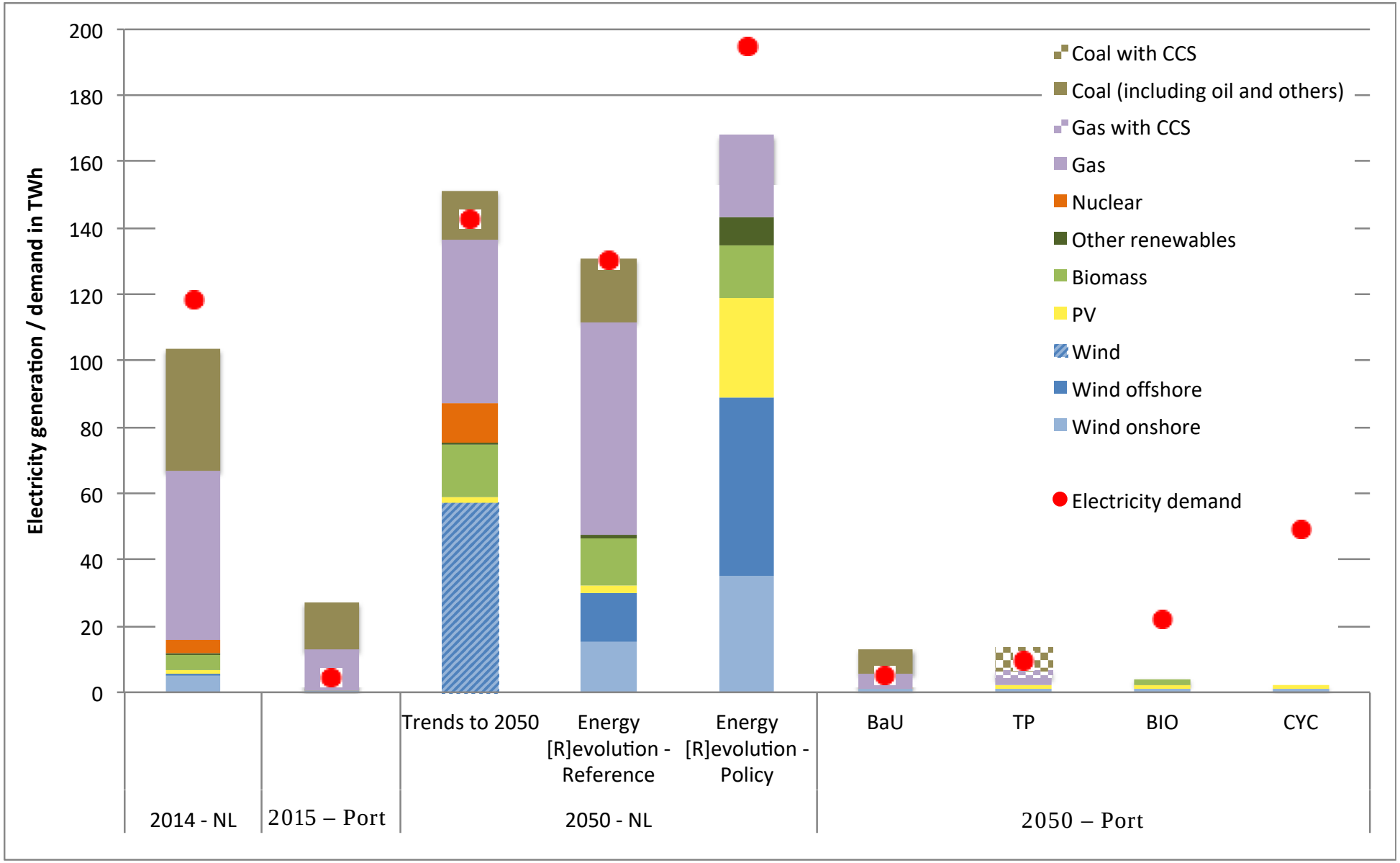
Electricity generation in the Netherlands and the port area in different scenarios



Identified potential for new economic activity at the port in a decarbonising world

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