

# Splitting the EU ETS: strengthening the scheme by differentiating its sectoral carbon prices

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- Main objectives of the study;
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# Background & main objectives

# Background

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- Current EU ETS dilemma:
  - Need for high(er) carbon prices to stimulate investments in low-carbon technologies, notably in the power sector, to reach (ambitious) long-term GHG objectives;
  - Need for low carbon prices to reduce the risk of carbon leakage due to loss of industrial competitiveness.
- Fundamental theoretical/policy issue:
  - Ideal (textbook ) ETS: closed system, with one single carbon price, resulting in the most efficient outcome;
  - Practice: open system with unequal/differentiated carbon prices, resulting in carbon leakage due to loss of industrial competitiveness and, hence, in a less efficient outcome:

# Possible solution & policy options

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- Possible solution:
  - Differentiate ETS sectoral carbon prices, i.e. a high carbon price for the power ('sheltered') sector and a low carbon price for the ETS industrial ('exposed/vulnerable') sectors;
  
- Policy options:
  1. *Splitting the ETS* into two separate regimes, each with its own abatement ambition ('cap') and carbon price, i.e. a more ambitious regime ('tight cap') for the power sector, and a less ambitious regime ('soft cap') for industry;
  2. Single ETS (with a single, relatively low ETS carbon price for both industry and the power sector) + additional carbon taxes on power sector emissions.

# Objectives

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1. To analyse the major effects and implications of differentiating ETS sectoral carbon prices between the power sector and industry;
2. To evaluate the two alternative policy options to achieve such a differentiation, i.e. through either (i) ETS splitting, or (ii) additional carbon tax on the power sector.

# Project organisation

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- **Principal:**
  - Dutch government (Ministry of Economic Affairs);
  - Steering committee (on behalf of the principal);
  - Advisory committee (including stakeholders).
- **Project team (partners/members):**
  - Energy CN: Jos Sijm (PL), Wouter Wetzels and Paul Koutstaal;
  - Cambridge Econometrics (CE): Hector Pollitt and Unnada Chewpreecha.

# Approach



# Overall approach

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1. Modelling: designing some modelling scenarios and assessing these scenarios by the '*Energy-Environmental-Economy Model for Europe*' (E3ME);
2. Case study on the Netherlands;
3. Qualitative assessment of the two alternative policy options.

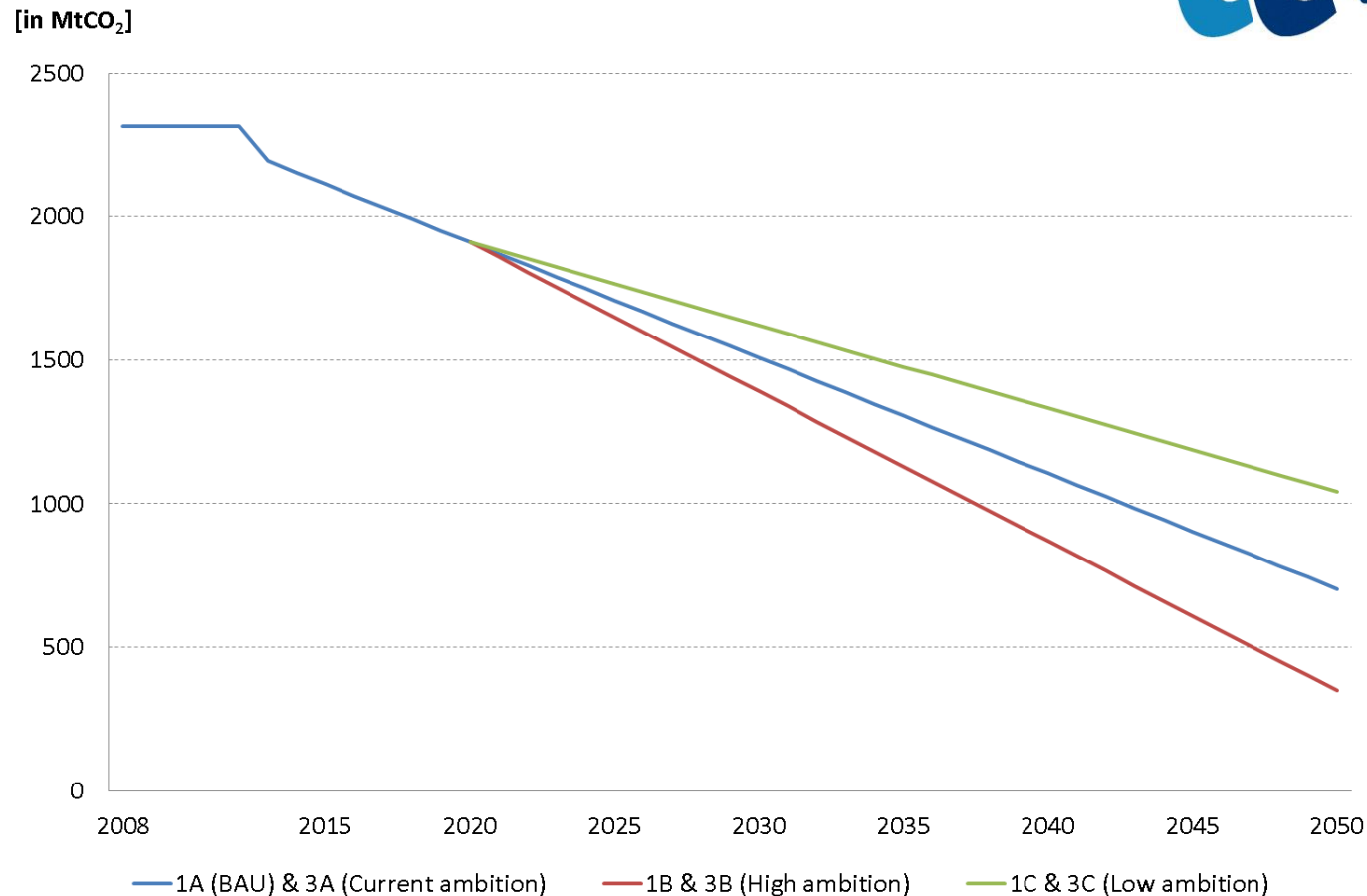
# Modelling approach

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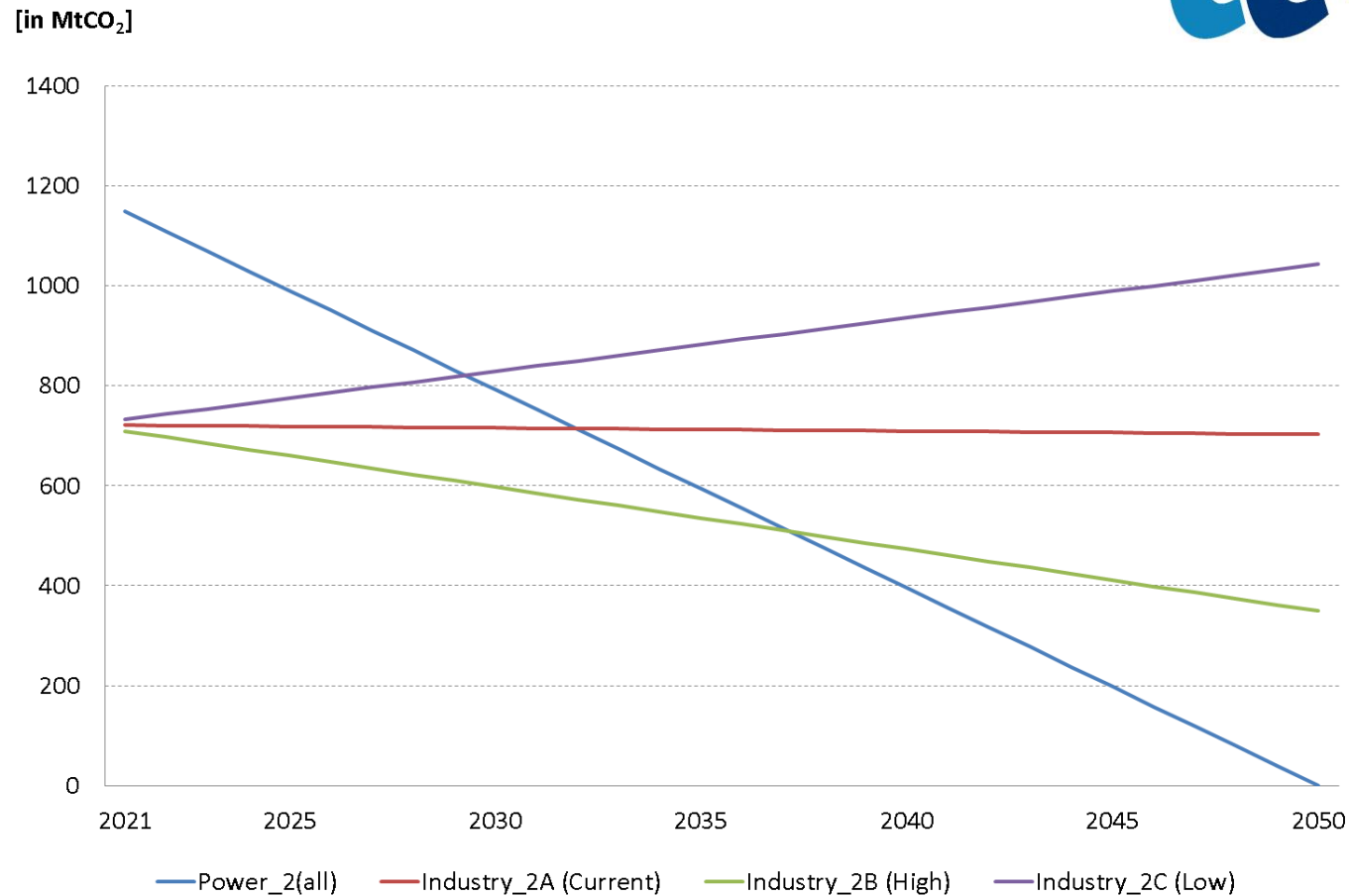
- Three policy options:
  1. Current, non-splitting option;
  2. ETS splitting;
  3. Alternative, non-splitting option + carbon tax.
- Three ETS ambition levels:
  - A. Current ambition, i.e. ETS cap declines by 1.74% per annum (2013-2050);
  - B. High ambition, i.e. cap declines by 2.25% p.a. (2021-2050);
  - C. Low ambition, i.e. cap declines by 1.25% p.a. (2021-2050).
- Sectoral ambition levels (in case of splitting/carbon taxation):
  - Power sector: full decarbonisation by 2050;
  - Industry: remaining part to meet overall ETS ambition.
- Total modelling scenarios:
  - In theory: 9 scenarios (1A, 2A,....., 2C and 3C);
  - In practice: 6 scenarios (as in economic/modelling terms 2A/2B/2C = 3A/3B/3C).

# Modelling results

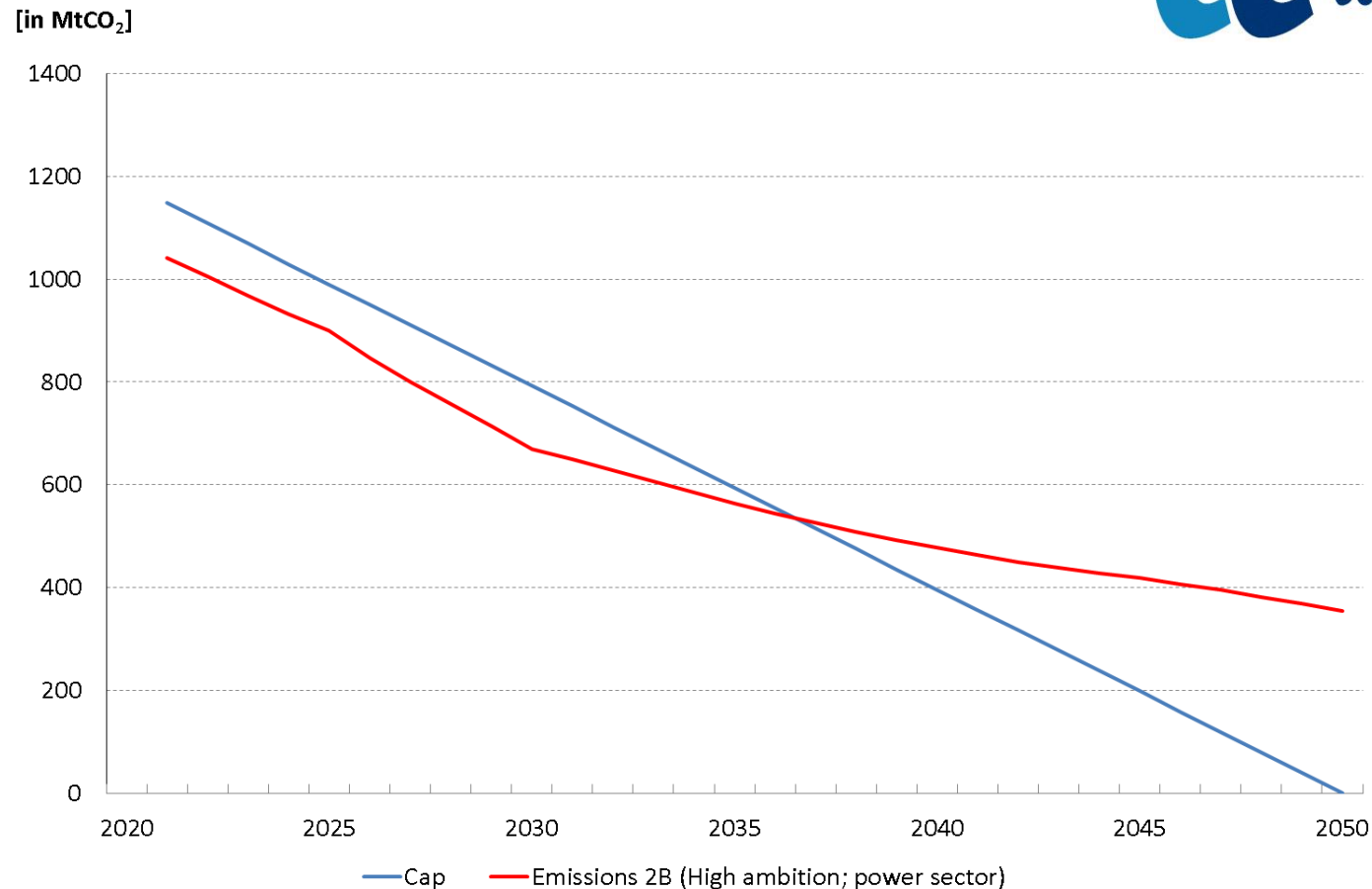
# Non-splitting scenarios: ETS cap (including CDM), 2008-2050



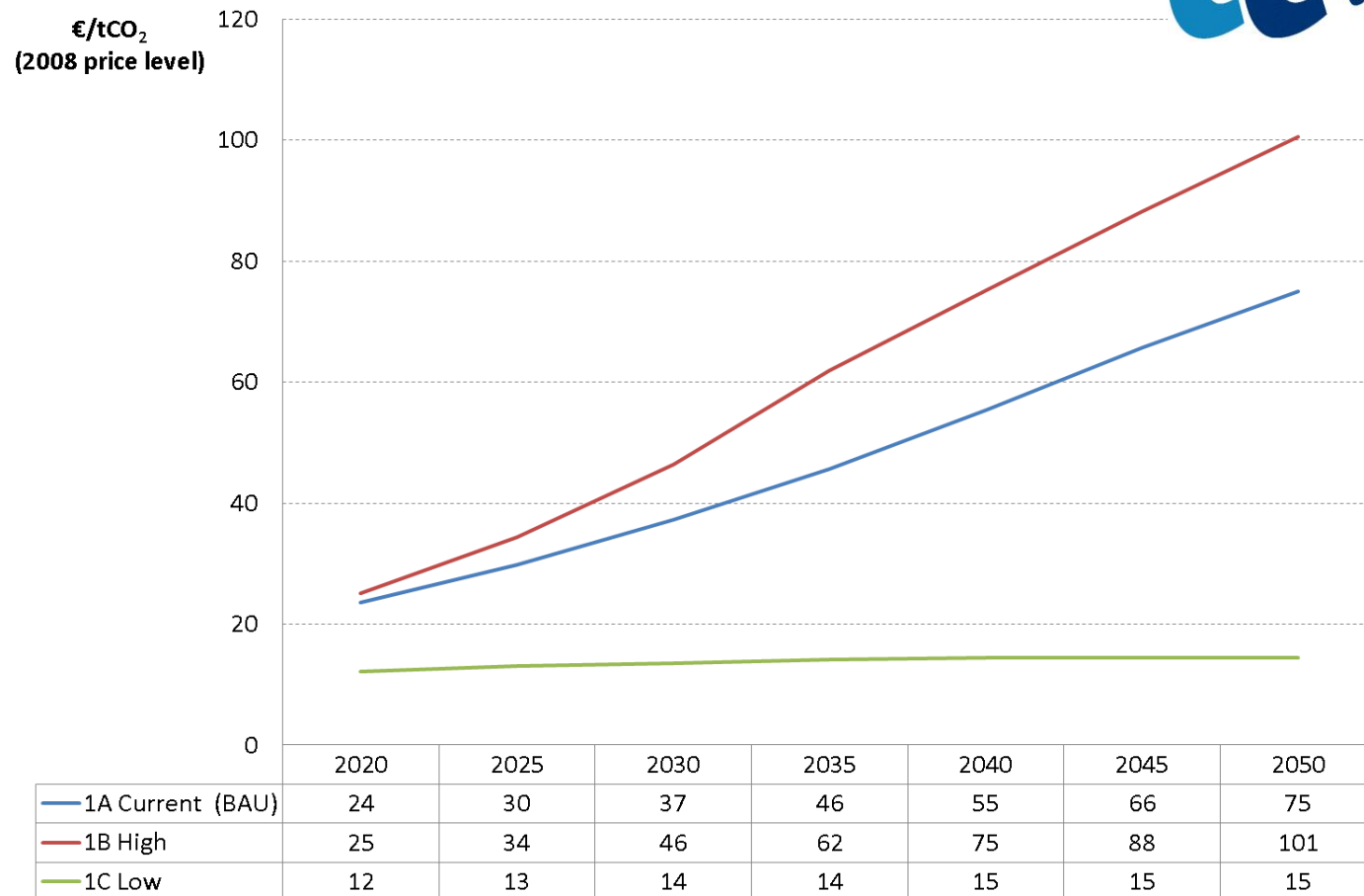
# Splitting scenarios: ETS cap (+CDM), industry and power sector, 2021-2050



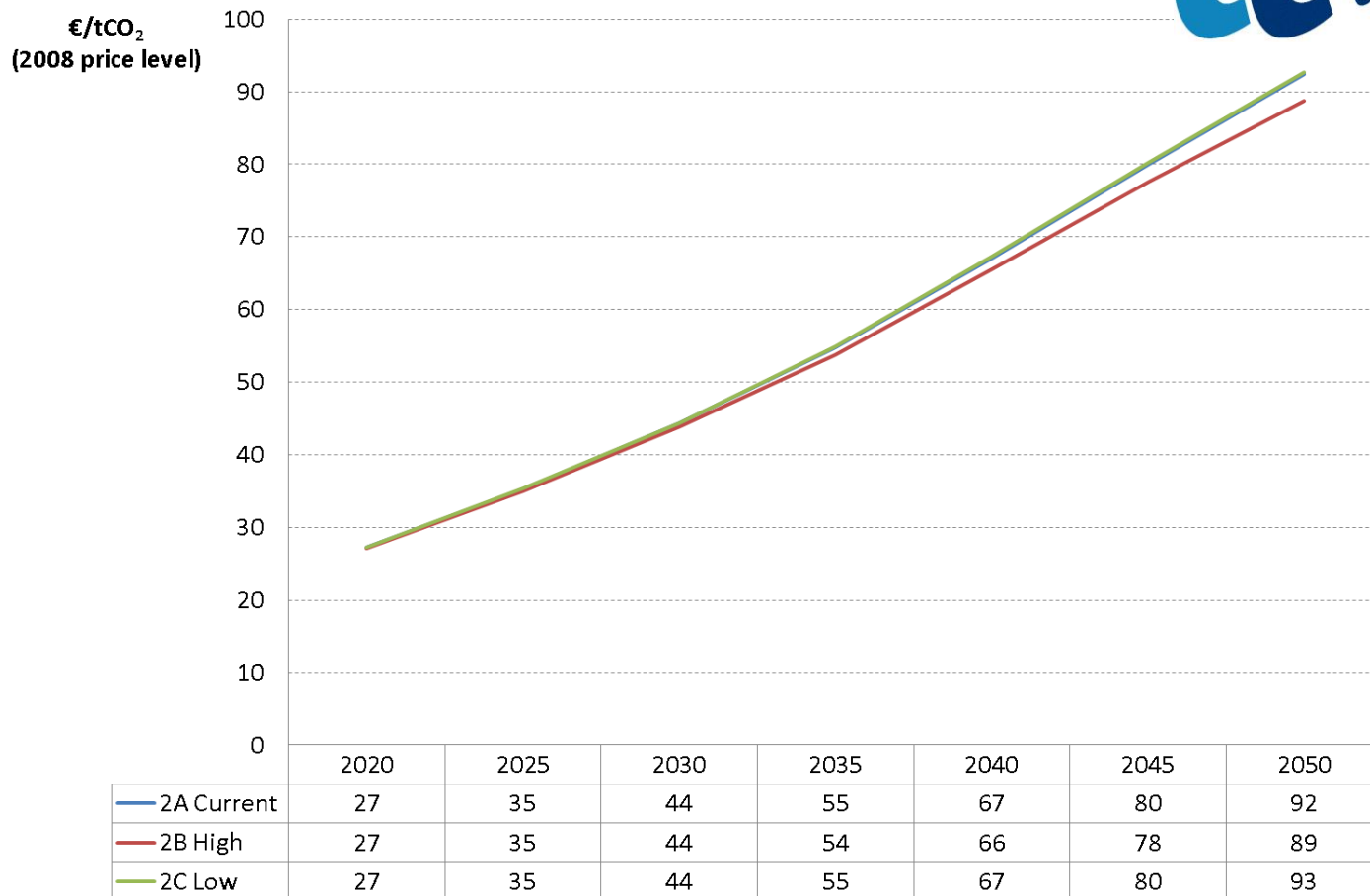
# Impact of banking: ETS cap versus CO<sub>2</sub> emissions in the power sector



# ETS carbon price: Option 1 (non-splitting scenarios), 2020-2050

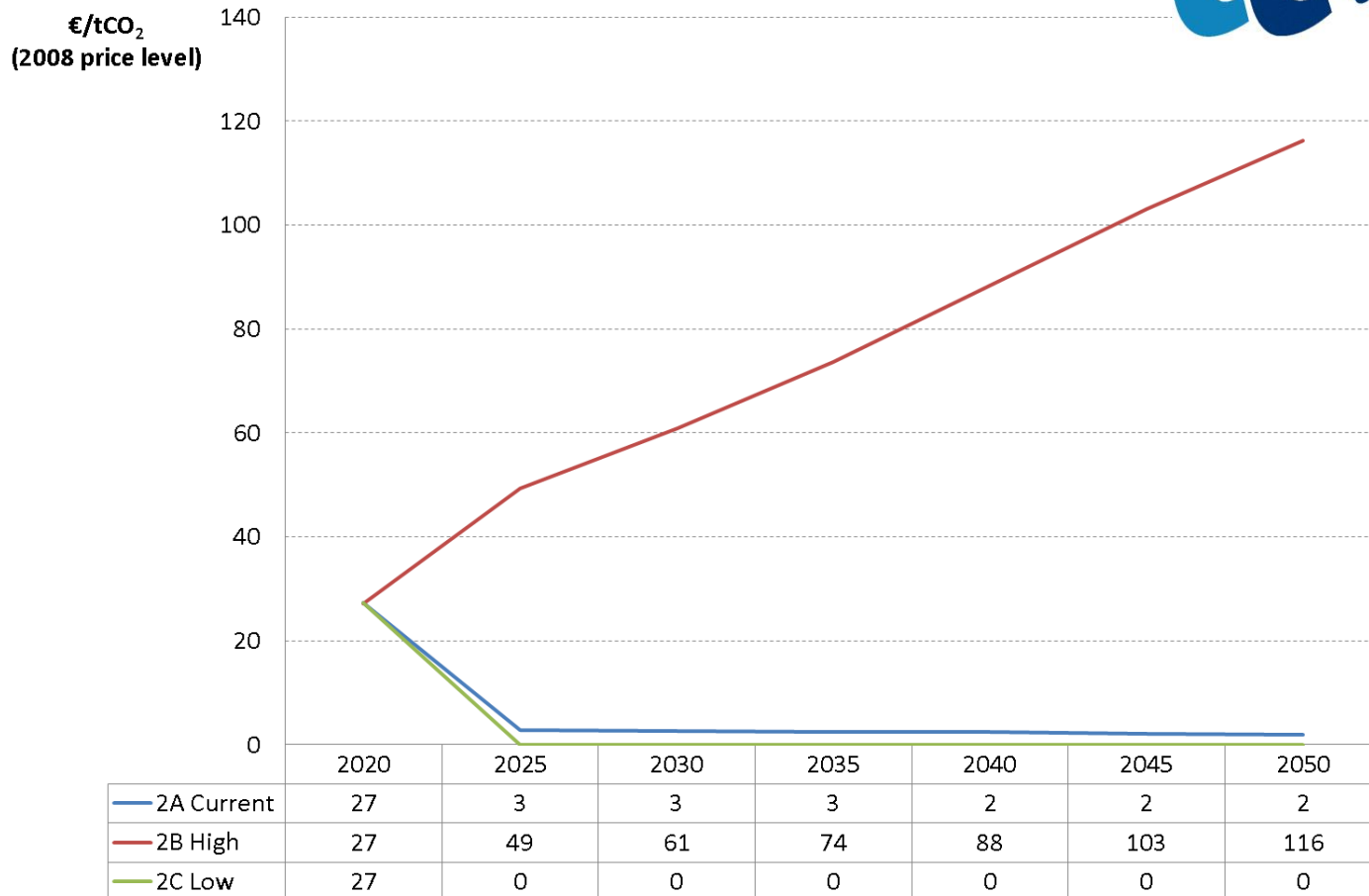


# ETS carbon price: Option 2 (splitting scenarios): power sector, 2020-2050

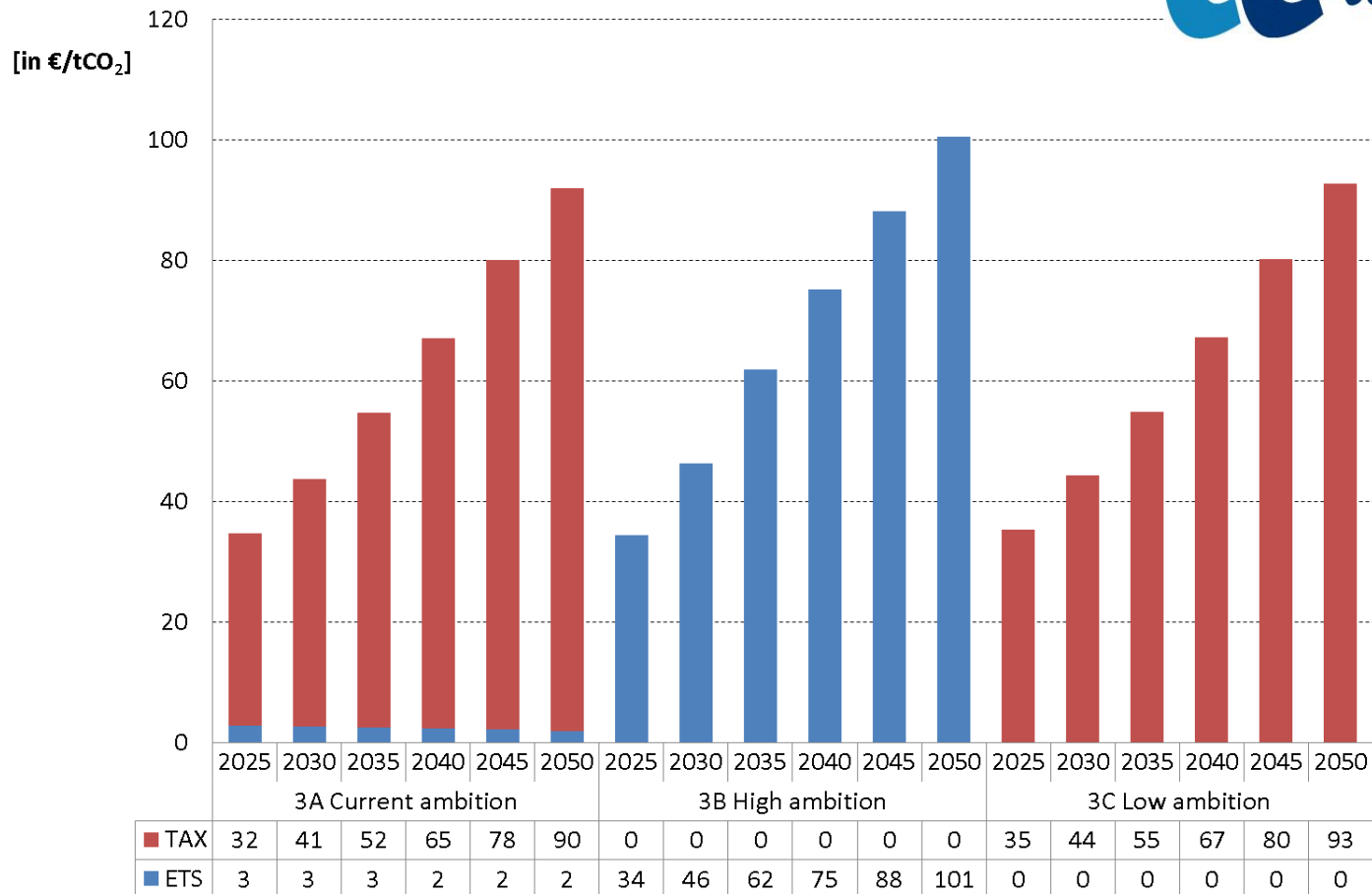




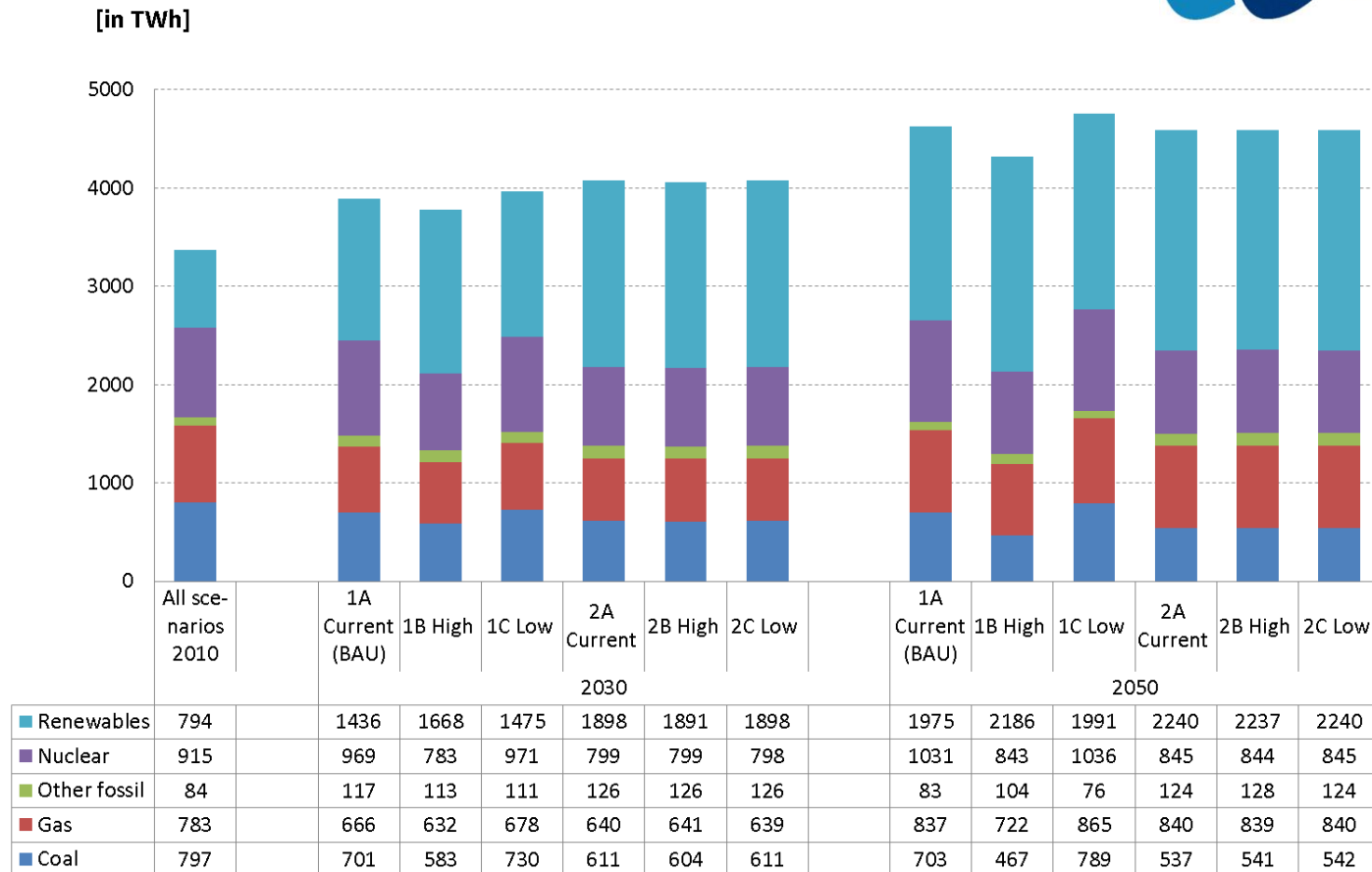
# ETS carbon price: Option 2 (splitting scenarios): industry, 2020-2050



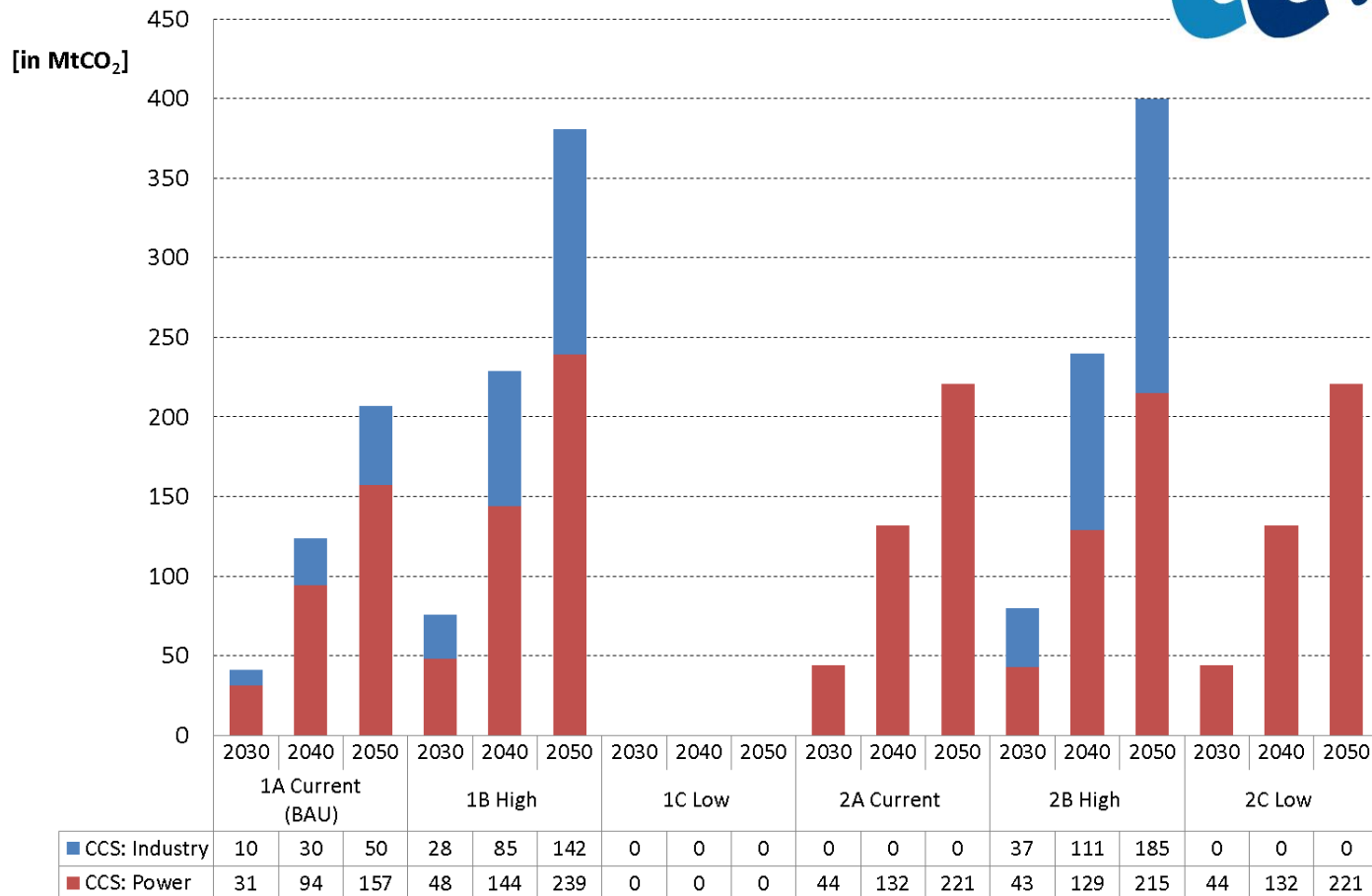
# Policy option 3 scenarios: Total carbon pricing in the power sector



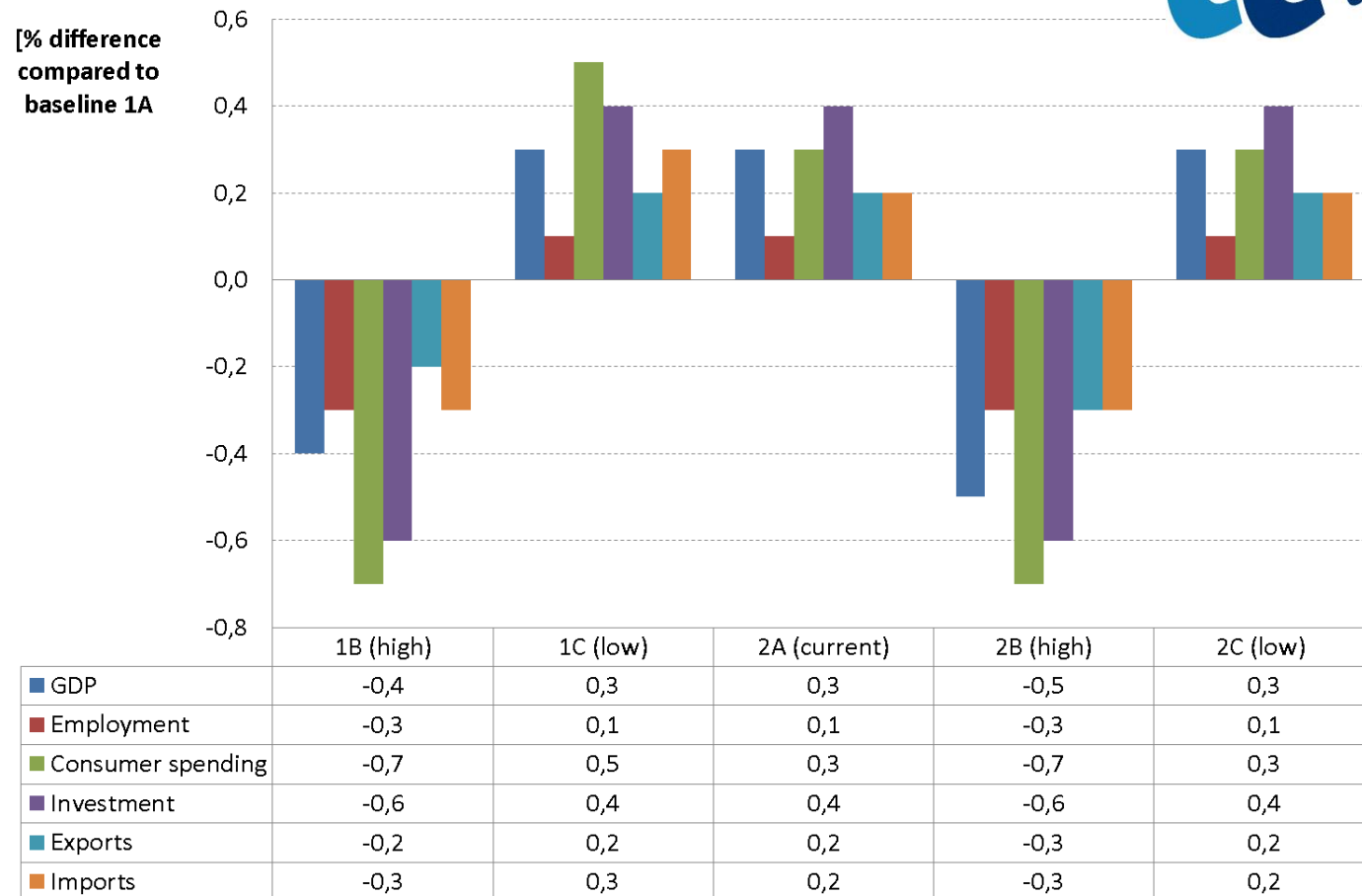
# EU27: Total power generation by source in 2010, 2030 and 2050



# CCS in industry and the power sector, 2030-2050



# EU27: changes in macroeconomic outcomes by 2050, in % difference from the baseline scenario 1A



# Main differences in modelling results between ETS splitting and non-splitting: current ambition

Pros	Cons
<ul style="list-style-type: none"><li>• Abatement costs: lower in industry (2050: € 5.4 billion);</li><li>• CCS: higher in power sector (2050: +64 MtCO<sub>2</sub>) and total ETS (2050: +14 MtCO<sub>2</sub>);</li><li>• RES-E: higher in power sector (2050: +6 percentage points);</li><li>• Output: higher in industry (2050: +0.5%);</li><li>• GDP: higher in EU27 (2050: +0.3%).</li></ul>	<ul style="list-style-type: none"><li>• Abatement costs: higher in power sector (2050: € 11.8 billion) and total ETS (€ 6.4 billion);</li><li>• CCS: lower in industry (2050: -50 MtCO<sub>2</sub>).</li></ul>

# Main differences in modelling results between ETS splitting and non-splitting: high ambition

Pros	Cons
<ul style="list-style-type: none"><li>• Abatement costs: lower in power sector (2050: € 7.8 billion);</li><li>• CCS: higher in industry (2050: +43 MtCO<sub>2</sub>) and total ETS (2050: +20 MtCO<sub>2</sub>)</li></ul>	<ul style="list-style-type: none"><li>• Abatement costs: higher in industry (2050: € 8.9 billion) and total ETS (€ 1.1 billion);</li><li>• CCS: lower in power sector (2050: -24 MtCO<sub>2</sub>);</li><li>• RES-E: lower in power sector (2050: -2 percentage points).</li><li>• GDP: lower in EU27 (2050 -0.1%)</li></ul>

# Main differences in modelling results between ETS splitting and non-splitting: low ambition

Pros	Cons
<ul style="list-style-type: none"><li>• Abatement costs: lower in industry (2050: € 0.5 billion);</li><li>• CCS: higher in power sector (2050: +221 MtCO<sub>2</sub>) and total ETS (2050: +221 MtCO<sub>2</sub>);</li><li>• RES-E: higher in power sector (2050: +7 percentage points);</li><li>• ETS emissions: lower in total ETS (2050: -134 MtCO<sub>2</sub>).</li></ul>	<ul style="list-style-type: none"><li>• Abatement costs: higher in power sector (2050: € 16.3 billion) and total ETS (€ 15.8 billion);</li><li>• Output: lower in industry (2050: - 0.1%);</li><li>• Electricity prices: higher (2050: +6 €/MWh).</li></ul>



# Conclusions on ETS splitting: 1-3 (based on modelling results)

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- In a world with unequal or differentiated carbon prices, there is a case for differentiation ETS sectoral carbon prices at each ETS ambition level;
- At each ETS ambition level, however, there is a trade-off between pros and cons of ETS splitting versus non-splitting;
- The case for ETS price differentiation is strongest at the current ETS ambition level;

# Conclusions on ETS splitting: 4-5 (based on modelling results)

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- There is also a case for ETS splitting at higher ambition levels, but there is a higher risk that carbon prices for industry become higher (rather than lower) due to splitting. This risk can be avoided by allowing ‘one-way EUA trading’ by industry;
- There is also a case for ETS splitting at lower ambition levels, but there is a higher risk that indirect carbon costs for electricity-intensive industries increase. This risk can be reduced/avoided by compensating ETS-induced increases in power prices.

# Qualitative assessment of policy options

# Qualitative assessment: ETS splitting compared to non-splitting (policy option 2 versus option 1)

Pros	Cons
<ul style="list-style-type: none"><li>• Lower risks of carbon leakage and loss of industrial competitiveness;</li><li>• Stronger incentives for low-carbon investments in power sector;</li><li>• May enhance credibility of the scheme.</li></ul>	<ul style="list-style-type: none"><li>• Requires change of ETS Directive;</li><li>• Higher administrative demands;</li><li>• Lower policy consistency/reliability;</li><li>• Lower EUA market liquidity.</li></ul>

# Qualitative assessment: carbon tax compared to ETS splitting (policy option 3 versus option 2)

Pros	Cons
<ul style="list-style-type: none"><li>• No change of ETS/Directive;</li><li>• Higher EUA market liquidity;</li><li>• Combines environmental effectiveness and investment (price) security;</li><li>• Carbon price for power sector is always higher than for industry;</li><li>• Can be implemented by individual Member States or group of like-minded countries;</li><li>• More flexibility (to adjust carbon tax/sectoral carbon pricing).</li></ul>	<ul style="list-style-type: none"><li>• EU-wide resistance against 'carbon tax';</li><li>• EU-wide carbon tax requires unanimity among all Member States;</li><li>• "Right tax level" may be hard to determine;</li><li>• No guarantee that a specific abatement target will be reached by the power sector, e.g. full decarbonisation by 2050.</li></ul>

# Conclusions on ETS splitting: 6-8 (based on qualitative assessment)

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- Both policy options (ETS splitting versus additional carbon tax on power sector emissions) have similar outcomes in economic/modelling terms;
- In qualitative terms (policy implementation; social acceptance, etc.) each policy option/instrument has its specific pros and cons;
- There is always a trade-off between these pros and cons (i.e. no ideal policy option/instrument);

# Conclusions on ETS splitting: 1-3 (based on qualitative assessment)

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- However, on balance:
  - First-best option: EU-wide carbon tax;
    - However, such a tax requires unanimity by all Member States (lo of opposition);
  - Second-best option: ETS splitting;
  - Third-best option: carbon taks on power sector by individual countries(UK) or group of like-minded countries;



Thanks for your attention!