

Can energy also in the future support the global competitiveness of Nordic industry?

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Industrial development and export opportunities

- for Nordic industry

- **Climate policy impacts in the Nordic countries**
 - Regime makes clear difference to energy-intensive industry
 - Global climate policies more favourable for Nordic industry
 - than national or regional European policies
- **World economies grow, emissions grow and leak**
 - Wide participation in climate policy regime needed to minimise costs and carbon leakage
- **Economy-wide impacts in the Nordic countries:**
 - Macroeconomic differences from policies small but characteristic

Global scenarios

- **Reference**

- Current EU CO₂ commitments (ETS I and II)

- **Global policy**

- EU CO₂ reduction target 30% by 2020
- Other developed countries with comparable reductions

- **2 °C policy**

- Global emissions reduction path assuming 2 °C climate target from Nordic TIMES simulation
- Global participation and emissions trade

- **GTAP simulations**

- Common macro drivers with TIMES simulations
- Renewable targets not implemented
- CO₂ emissions permit price path solved by the model, given the annual reduction targets

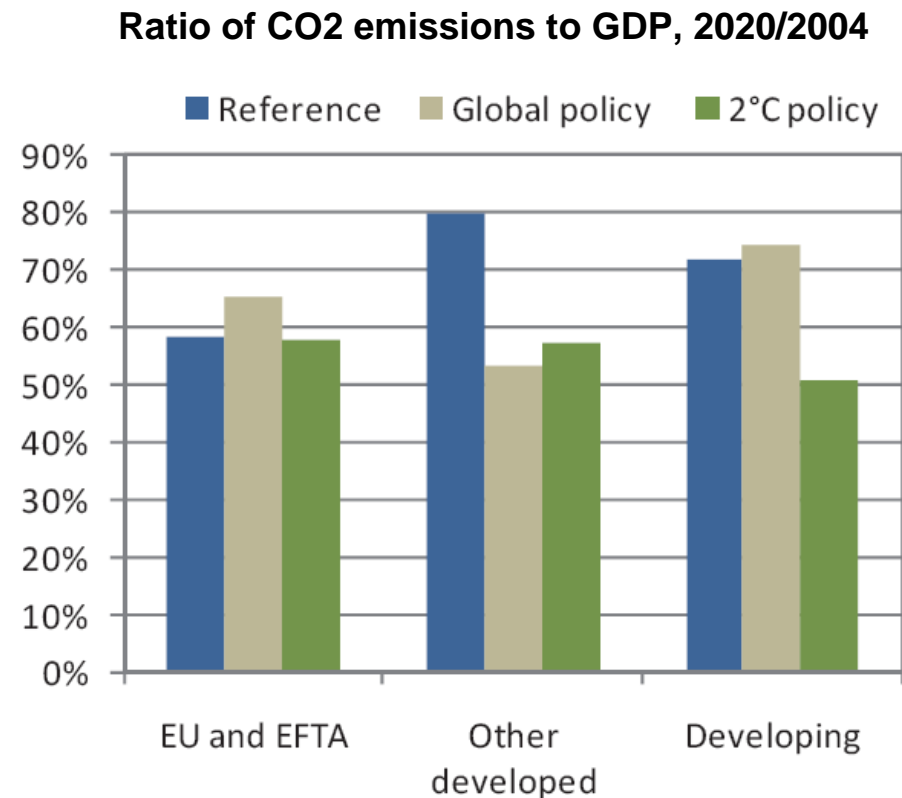
Global trends (all scenarios):

Growing population and economies

- World population reaches 9.2 billion in 2050
 - Annual growth rates between -0.2% and 2.8%
 - Share of working age population starts to decrease globally from 2020
- World combined GDP triples between 2010 and 2050
 - Annual GDP growth rates 2.7% - 9.5 % for next 10 years
- Food and energy become more critical
 - Prices for scarce resources increase fast...
 - ... even if their share of total consumption declines

Growth comes with increased emissions

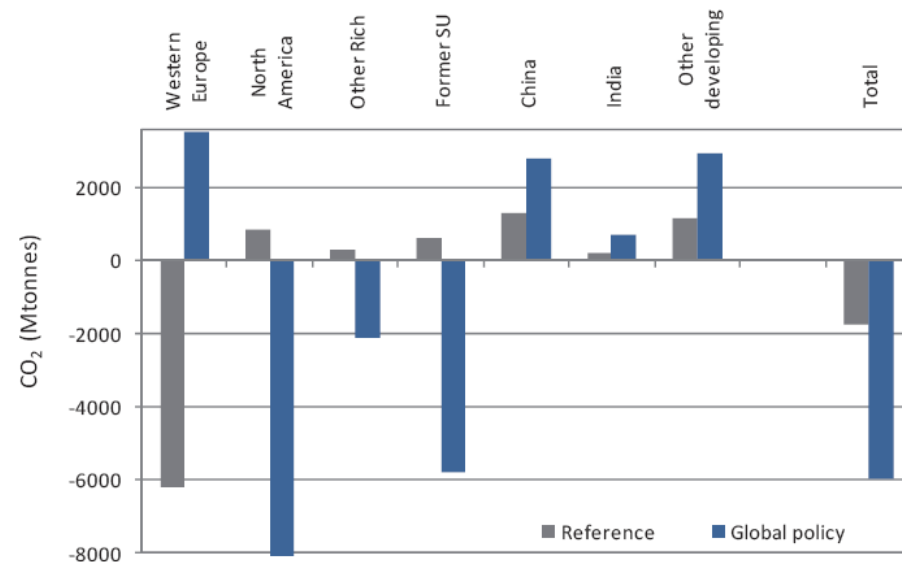
- Without commitment to any climate policies emission intensity remains high
 - ⇒ Ratio of 2020 emissions to GDP still up to 80% compared to the present level.
- Globally, 2 °C climate policy has marginal impact on economic growth (max 0.1% annually)



Wide participation in climate policy regime needed to minimise costs and carbon leakage

- Simulations show up to 75% carbon leakage with a unilateral European policy.
- Wider policy coverage, more cost efficient emission reduction

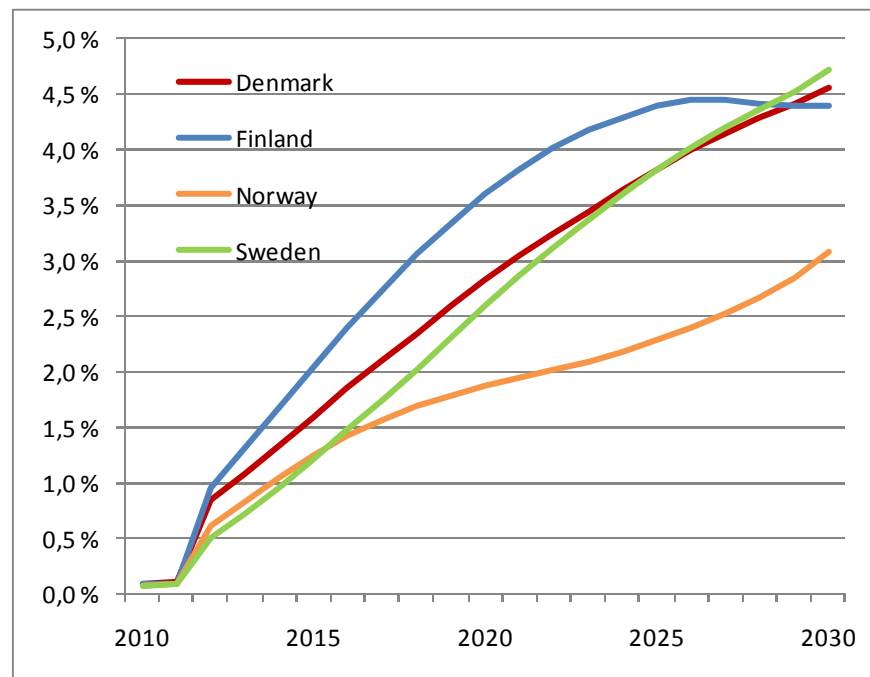
World emissions in 2020
difference of no climate policies scenario to reference
and global policy scenarios in Megatons of CO₂



Policy impacts in the Nordic countries: Macroeconomic differences small but characteristic

GDP difference in Nordic countries.

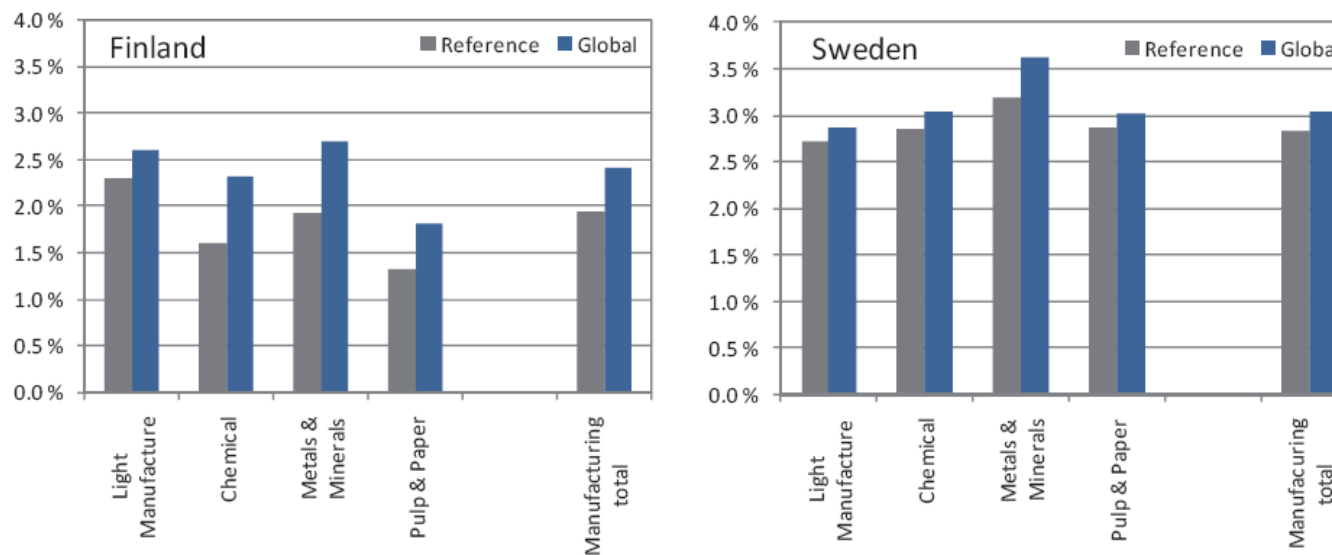
Real GDP levels "Global Policy" / "Reference"



- Global climate policy participation makes Nordic countries relatively better off
- Clean energy improves competitiveness
- Longer term slower global demand growth for industrial products may offset some of the gains
- Decrease in demand for petroleum products decreases Norway's GDP

Climate policy impacts in the Nordic countries: Regime makes clear difference to energy-intensive industry

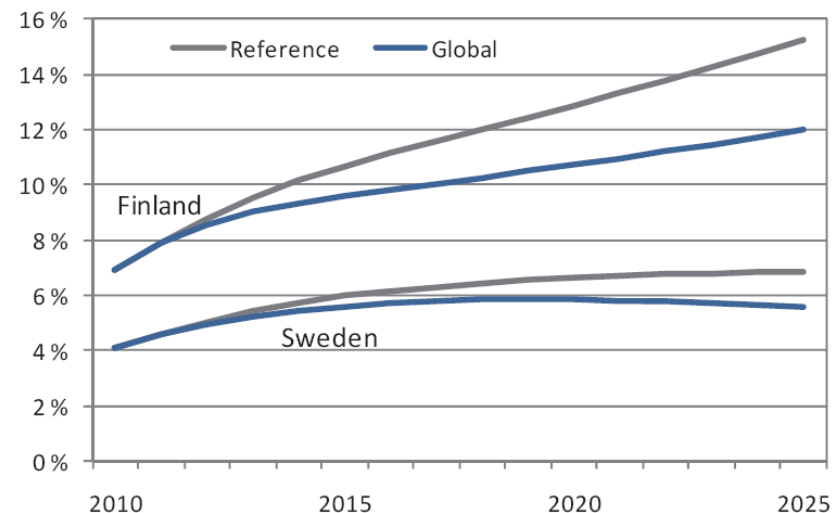
Output growth in manufacturing industries shown as average annual growth rates in 2004-2020



Policy impacts in the Nordic countries: Case pulp and paper industry in Finland and Sweden

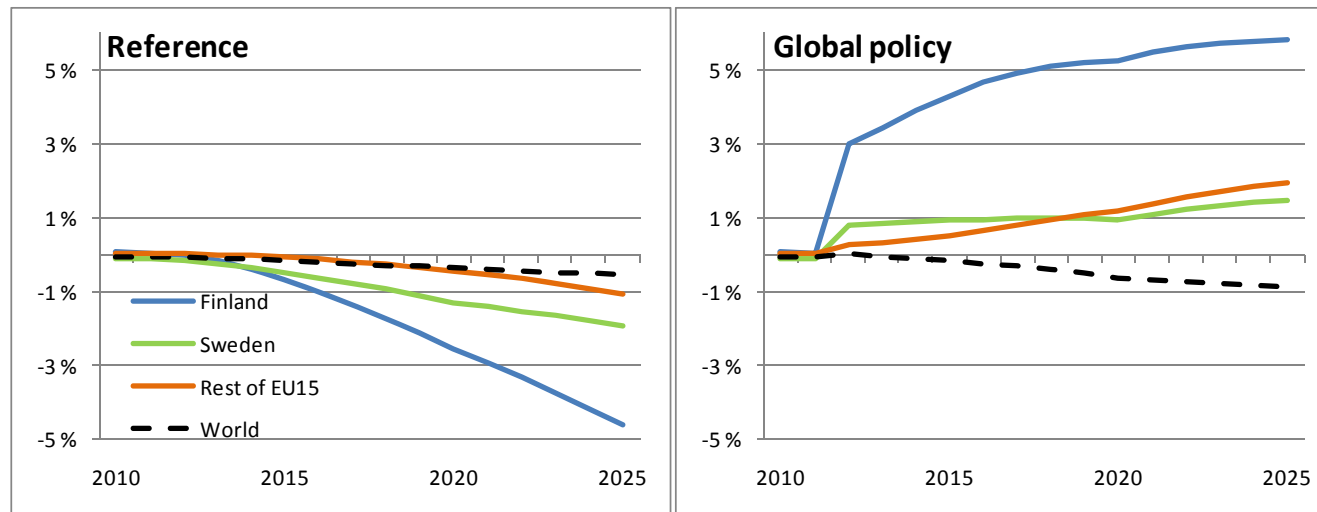
- Production costs increase more than world market price
- Smaller difference with global policy scenario
- Bigger difference in Finland than in Sweden
 - More pulp production compared to paper
 - High share of energy-intensive mechanical pulp
 - Higher dependence on imported wood

Cost of pulp and paper production
Local price increase relative to world market price



Policy impacts in the Nordic countries: Case paper and pulp in Finland and Sweden

- Nordic industries gain in the Global policy scenario
 - Relative competitiveness improves, as also competitors have to comply with climate policies
 - Compared to many competitors, cleaner energy available in Nordic countries
- Availability of non-emitting energy can strengthen the advantage



Paper and pulp sector supply compared to no climate policies