Development and preparations of Low carbon development strategies in Norway – Challenges and recommendations

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Norwegian Environment Agency
Riga, 1st. April 2016

The MAC - Curve – Basic Theory

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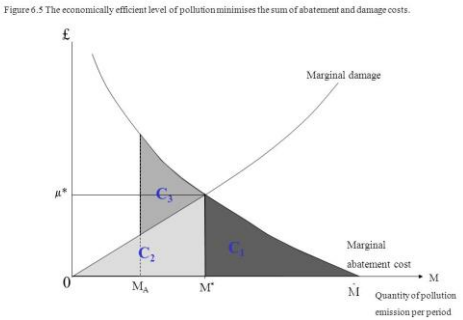
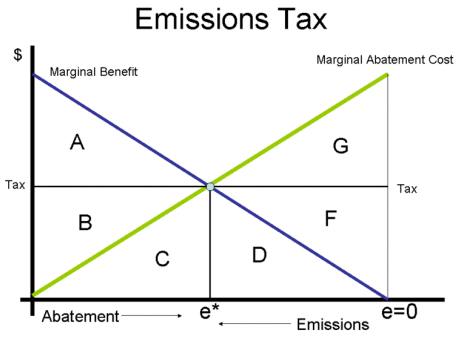
The Marginal Abatement Cost Curve





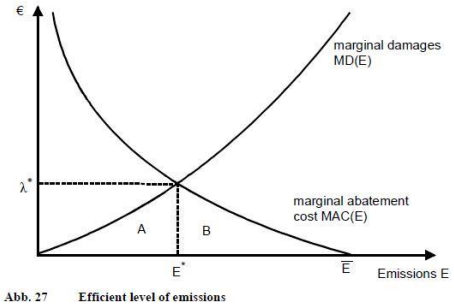
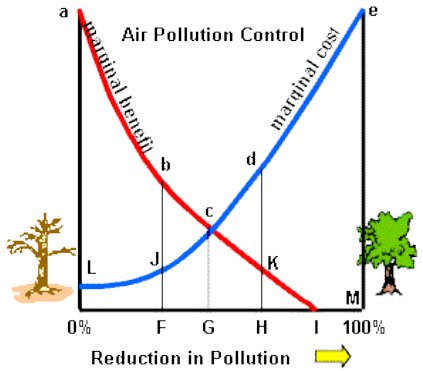
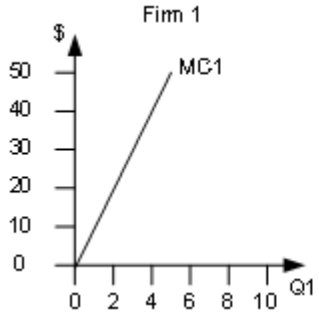
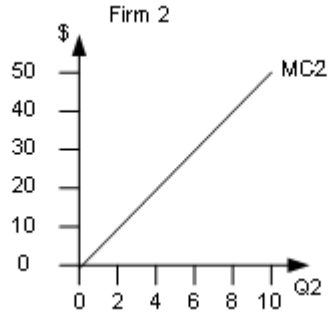
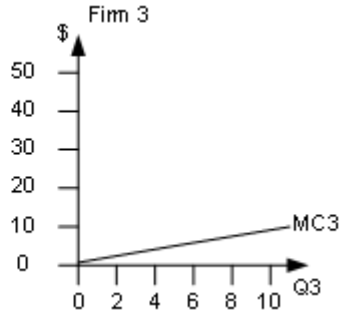


Abb. 27 **Efficient level of emissions**









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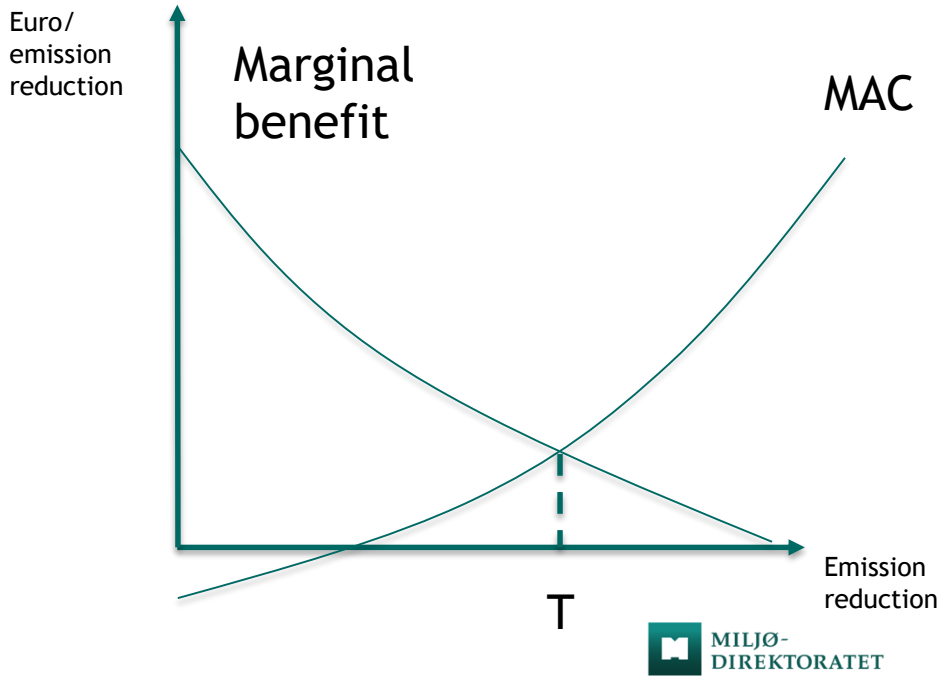
Use of MAC-curves

- Establish emission targets



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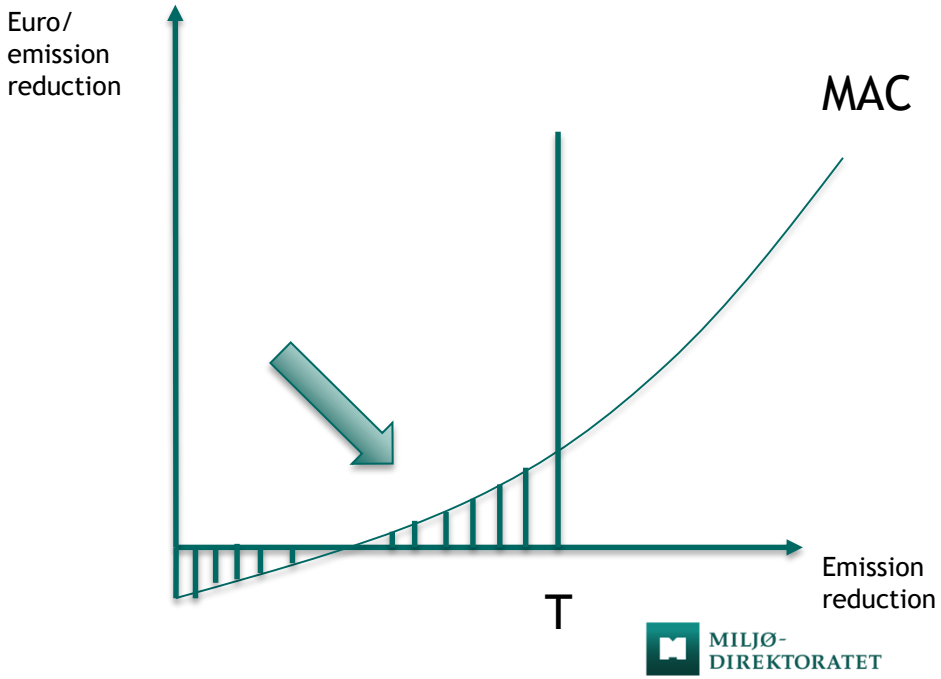
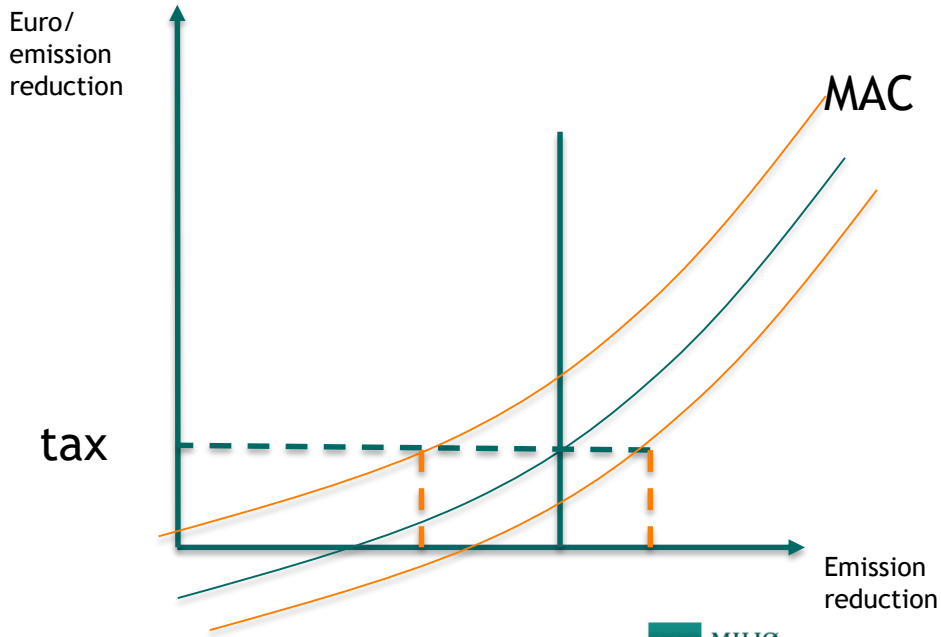
Use of MAC-curves

- Establish emission targets
- Identify cost-effective measures



Use of MAC-curves

- Establish emission targets
- Identify cost-effective measures
- Basis for policy options:
  - Emission tax



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Use of MAC-curves

- Establish emission targets
- Identify cost-effective measures
- Basis for policy options:
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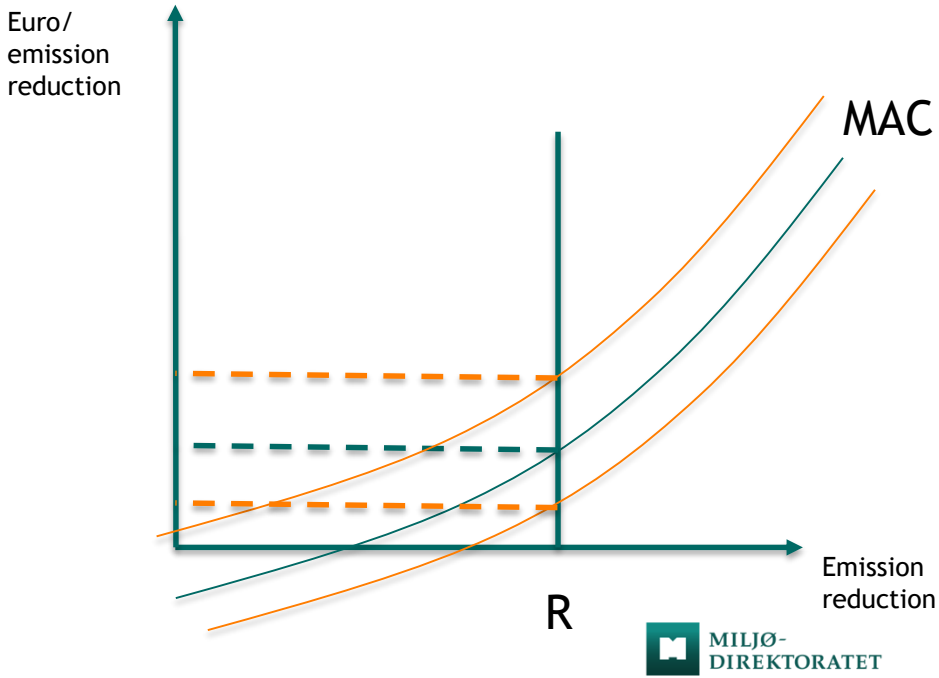
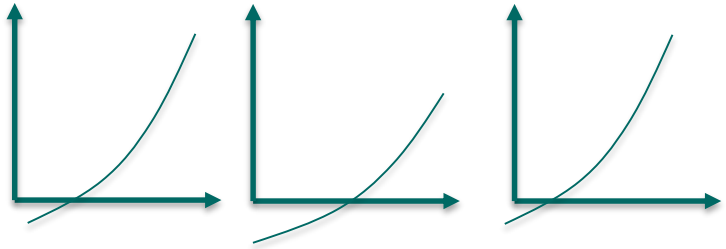
  - Regulation



Use of MAC-curves

- Setting emission target
- Identify cost-effective measures
- Basis for policy options:
  - Emission tax
  - Regulations
- Comparing MAC-curves for different sectors or nations



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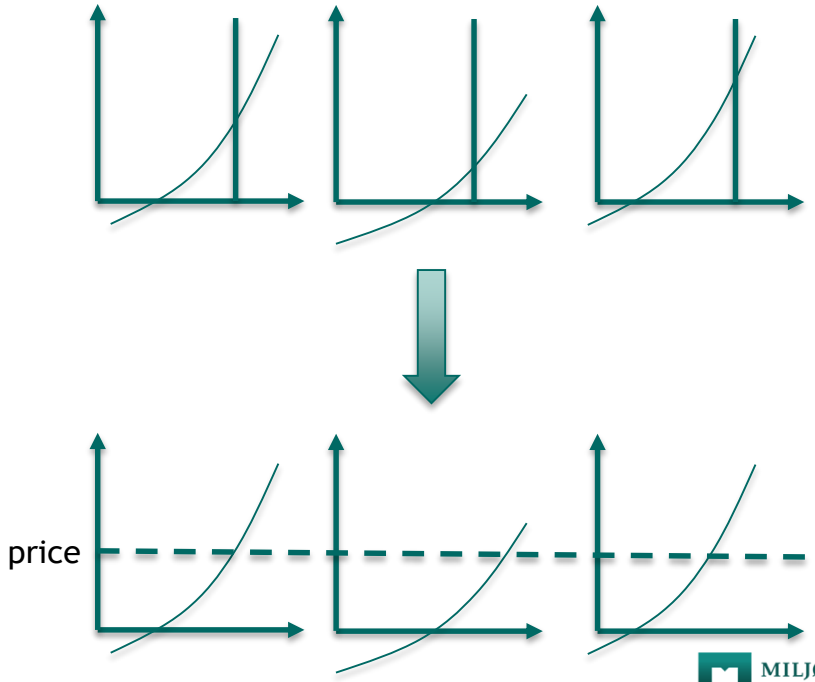
Use of MAC-curves

- Setting emission target
- Identify cost-effective measures
- Basis for policy options:
  - Emission tax
  - Regulations
- Comparing MAC-curves for different sectors or nations
  - Tradable emission permits



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MAC – some practical examples

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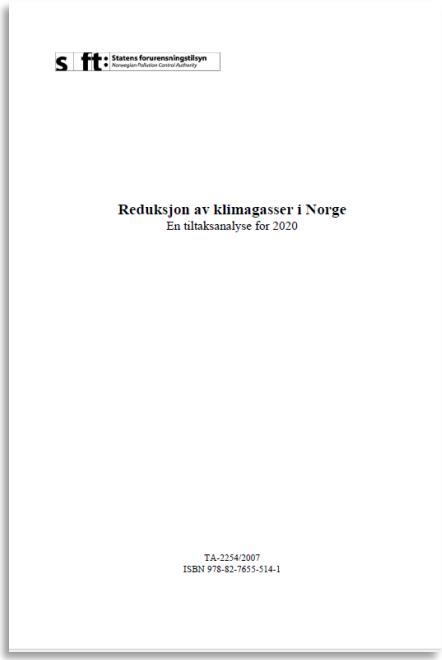
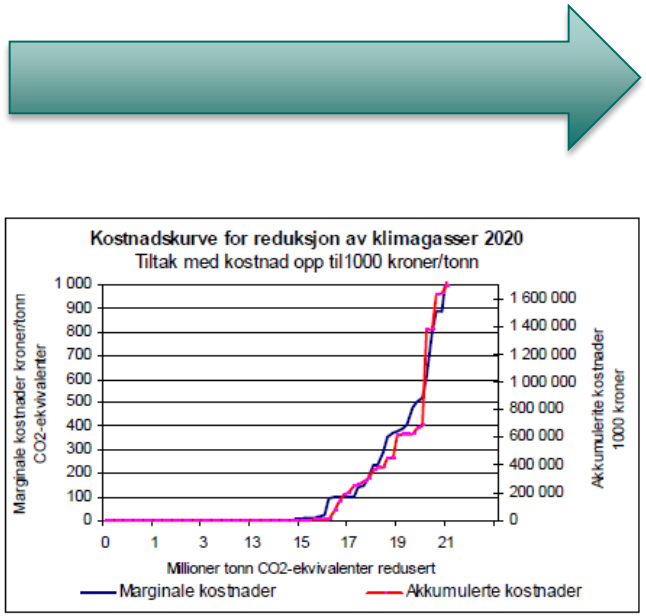
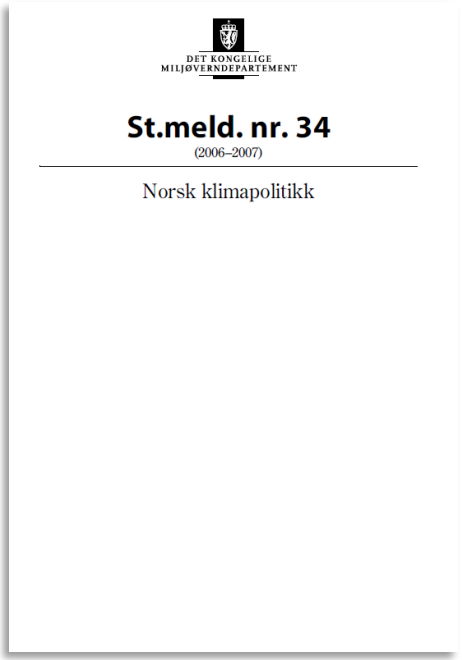
2007: MAC – Curve basis for establishing National Emission Target 2020







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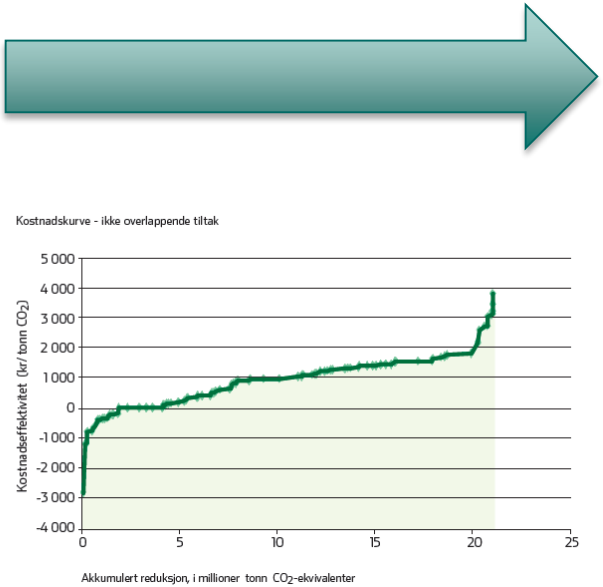
2010: MAC-Curve basis for identifying cost-effective measures for reaching 2020 emission target



DET KONGELIGE MILJØVERNDEPARTEMENT

Meld. St. 21
(2011–2012)
Melding til Stortinget

Norsk klimapolitikk

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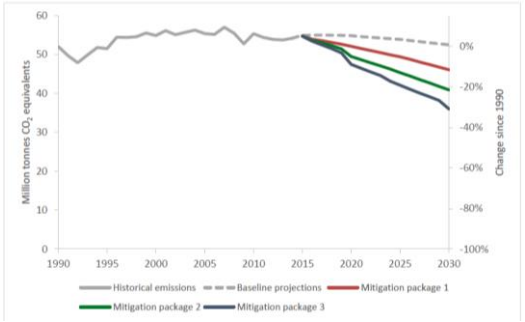
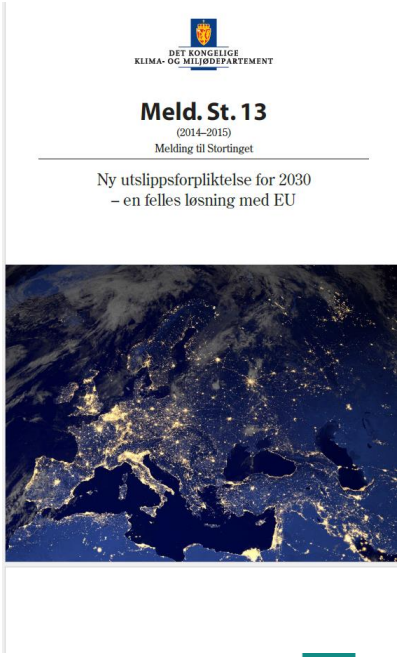
Knowledge base for Low Carbon Transition – basis for 2030-target



		Feasibility		
Cost		High	Medium	Low
	< USD 75/tonne	Package 1	Package 2	Package 3
	USD 75–225/tonne			
	>USD 225 tonne			



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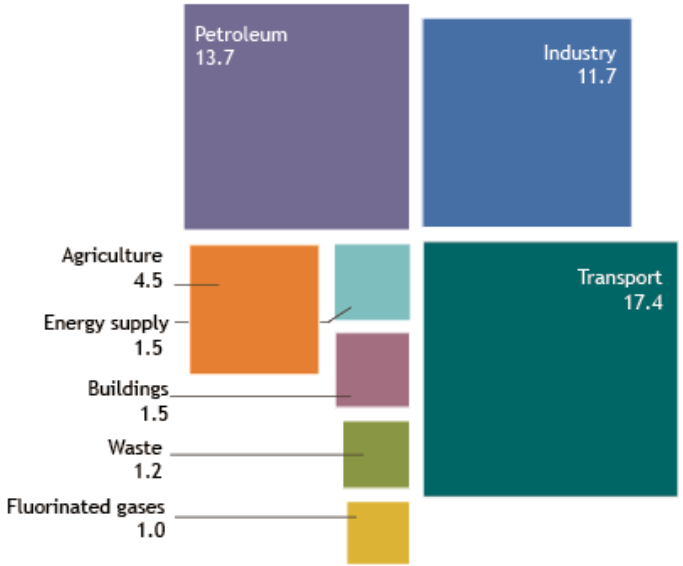
Norway as a low emission society

Norwegian emissions of greenhouse gases in 2012

Emissions to air (million tonnes CO_2 equivalents)



10.5 tonnes/capita

1 tonne/capita

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Challenges and recommendations

- Calculation of emission reduction potential:
  - Should be based on baseline scenario/official projections
    - Be aware risk of double-counting and overlapping measures
  - Wide range of approaches:
    - Pure bottom-up: CCS on point source
    - More general approach: Transport reduction, zero-emission vehicle introduction
    - Not directly included: Urban Planning. Infrastructure investments.
    - Alternatives: Transport modelling, energy market modelling, macroeconomic modelling.

- Definition of costs:
  - Based on national guidelines on cost-benefit-analysis
  - Sosio-economic costs versus private-economic costs. Distribution of income.
    - Investment Costs. Often relatively easy to calculate
    - Operating Costs. Often relatively easy to calculate
    - Convenience Costs. Consumer surplus loss. More demanding to calculate. Can be important. Willingness to pay as an indicator of welfare?
    - External Costs/Co-benefits. Health: PM10, NOX, SLCPs

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Challenges and recommendations

- Cost- and feasibility categories can represent an alternative to MAC-curves when comparing quite different measures
- Science before policy
- Cooperation. Check out all facts and calculations as far as possible with directorates (ministries), representatives for industry, NGOs and experts
- Transparency
  - Communicate the uncertainty
  - Be explicit on the assumptions
  - Explicit on methodology used

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Important aspects besides reducing national emissions

- Low-Carbon-development – or a dead end?
- Lock-in effects
- Export of technologies and solutions
- Reducing risk of carbon leakage

- Public acceptance – distribution of income

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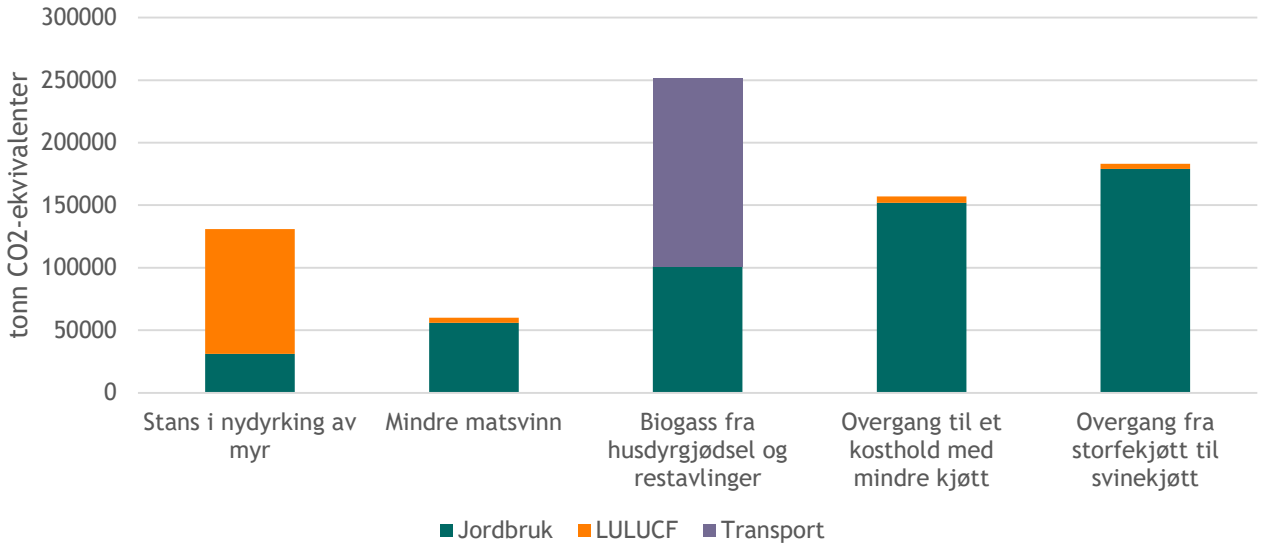
Utslippsreduksjoner fra jordbrukstiltak i 2030



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