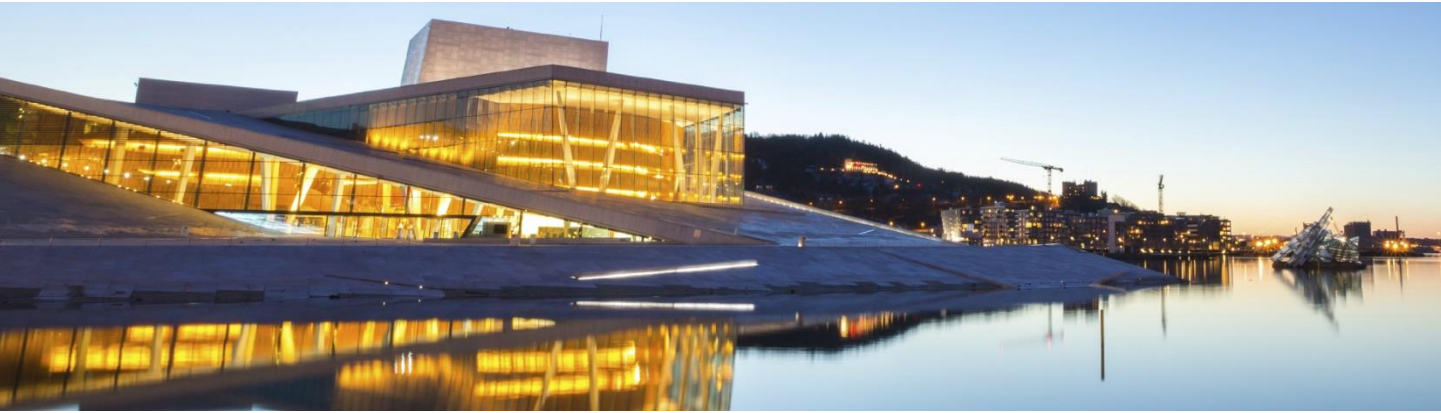

Climate change policy evaluation in Norway and Latvia

SECTORAL POLICIES AND CLIMATE POLICY IN NORWAY

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ABOUT CLIMATE TARGETS, POLICY MEASURES AND SECTORAL POLICIES

- Bottom-up approach to abatements / emission targets
  - Estimates of potentials and costs per sector and measure
    - Different approaches and considerable uncertainty
  - Sectoral targets and sector-specific policy measures
  - Unclear responsibilities and competencies
  - Possible conflicts with other sectoral policies?
- Top-down approach to abatements / emission targets
  - Identify and mitigate market failures
  - General policy measures
    - Such as quota markets or a general CO_2 tax – puts a common price on emissions
    - More easily adjustable?
  - Sectoral targets – commonly agreed (high-level)
    - Prioritized sectors and (shared) clear responsibilities

AGENDA

- Case studies Norway
- Challenges for climate policies
- Concluding remarks

EXAMPLE: STUDY OF SECTORAL ABATEMENT MEASURES IN NORWAY

- The Klimakur (2010) study had identified sectoral abatement measures
  - Some of the measures were found to be profitable under current policy and market conditions

- *Question: Why are seemingly profitable measures not carried out?*
  - Are costs misrepresented?
  - Do other regulations constitute barriers to implementation?
  - Should additional policies be implemented?

- Study of sectoral potentials and measures in Norway
  - Buildings – energy efficiency
  - Industry – conversion to renewable energy
  - Transportation – public transportation and infrastructure

BUILDINGS – ENERGY EFFICIENCY THROUGH STRICTER BUILDING STANDARDS

BACKGROUND

- 26 % of energy consumption, 3 % of emissions
  - High share of electricity
- Abatement potential: 1-2 mill. tons
  - Uncertain estimates: Total area, new-build and refurbishment rates, purpose distribution of electricity use
  - Reference: Low growth in el consumption
  - Result of stricter building standards (2010)
- Stricter technical standards: Not primarily targeted at emissions – general energy efficiency improvements
  - High RES share in Norwegian electricity

FINDINGS

- Uncertain implementation
  - Applies primarily to new buildings
  - Rebound effects?
- Many non-quantified cost elements
  - Transaction costs
  - Time costs
  - Comfort costs
  - Lacking competence
  - High uncertainty: Too low discount factor?
  - Tax cost for public buildings
- Possible market failures
  - Owner/tenant issues: Energy labelling?
  - Information: Is available

A NOTE ON ENERGY EFFICIENCY POLICIES

UNCLEAR TARGET STRUCTURE

- Possible conflicting targets
  - Cut CO_2 emissions?
  - Improve or maintain security of supply?
    - Reduce electricity consumption during winter? (Energy? Maximum load?)
    - Grid costs? (Maximum load?)
  - Increase flexibility of energy demand?
  - Save nature?

EE contributes to several targets: Trade-offs require evaluation principles

LACKING PRINCIPLES FOR EVALUATION

- What CO_2 prices should be used? and
- How should it be reflected in power price projections?
- Valuation of improved security of supply
- Are negative external effects (nature conservation) internalized in power prices and grid tariffs (via the licencing system)?
- Are emissions to air fully internalized in energy prices (fossil energy, bio energy and district heating)?
- Who is the responsible authority?

INDUSTRY – PRIVATE INVESTMENTS

BACKGROUND

- Detailed analyses of measures
- Individual industries
  - Pulp and paper; aluminium; ferro industry; petrochemicals; cement, lime, and leca production; mineral wool; food industry
- Specific measures – mostly conversion from fossil to RES
  - Oil to district heating; Oil to bio energy; Sales of CO gas; Increased share of bioenergy; Reduced use of coke; …

FINDINGS

- Underestimated costs?
  - Cost estimates based on averages or case studies: Could be large cost differences between installations
  - Large differences in discount factors – welfare economics vs. business economics
  - Uncertainty: Profitability strongly influenced by assumed energy prices
- Some measures already implemented
- *Things take time – for good reasons*
  - *Measures are carried out in conjunction with other investments*
  - *Uncertainty puts an option value on waiting*

TRANSPORTATION – PUBLIC INFRASTRUCTURE INVESTMENTS

BASICS

- Large source of emissions
- Potential: 3-4,5 mio tons
- Requires strong measures
- Partial analyses identify several extremely profitable measures
- While analyses of clusters of measures in transportation models hardly yields profitability at all
- The truth is probably somewhere in-between

ASSESSMENT

- Estimates extremely uncertain
  - Private costs not properly taken into account
    - Particularly for motorists
  - Transfer from cars to public transportation and/or bicycles very uncertain
  - Coordinated transportation of goods
    - Missing internalization of external costs?
- Infrastructure measures require political decisions – and coordination
  - Decision processes, long-term perspective, different budgets
  - Local authorities may not take long-term health benefits into account, benefits which do not necessarily affect local budgets

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INCOMPLETE COST ESTIMATES – IT IS EASY TO GET IT WRONG

NON-QUANTIFIED COSTS

- Use of time
- Information gathering and processing
- Reduced comfort (energy efficiency)
- Management priorities and maintenance of competencies
- Uncertainty regarding the choice of measure and the impact of measures
- Missing investment, transportation and taxation costs: Transaction costs and costs during construction/implementation
- Benefit of control with own distribution of goods (with regards to coordination)

CHOICE OF DISCOUNT RATE/IRR

- Social vs private discount rates in Klimakur
  - Social: 5%
  - Private: 7% for buildings and transportation, 20% for industry
- No reason to assume imperfect capital markets (if so, a it is a general problem)
- Little evidence of 20% IRR in industry
- Regulatory risks? Future climate policies and abatement costs uncertain for both authorities and market actors
  - Implies a higher social discount rate
- *Authorities should provide common guidelines – complex issue*

SUBSTANTIAL UNCERTAINTIES

FUTURE PRICES

- The uncertainty is substantial
  - Of energy prices as well as CO_2 prices
- Changes affect social and private cost-benefit estimates
- Long-term measures need robust profitability outlooks – in view of several possible scenarios for future climate policies

- *The option value of postponing emission reduction investments could be substantial – even if the measure is profitable based on current prices*

POTENTIALS

- Rebound effects imply that net potentials may be smaller than estimated potentials
- Available data is incomplete for several measures
- Some cost estimates are based on averages or case studies – the variation can be substantial
- Sensitivity analysis of profitability
  - Profitability strongly dependent on prices for energy and carbon

MARKET FAILURE – EXISTENCE AND MITIGATION

MISSING INFORMATION

- Private actors need to be able to assess profitability: Potential for reduced energy consumption and possible conversion to other energy sources
- A lot of information seems to be available
  - Focus on energy and fuel costs in mass media
  - Several schemes for information dissemination
    - Enova, Energy labelling, etc.
- *Conclusion*
  - *No strong evidence of missing information*
  - *Lacking implementation probably due to real private costs of information gathering and processing*

PRINCIPAL – AGENT ISSUES

- One actor (the agent) acts on behalf of another (the principal)
  - They may have opposing interests
- Could explain why some measures in buildings are not carried out
  - Particularly between owner and tenant
- *Conclusion*
  - *Mitigation by e.g., energy labelling and technical building standards*

MARKET FAILURE – EXISTENCE AND MITIGATION

EXTERNAL COSTS

- Missing internalization of external costs (regulatory failure) creates deviation between social costs and private costs
- Several examples of incomplete or inconsistent excise taxes, e.g.,
  - No tax on emissions of particles from use of bio energy in buildings
  - Noise, abrasion, and accidents in transportation of goods
- *Tax policies should to the extent possible reflect external costs and be consistent across sectors*
  - *But also need to take distributional effects into account*

MARKET INTERVENTIONS

- Subsidies to renewable power generation (Elcertificates) yield too low power prices (power surplus)
  - Reduced incentives for
    - energy efficiency improvement,
    - conversion to district heating etc.,
  - But the electricity tax and the Elcertificate price draws in the opposite direction
- International commitments require increase in renewable energy production
  - Which yields power surplus and lower prices in Norway (the Nord Pool area)
- *Lower power prices reflect the marginal value of the induced power surplus*

MEASURES IN THE PUBLIC SECTOR

COORDINATION BETWEEN SECTORAL AUTHORITIES AND DIFFERENT LEVELS OF GOVERNMENT POSES A CHALLENGE

- Infrastructure for public transportation requires huge investments and yield small reductions in emissions
  - Very profitable as abatement measures because they yield other substantial benefits, e.g. health benefits
  - Costs and benefits are borne by different parts of the public sector
- *Public measures with high benefits should in any case be closely assessed*

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CONCLUDING REMARKS

- Three main reasons why seemingly profitable measures are not carried out
  - All relevant costs have not been quantified in the analysis
    - Some cost factors are very uncertain and changes over time
  - Market (or regulatory) failure
  - Decision structure in public administration
- Bottom-up approach to climate policies implies a number of challenges which jeopardize results
  - Sectoral targets
  - Rigid and inconsistent policies
  - Unclear allocation of responsibilities and conflicts of interest
- Top-down approach more flexible and robust
  - Markets change and adapt
  - Focus on removal of market failures

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