

# Green Electricity in the Nordic Countries

Atle Midttun

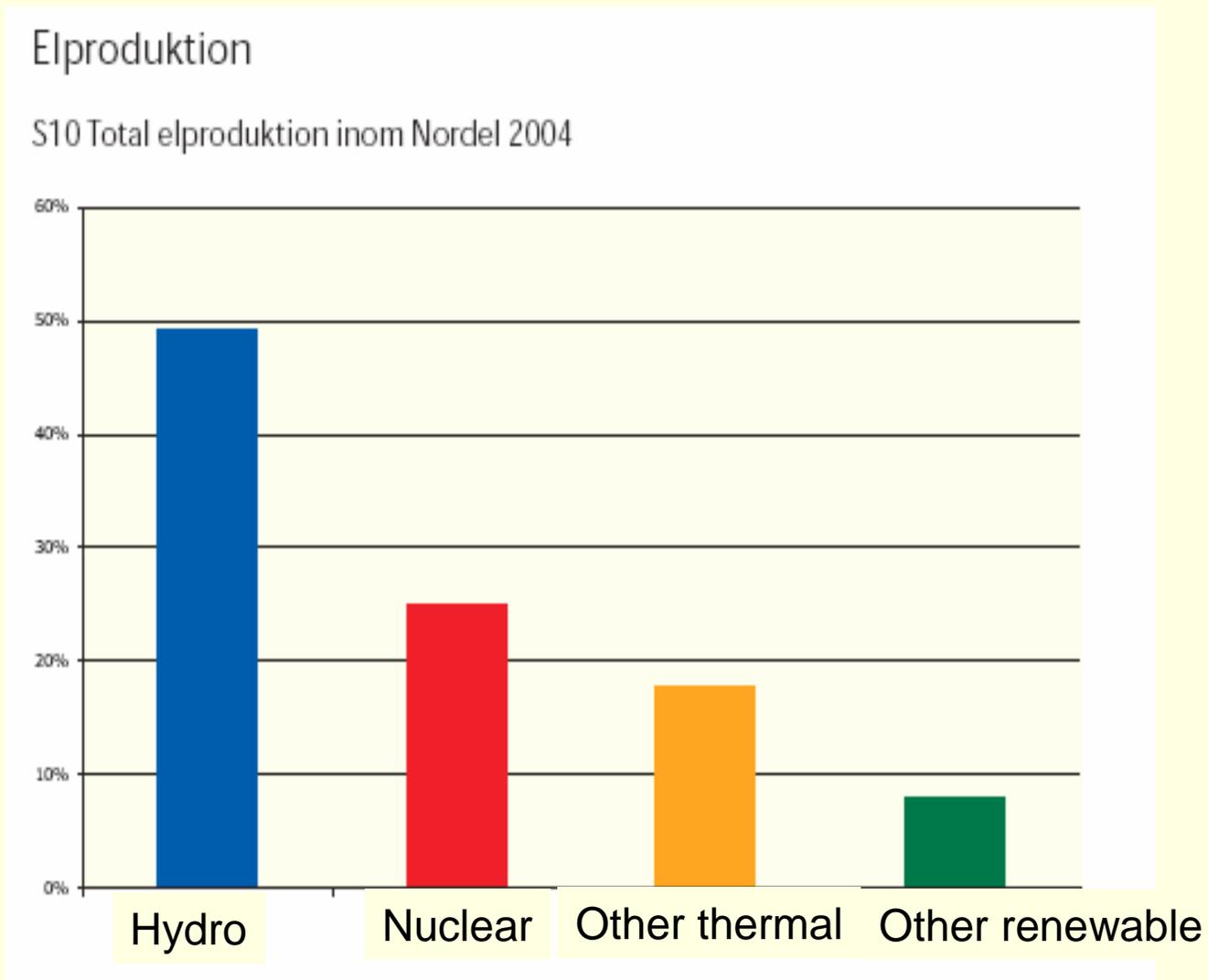
Presentation at the Berlin Realise  
conference 2-3 November 2006

# Outline

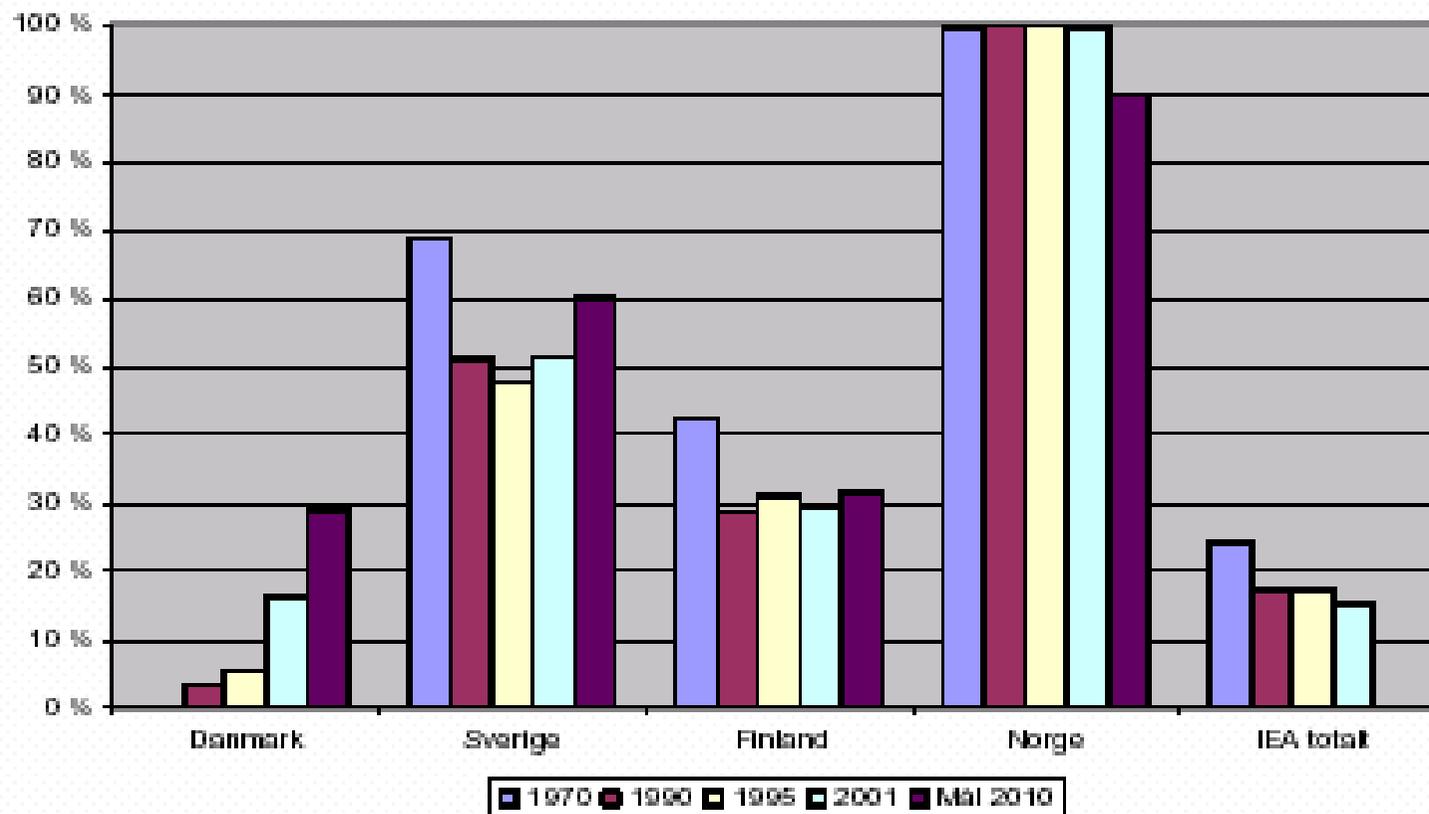
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1. The Nordic green el contribution to Europe
2. Development of the Nordic support regimes for green electricity 90s and early 2000s
3. Green el related policy issues with Nordic stakeholders
4. Reflection on policy tools in an innovation perspective

# The Nordic green el contribution to Europe I



# The Nordic green el contribution to Europe II



Source: IEA

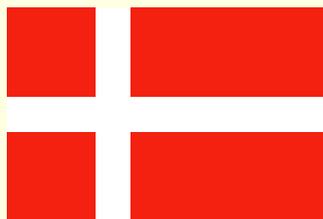
# The Danish regime: 1990s and 2000s

## 1990s

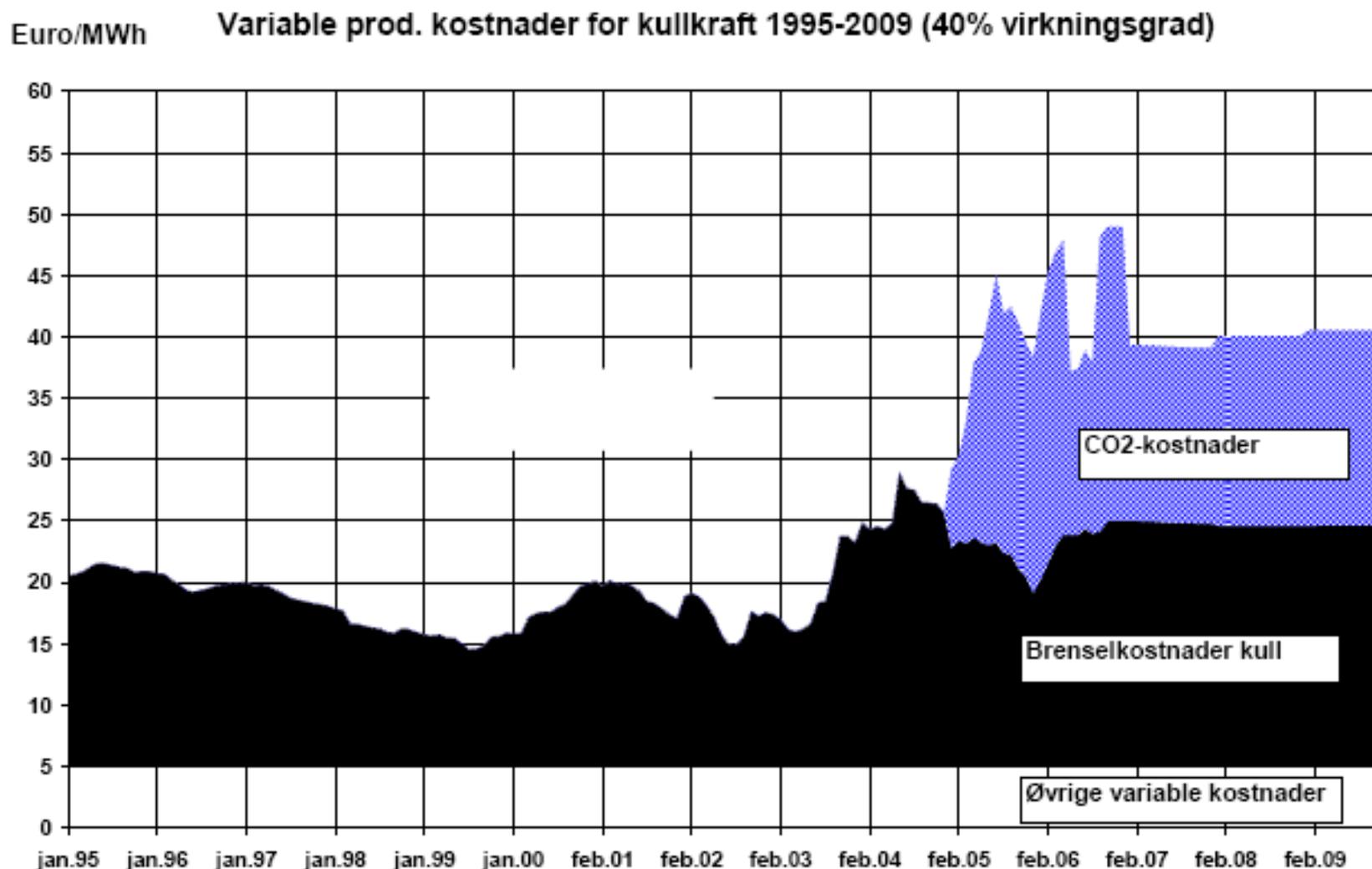
- Efficient use of feed in model (between DKK 0.30 and 0.60 kWh)
- Investment support schemes 15-40% of costs (techn dependent)
- Purchase obligation on local utilities
- 1999: attempt to introduce certificate model (withdrawn)

## 2000s

- Regular energy markets + CO2 quotas
- 0.10 DKK/kWh flat rate support
- Grid investments
- Exemption from energy levies
- R&D funds (30mill DKK pr year)
- Ad hoc auction: investment in 2 offshore windmill parks



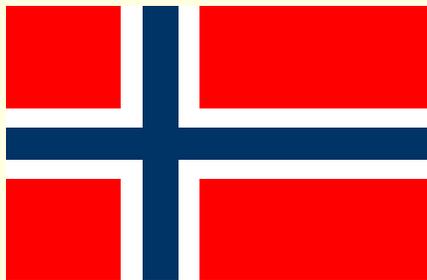
# Kullkraft har blitt dyr pga kvotepriser på CO2



# Norwegian regime: 1990s and 2000s

## 1990s

- Investment support
  - maximum 25% of total costs
- Production support
  - ex: wind producers got equal to 50% of el-tax (NOK 0.05)
- Tax incentives
  - Wind power exempted from 7% investm. fee



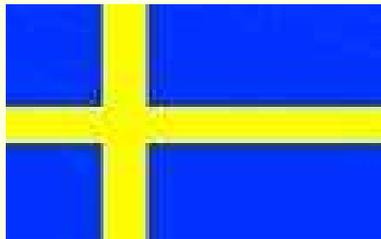
## 2000s

- Creation of ENOVA 2001
  - Shall contribute to energy efficiency and renewable energy policy
- Planned ascension to Swedish cert system (2003-2005)
- Adoption of supplementary feed in system 2006:
  - Small hydro: 4Øre / 0.48 Eurocent kWh
  - Wind: 8 øre / 0.96 Eurocent kWh
  - Bioel & immature techn: 10 øre / 1.2 Eurocent kWh

# Swedish regime: 1990s and 2000s

## 1990s

- Investment support
  - wind power up to 15%
  - biofuels up to 25%
- Tax incentives
  - Energy tax exemption on renewables, paid via an environmental bonus 0.162 SEK in 2000
  - Reduced grid fee 0.09 SEK kWh



## 2000s

- Since May 2003 electricity certificate trading system
- Quota obligation of 17% by 2010 until 2030
- Price 150-200 SEK MWh

# Prices for El certs in Sweden



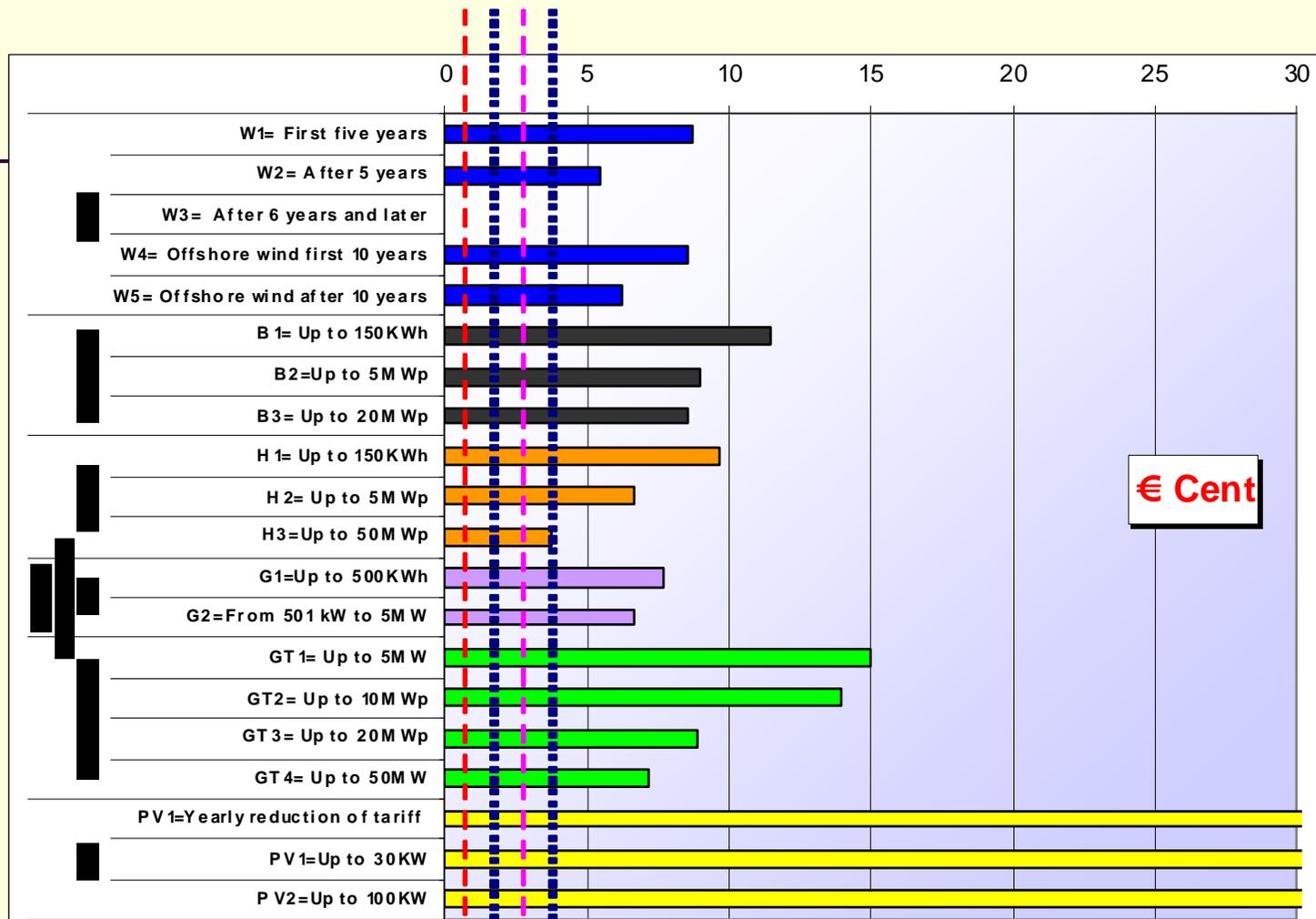
# Feed in tariffs in Germany and Certificate prices in Sweden

## Feed in:

- Differentiation
- Stability?
- Strong boosting effect

## Certificates:

- Non-differentiated
- Low cost?
- Market exposed



Elcert market price Low (1.07) KWh

Elcert market price High (2.72) KWh

2 € cent el price included

Legg inn Norske tariffer

# Finnish regime: 1990s and 2000s

## 1990s

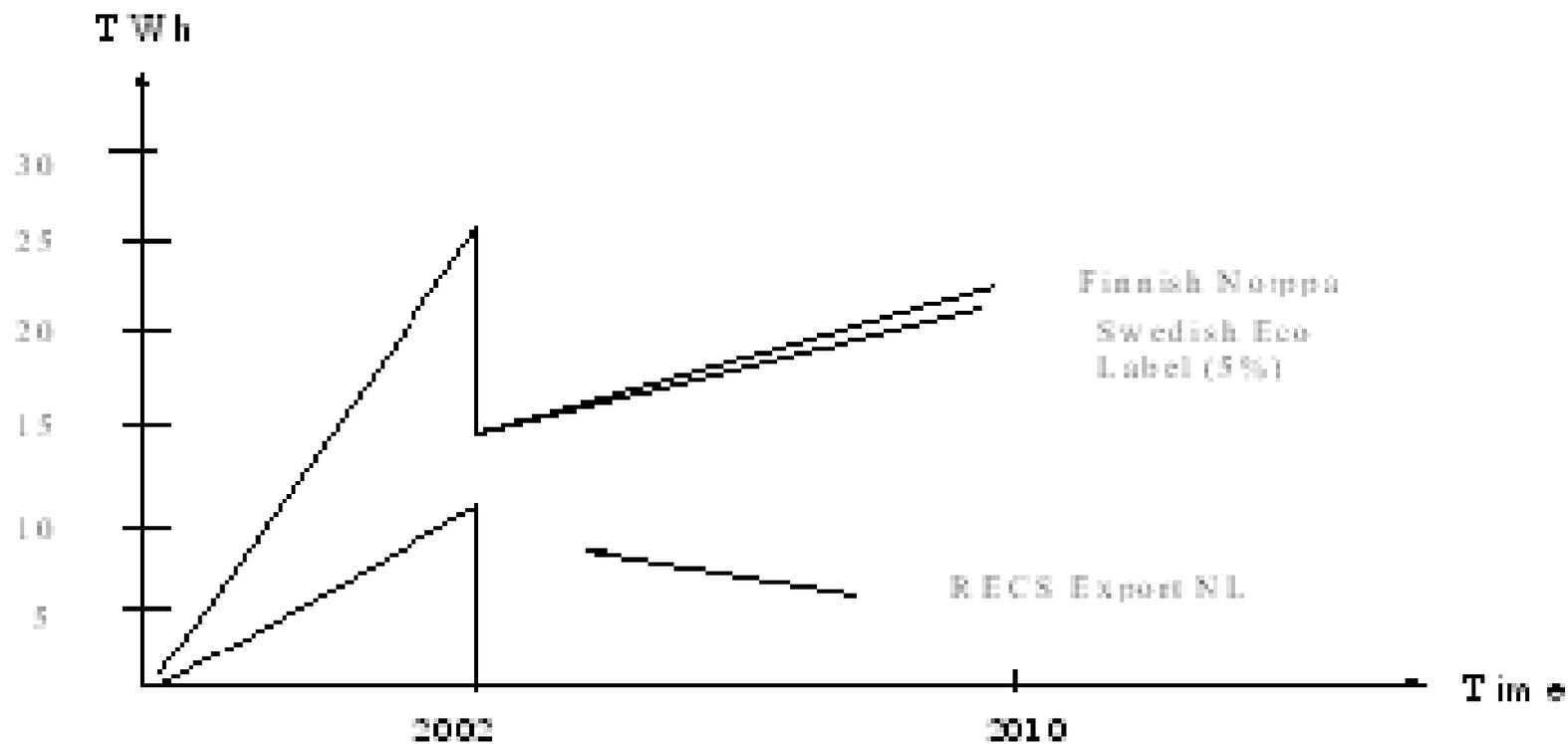
- Investment support
  - % support depends on the innovativeness of the technology: runs up to 40% generally 20-35%
- Electricity tax exemption
  - Under 1 Eurocent

## 2000

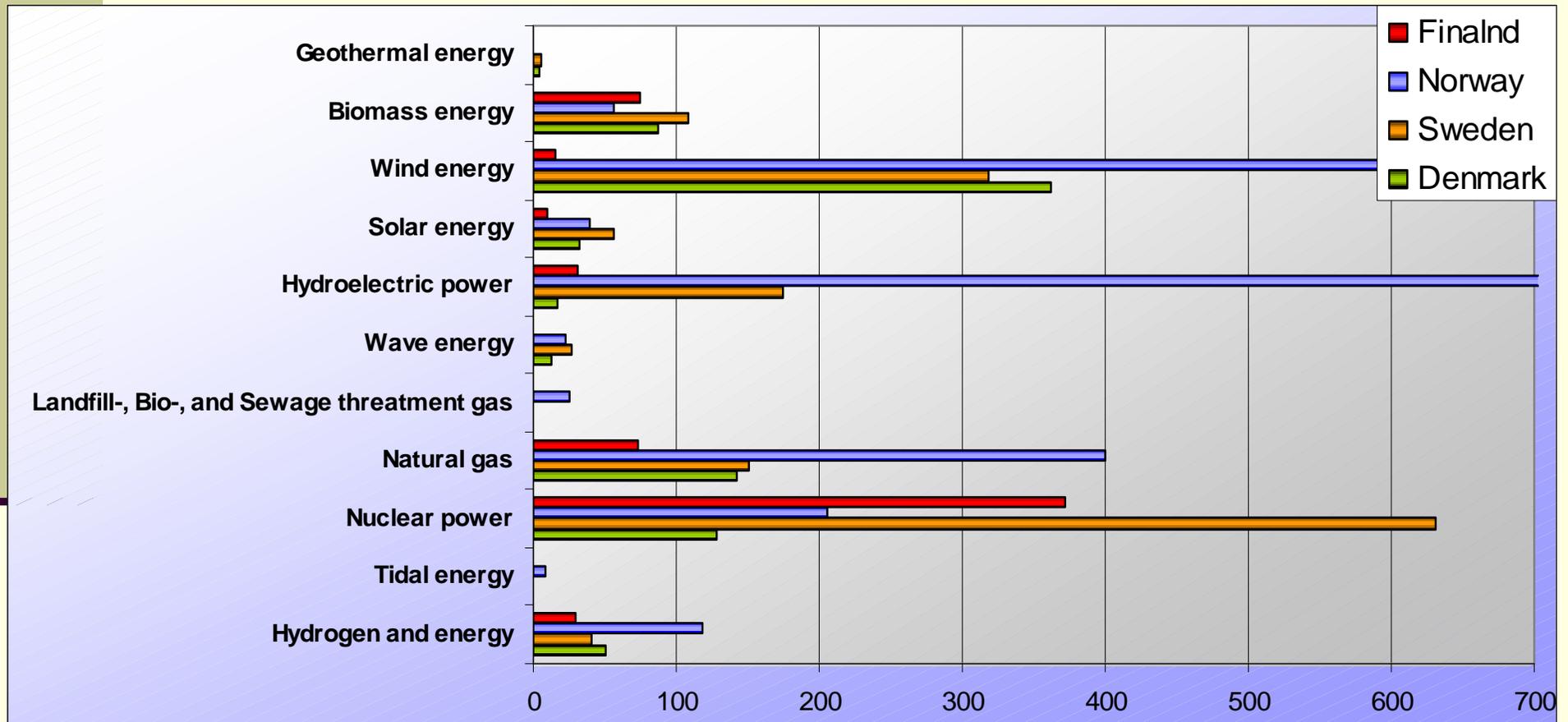
- Investment support
  - % support depends on the innovativeness of the technology: runs up to 40% generally 20-35%
- Tax incentives
  - **99 Action plan for renewable el sources:** consumer tax refunded as subsidy to producer
  - Wind: 0.69 ct/kWh
  - Biomass: 0.43 ct/kWh
  - Small hydro: 0.42 ct/kWh
  - 2003 update: focus on bioenergy



# Accumulated volume in voluntary markets (2002 and projections for 2010)



# Energy focus of public debate in Nordic countries



# Green el related policy issues in DK

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- Fairly broad consensus on liberalist re-orientation from industry and energy industry
- Some fatigue with playing the pioneering role for green el in EU
- More scepticism to liberalist policy from wind energy actors and to some extent the ecological movement
- Joint concern about the late integration of EU CO2 policy
- Concern with lacking integration into German market
- Concern with investment uncertainty and capacity limitation in Danish el supply
- Concern with price effects of under-investment

# Green el related policy issues in S

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- Mixed opinions about the certificate system, but acceptance that the system was there to stay
- Concerns with the functions of the cert syst
- Concerns with possible expansion to Norway (symmetry issues)
- Focus on the need for complementary support systems to elcert
- Concern with energy efficiency
- Concerns with power costs for heavy industry

# Green el related policy issues in N

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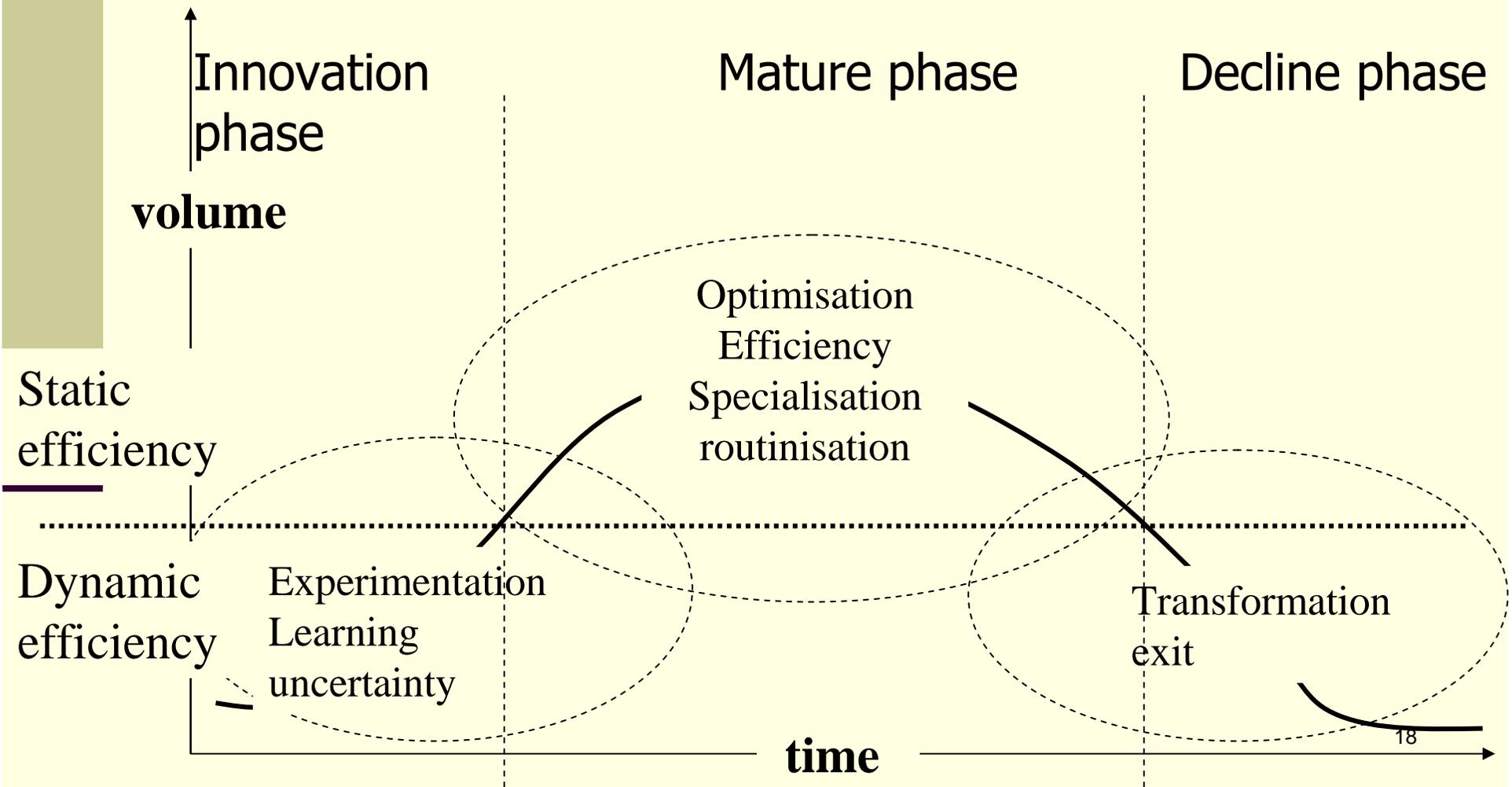
- Orientation towards elcert market with Sweden
- Disappointment with failure to reach commom agreement N+S
- Reorientation towards feed in
- Wide acceptance that high el and CO2 prices are not sufficient
- Small hydro may however partly be profitable with present prices
- Gas power continues to be debated: current policy on CO2 sequestration
- Concern with high electricity prices from el-consuming industry

# Green el related policy issues in FI

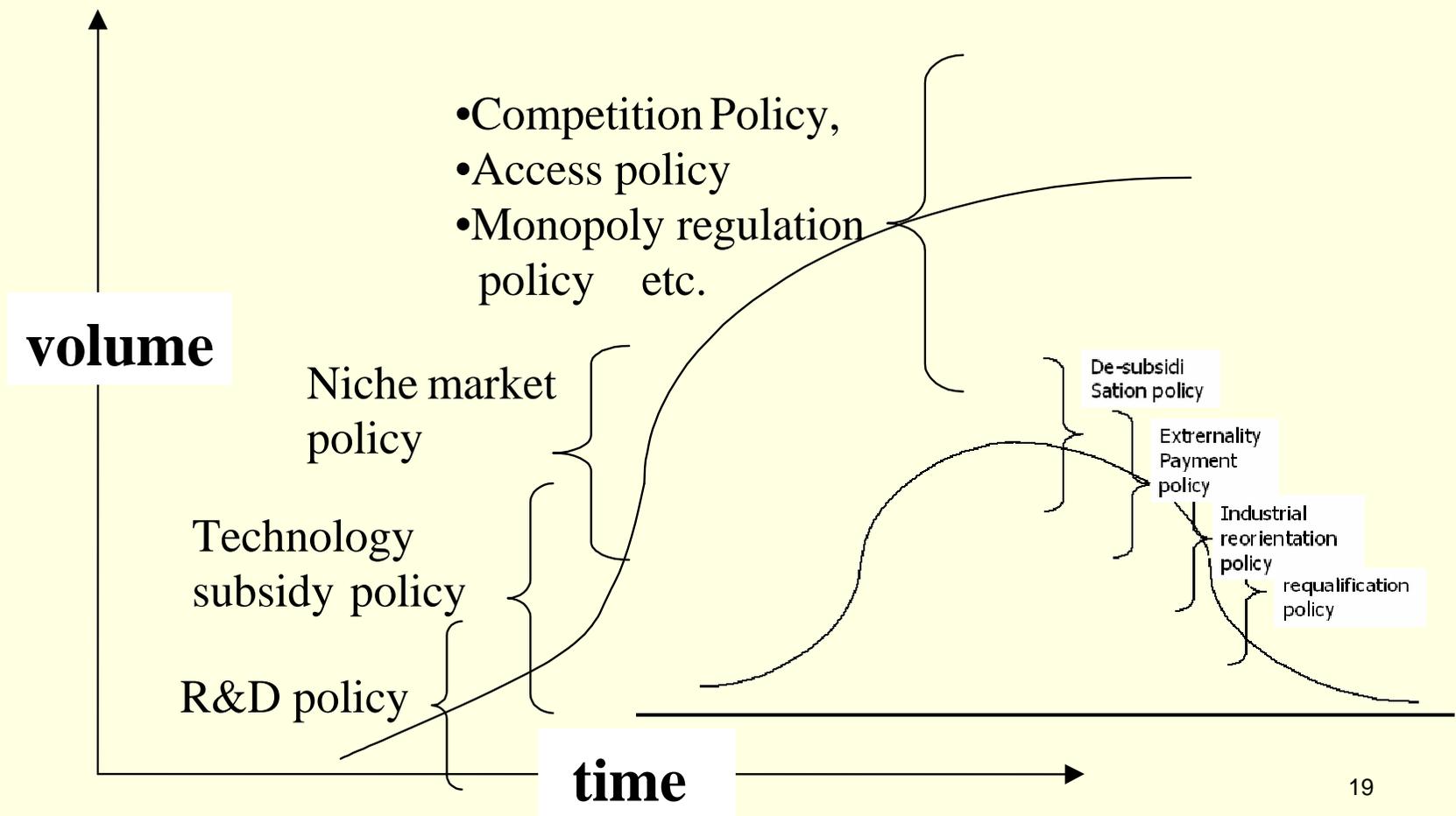
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- Basic acceptance of present support system admin.
- Concern with possible competition for biomass between paper and pulp industry and ren. En ind.
- Concern with international pressure against Finnish peat
- Acceptance for both nuclear and renewables to solve supply deficit and fulfill Kyoto
- Nuclear issue was much debated, but is now decided on
- Green electricity pushed politically, as household consumers show moderate interest
- Dominant renewable is black liquor from paper and pulp
- Fortum stands alone in support for green certificates

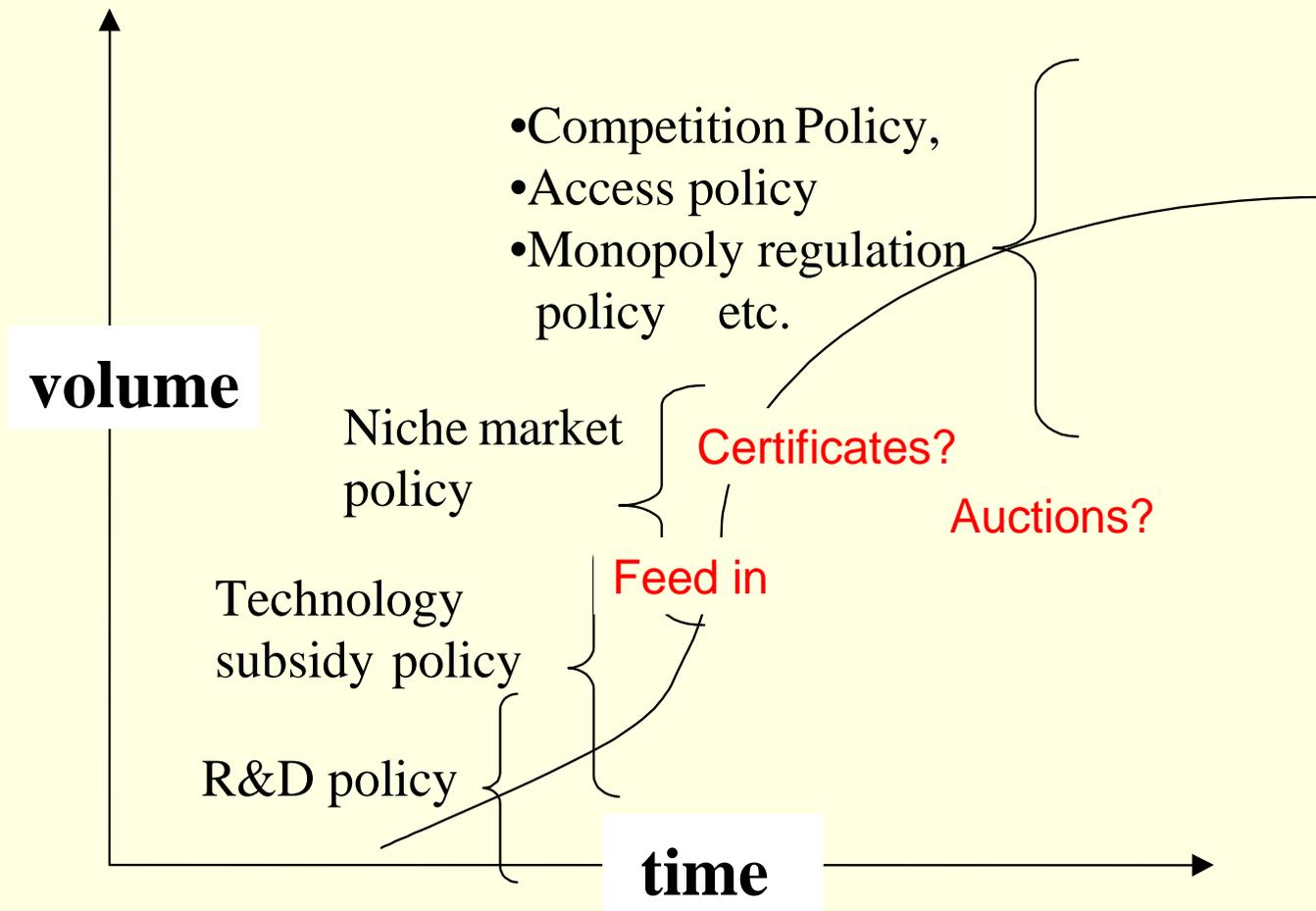
# A product cycle perspective on policy instruments and learning



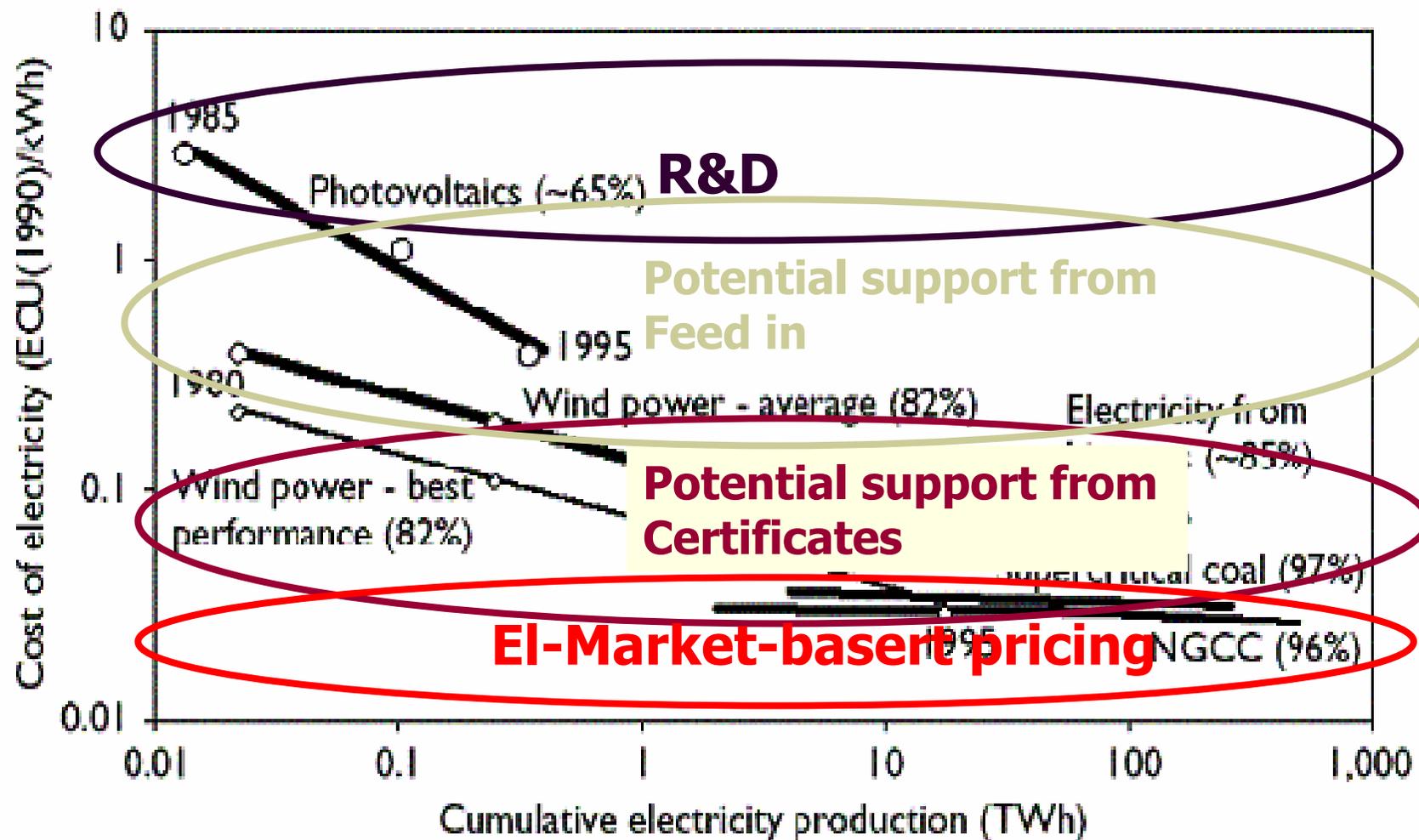
# Reflection on policy tools



# Reflection on policy tools II



# Support systems and Learning Curves

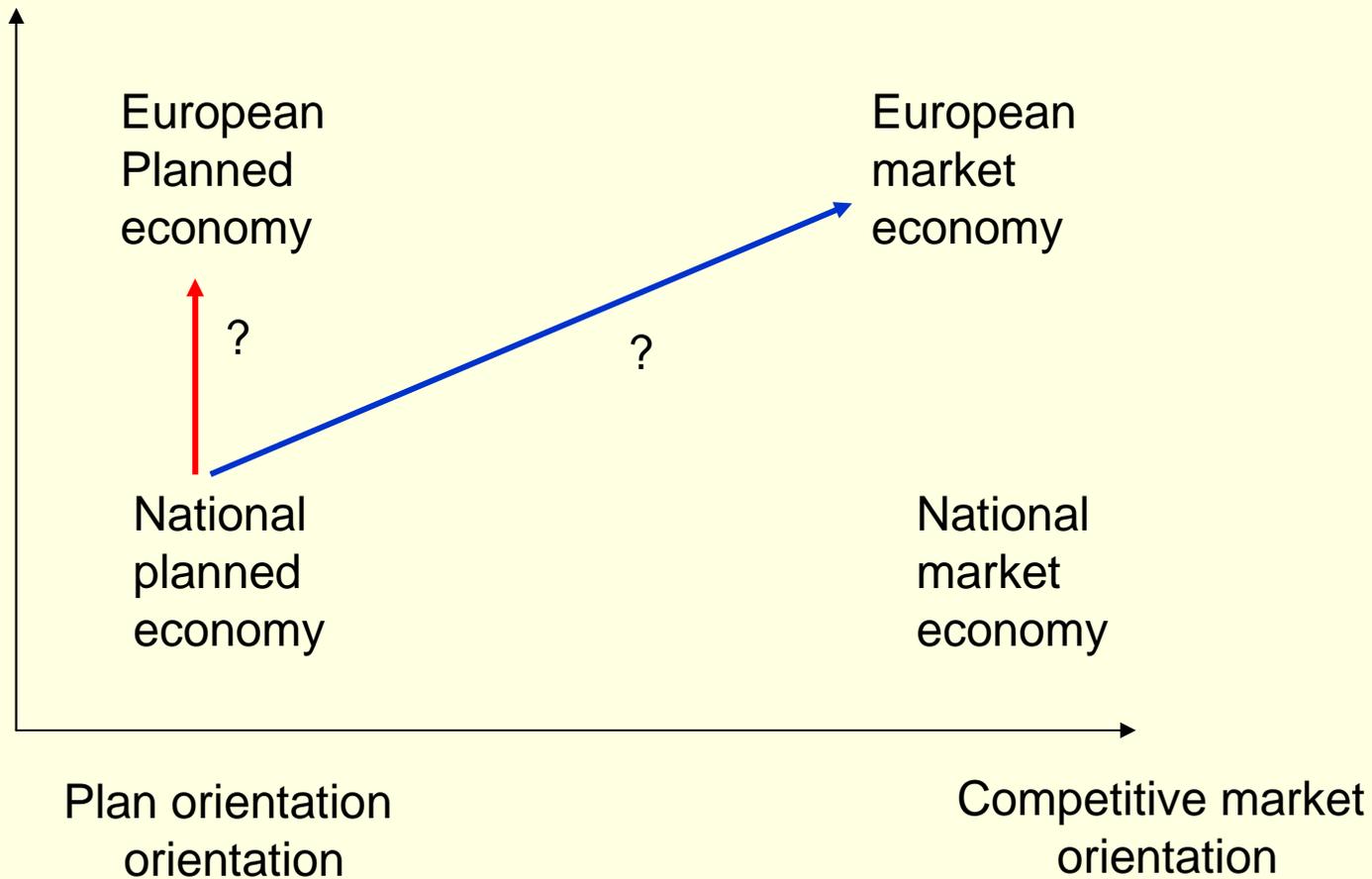


# Why competitive market orientation and why Europeanisation

Europeanisation

Scale and Scope specialisation

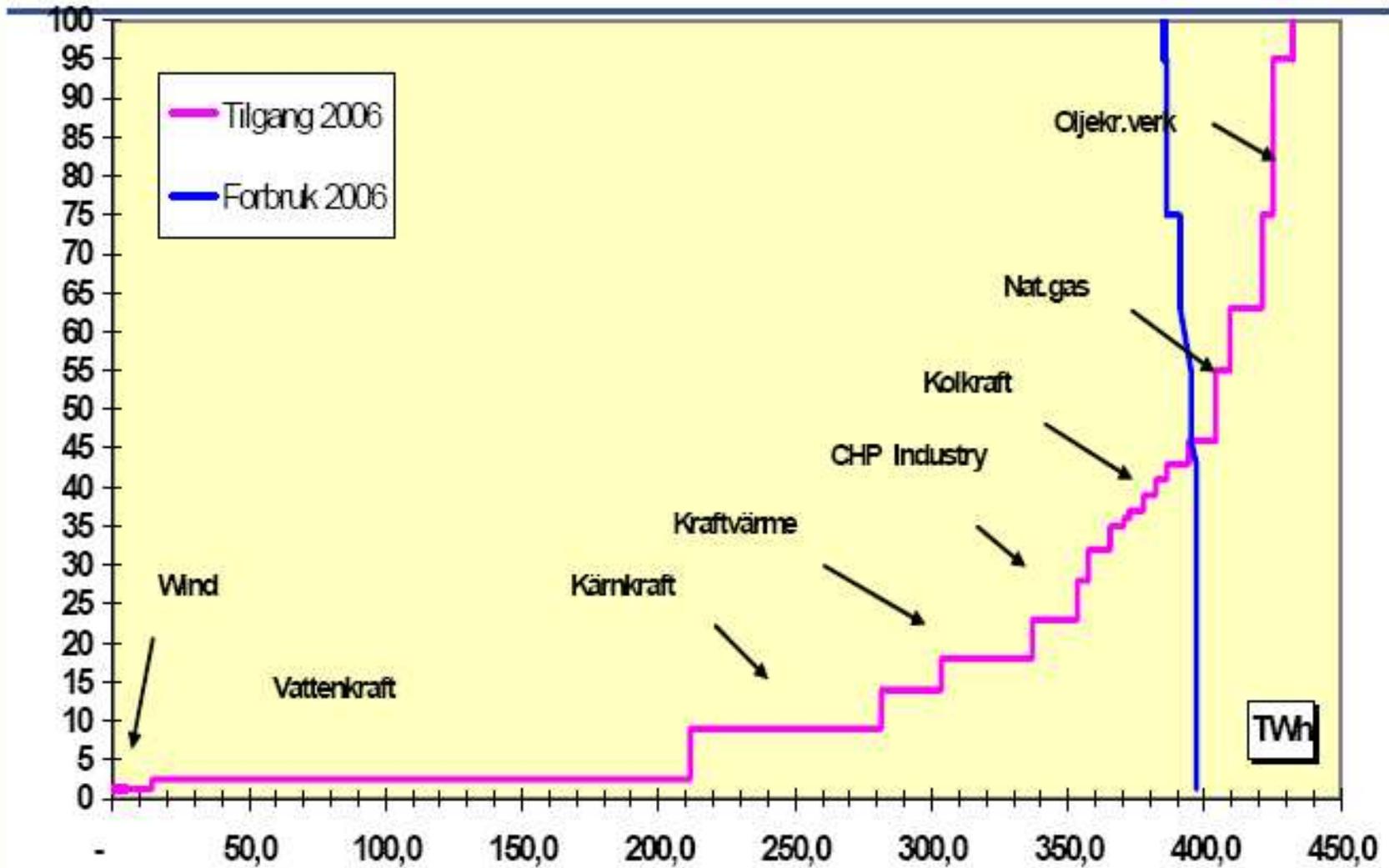
Local distribution of jobs and welfare



# Markedskurver tilgang/etterspørsel Norden år 2006



[Euro/MWh]



# Markedskurver tilgang/etterspørsel Norden år 2006

