Nordic Energy Technology Scoreboard

IEA EGRD Workshop, Brussels

9 November 2010

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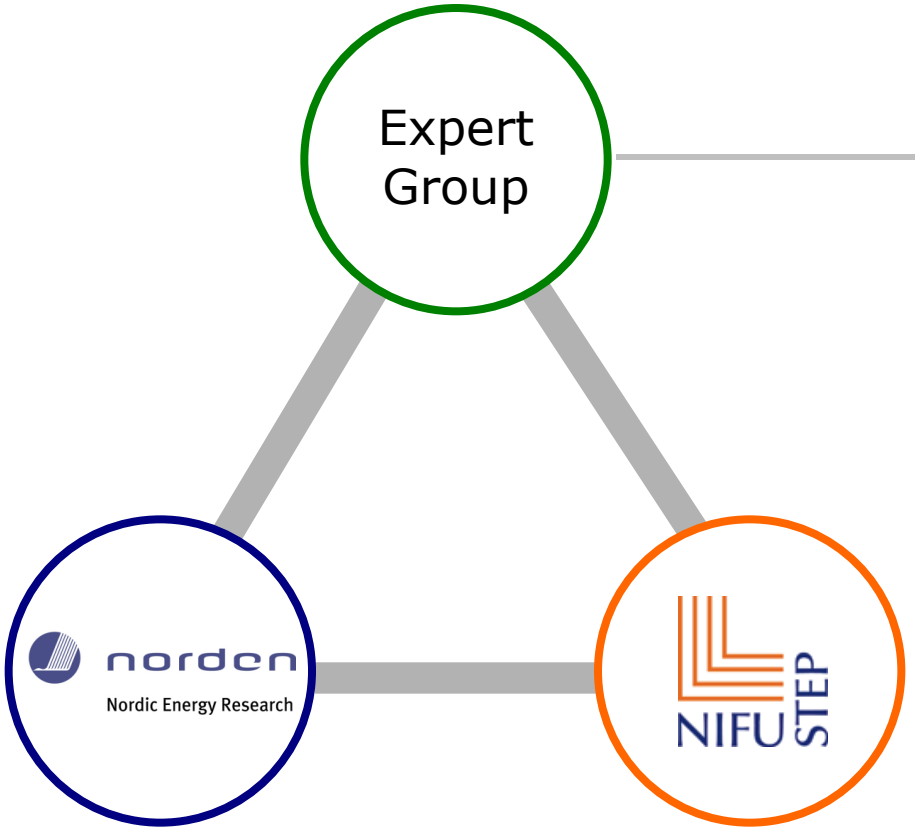
Project participants



JRC EUROPEAN COMMISSION

ie Institute for Energy

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The Research Council of Norway

ADVANSIS

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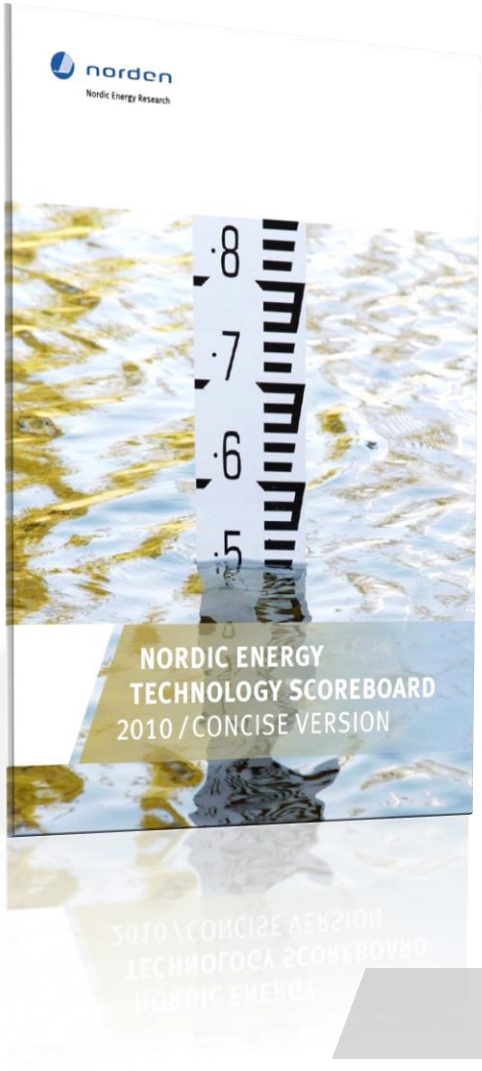
Aims

Pilot project with limited scope

Tool for decision-makers

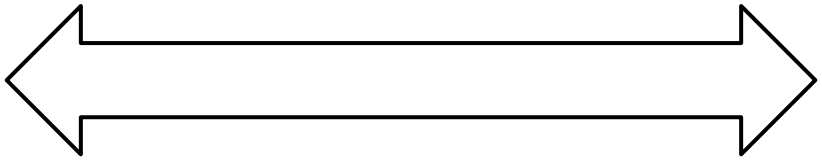
Vehicle to promote data collection



Two approaches

Model

- Generic
- Scalable
- Shallow



Tool

- Specific
- Unscalable
- Deep

Scope

Geographic

- Denmark, Finland, Iceland, Norway, Sweden
- EU27, UK, DE, ES, PT, FR, IT, AT, USA, JP

Technologies

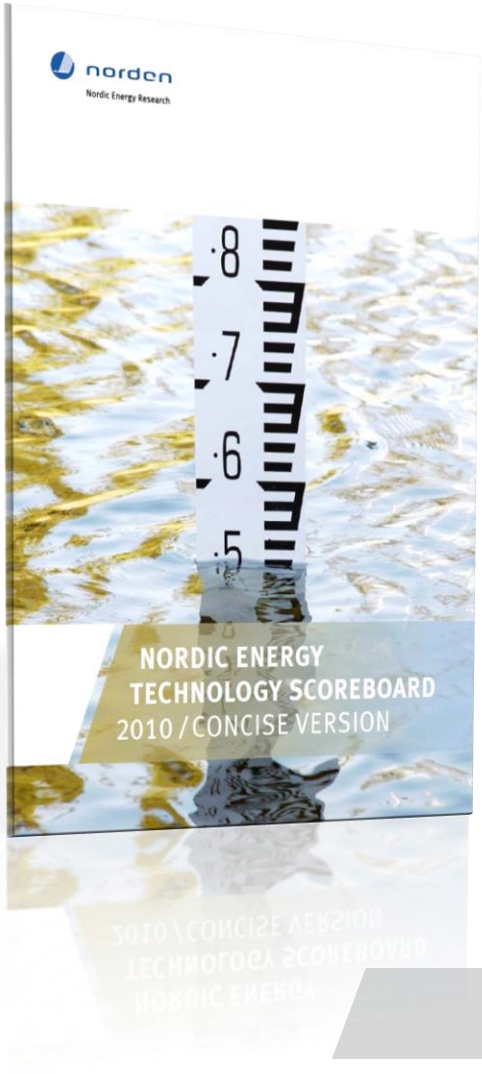
- Wind, PV, Biofuels, Geothermal, CCS

Time

- 10 years

Innovation chain

- Basic research to demonstration



Strategy

Near

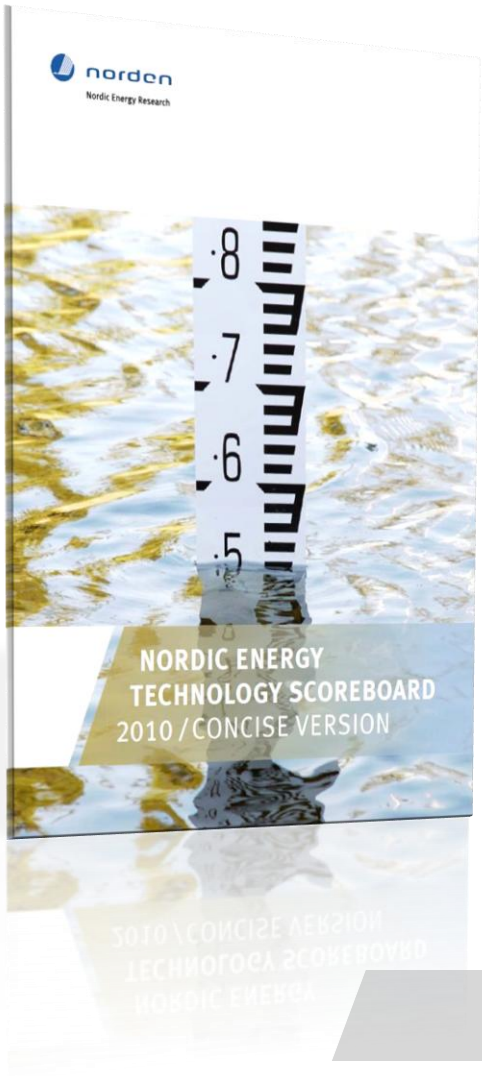
- Compiling data

Mid

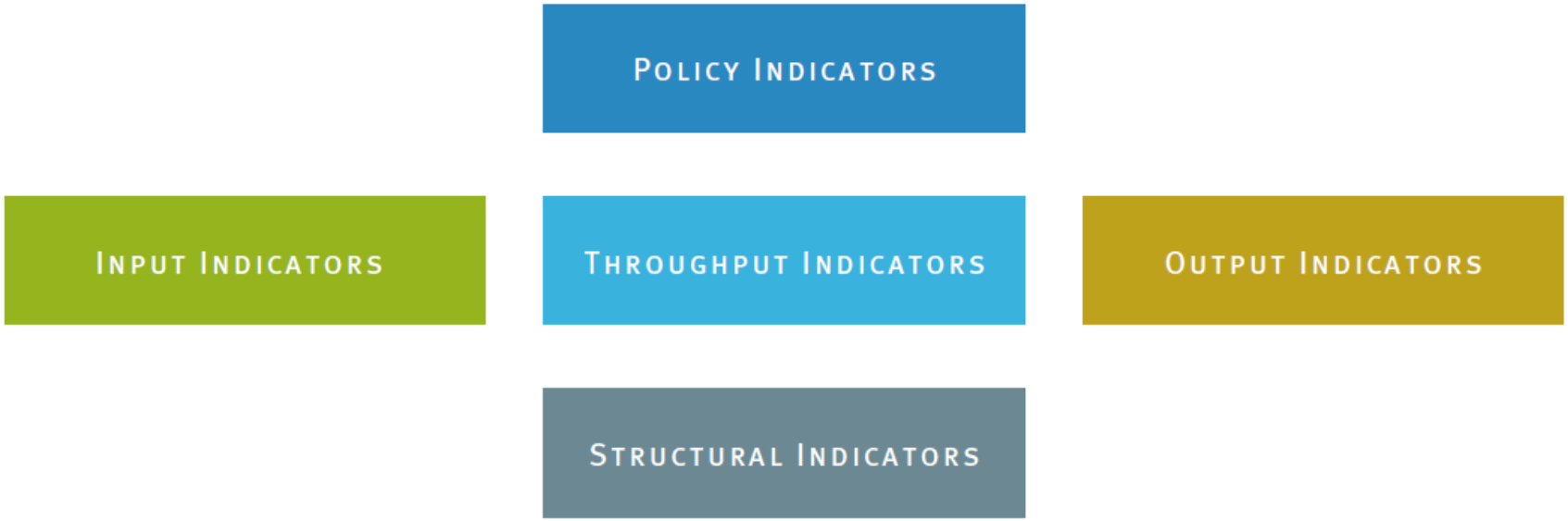
- Developing techniques

Long

- Recommending improvements



A model

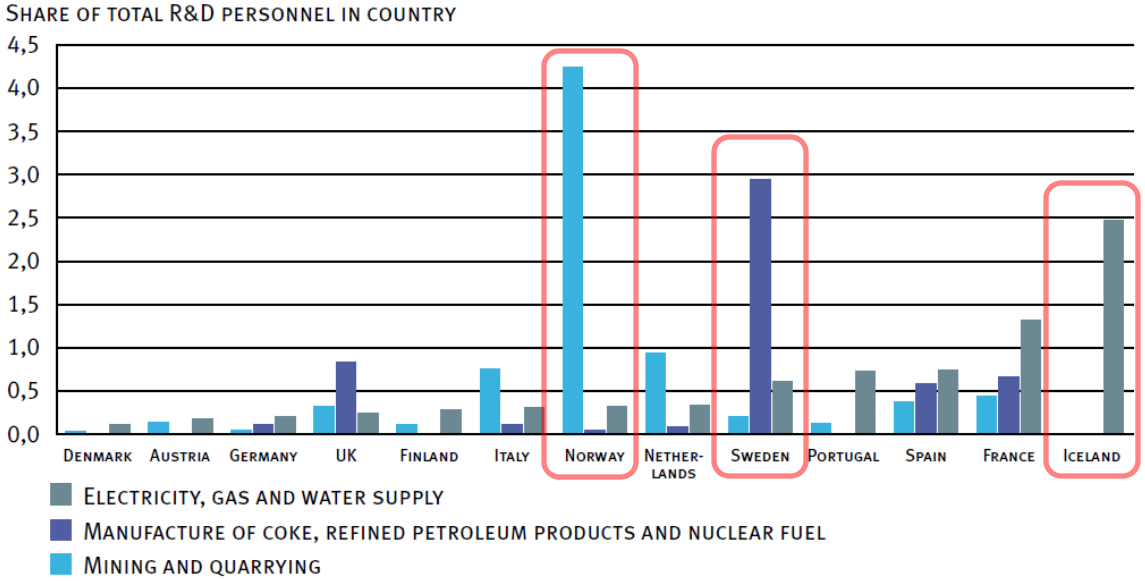

Policy Indicators
Input Indicators
Throughput Indicators
Output Indicators
Structural Indicators

Structural Indicator example: Human Resources

STRUCTURAL

- PROXIES OF SIZE
- INDUSTRIAL SPECIALISATION
- HUMAN RESOURCES
- ENERGY R&D PRIORITISATION
- ENERGY MIXES
- RESOURCE ENDOWMENT

FIGURE 5: R&D SKILLS, SHARE OF ALL NACE BRANCHES OF TOTAL R&D PERSONNEL IN 3 INDUSTRIAL SECTORS. 2007 FULL TIME EQUIVALENTS.



Source: Eurostat.

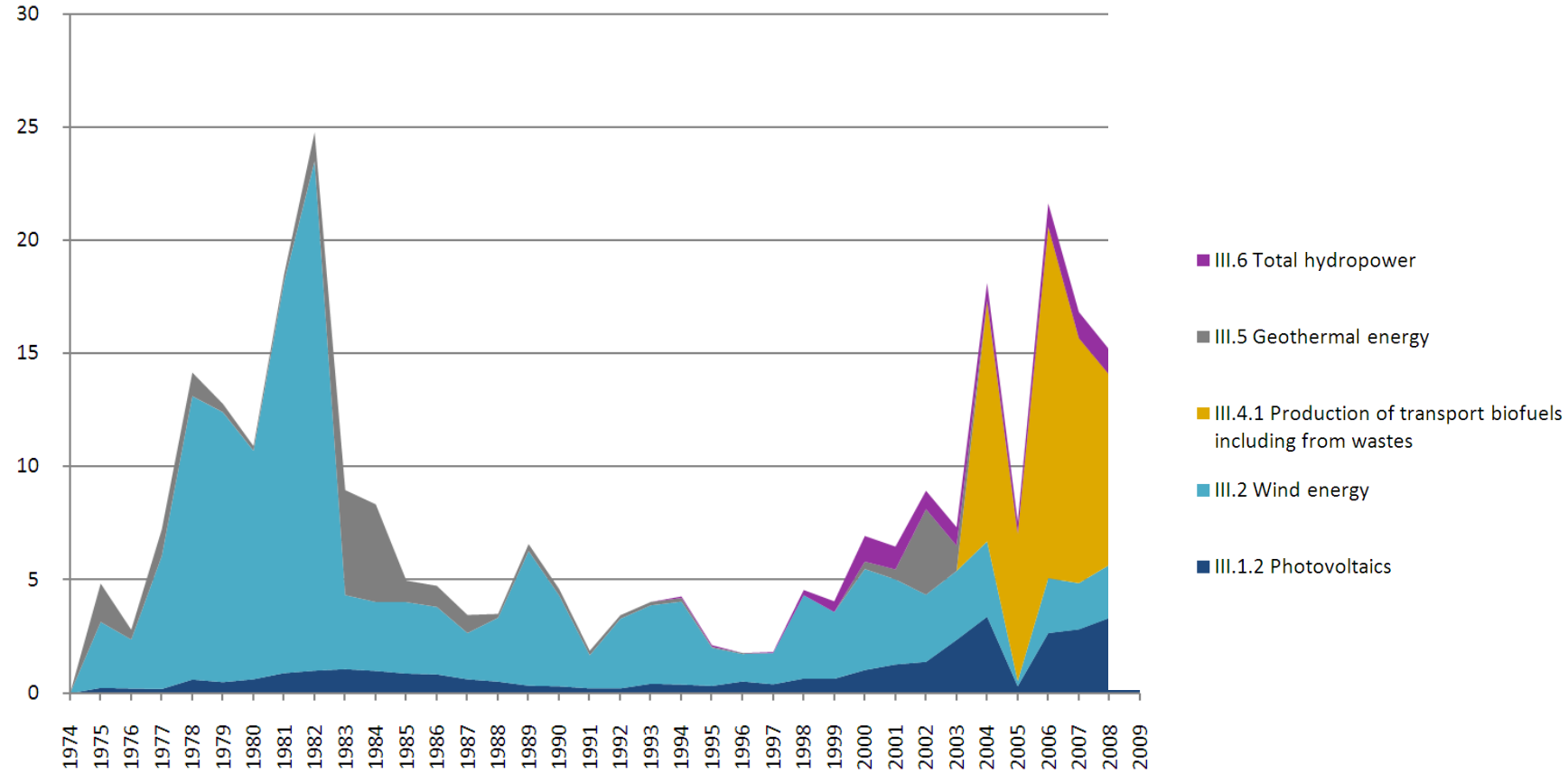
Notes: Latest year for Italy 2006; Netherland 2005 (ISIC codes 10-14, 23, 40); Denmark: confidential for manufacture of coke, etc)

Input indicators: Public RD&D budgets

INPUT

- PUBLIC RD&D BUDGETS
- SPECIALISATION (RD&D VS. VALUE ADDED, RD&D VS. PRODUCTION)

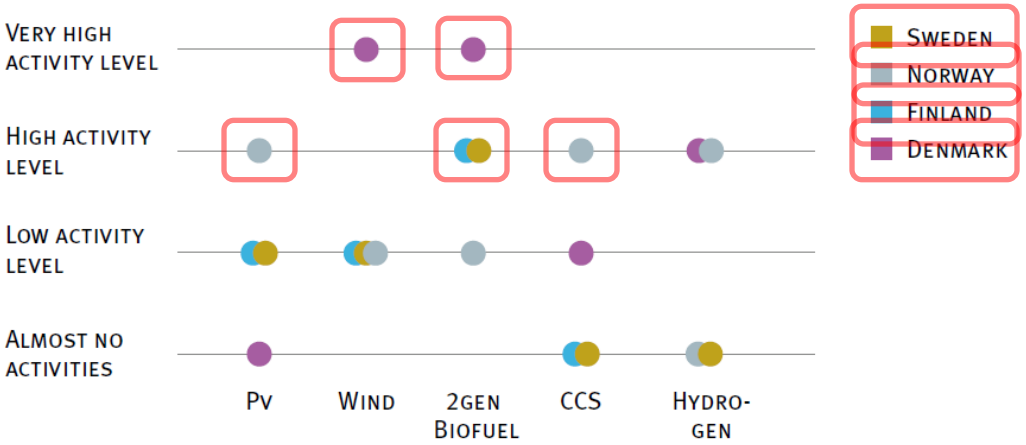
FIGURE 19: SWEDEN, DISTRIBUTION OF LOW CARBON ENERGY RD&D BUDGETS, MILL €. 1975-2008.



Source: IEA.

Throughput indicators: Patents

FIGURE 22: SUMMARY OF EPO PATENT APPLICATIONS FOR DENMARK, FINLAND, NORWAY AND SWEDEN. RATING BASED ON COMPARISON BETWEEN COUNTRIES.*



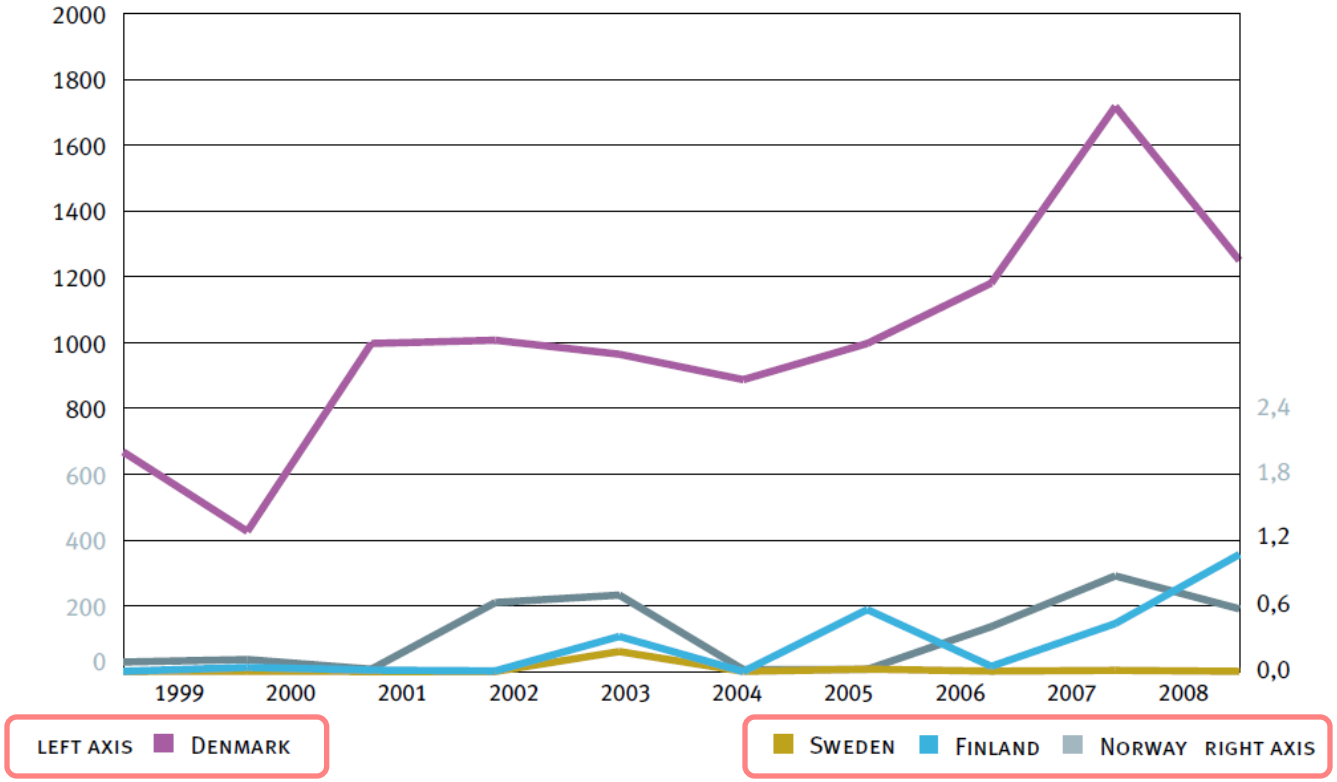
Sources: EPO, ENERGIA Technology reports, 2008.

Output Indicators: Wind

Output

- Energy technology exports

FIGURE 23: WIND TECHNOLOGY EXPORT FROM THE NORDIC COUNTRIES. 1999-2008. MILL. USD.



Source: UN Comtrade Database.

Policy Indicators: Norway and Finland

POLICY

- TAXES
- TRADABLE PERMITS
- INCENTIVES AND SUBSIDIES
- REGULATORY INSTRUMENTS
- POLICY PROCESSES
- RD&D POLICIES

FIGURE 28: NORWAY – POLICY MEASURES IN THE IEA DATABASE – ENDURANCE OF MEASURES.

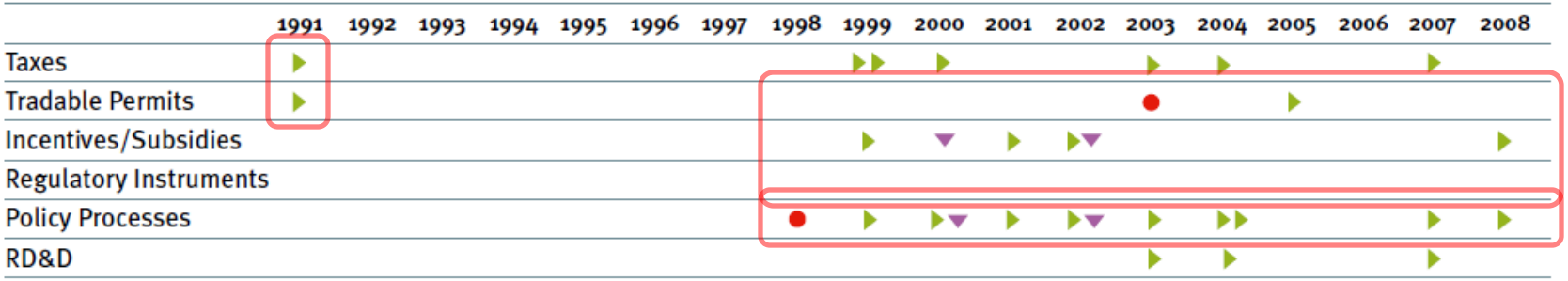
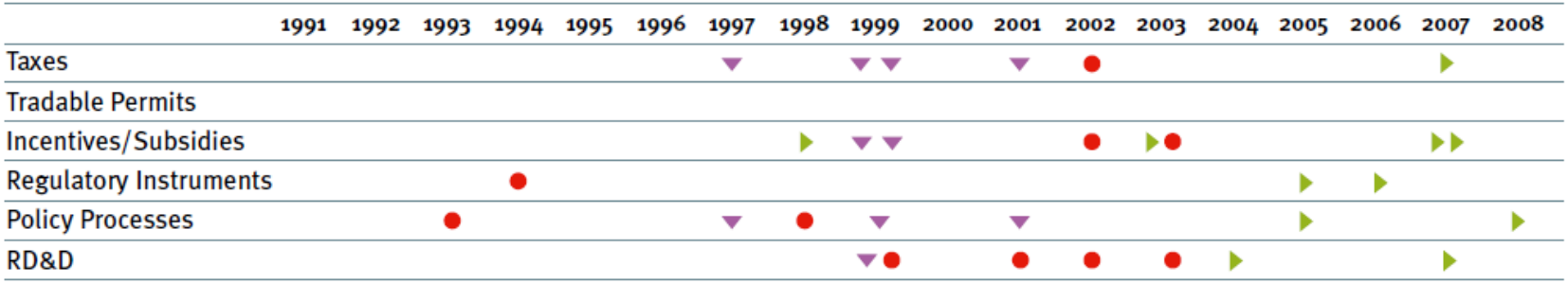


FIGURE 26: FINLAND – POLICY MEASURES IN THE IEA DATABASE – ENDURANCE OF MEASURES.



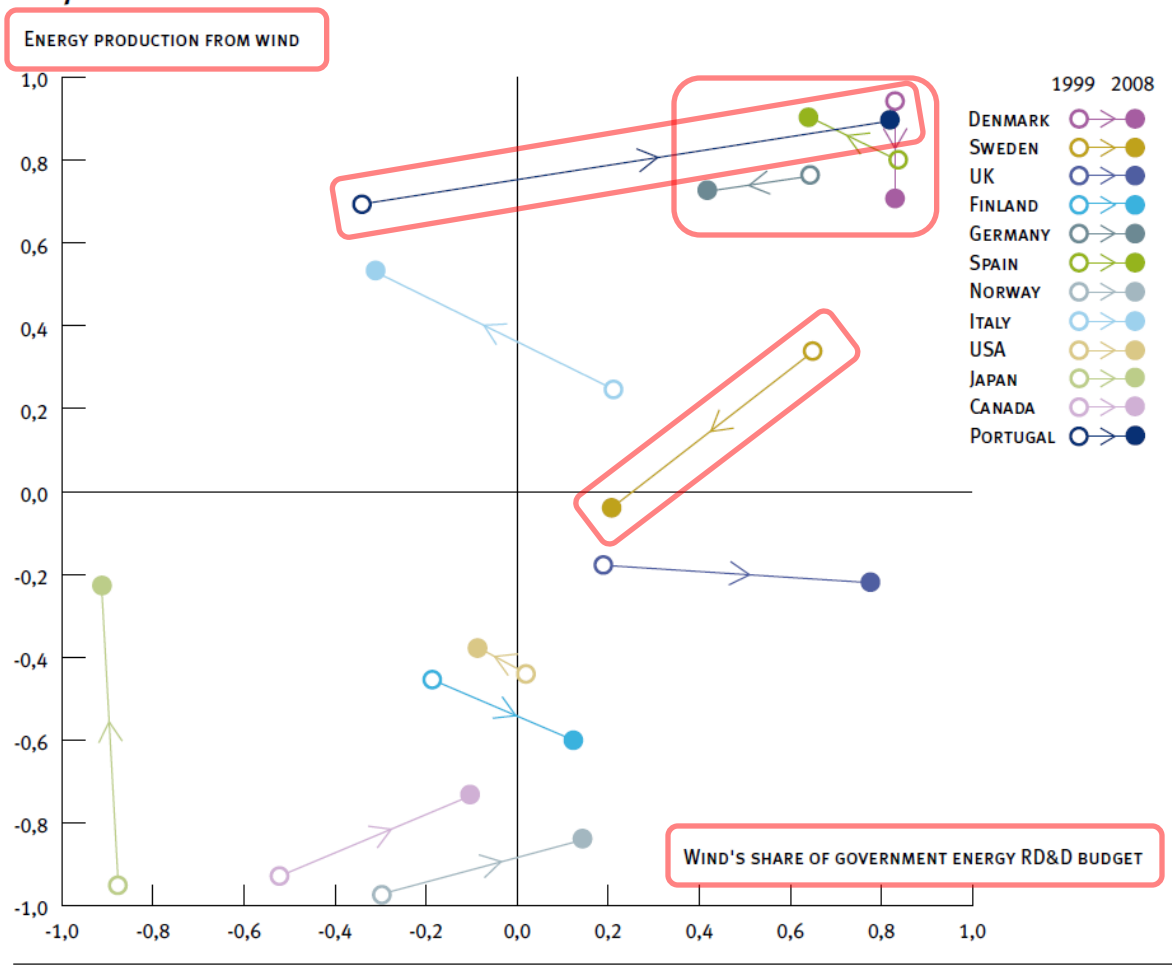
The year where the policy is included in the figure indicates the year it was introduced, regardless of its status.

- Policy introduced and still in force
- Policy introduced and since superseded
- Policy introduced and since phased out

Source: IEA Renewable Energy Policy Database

Composite indicator for Specialisation

FIGURE 20: REVEALED SYMMETRIC COMPARATIVE ADVANTAGE FOR WIND ENERGY. 1998 AND 2007.



For an explanation of how this figure has been calculated please refer to page 47 in the Annex.
Source: IEA.
Based on RD&D budget shares for wind RD&D and energy production shares for wind energy production.

INPUT

- PUBLIC RD&D BUDGETS
- SPECIALISATION (RD&D VS. VALUE ADDED, RD&D VS. PRODUCTION)

OUTPUT

- ENERGY TECHNOLOGY EXPORTS

Challenges identified

- Varying maturity of technologies
- Systemic technologies
- Positive externalities
- Data collection, comparibility, categorisation

10 Recommendations for Future Scoreboards (1 of 2)

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1. **RD&D investment**
2. **Industrial activities**
3. **Licensing and private investment**
4. **International technology transfer**
5. **Technology standards**

10 Recommendations for Future Scoreboards (2 of 2)

Nordic Energy Research

6. **Relationships between indicators**
7. **Bibliometric and patent indicators**
8. **Monitoring carbon capture and storage**
9. **Political framework conditions**
10. **Public acceptance**

Thank you

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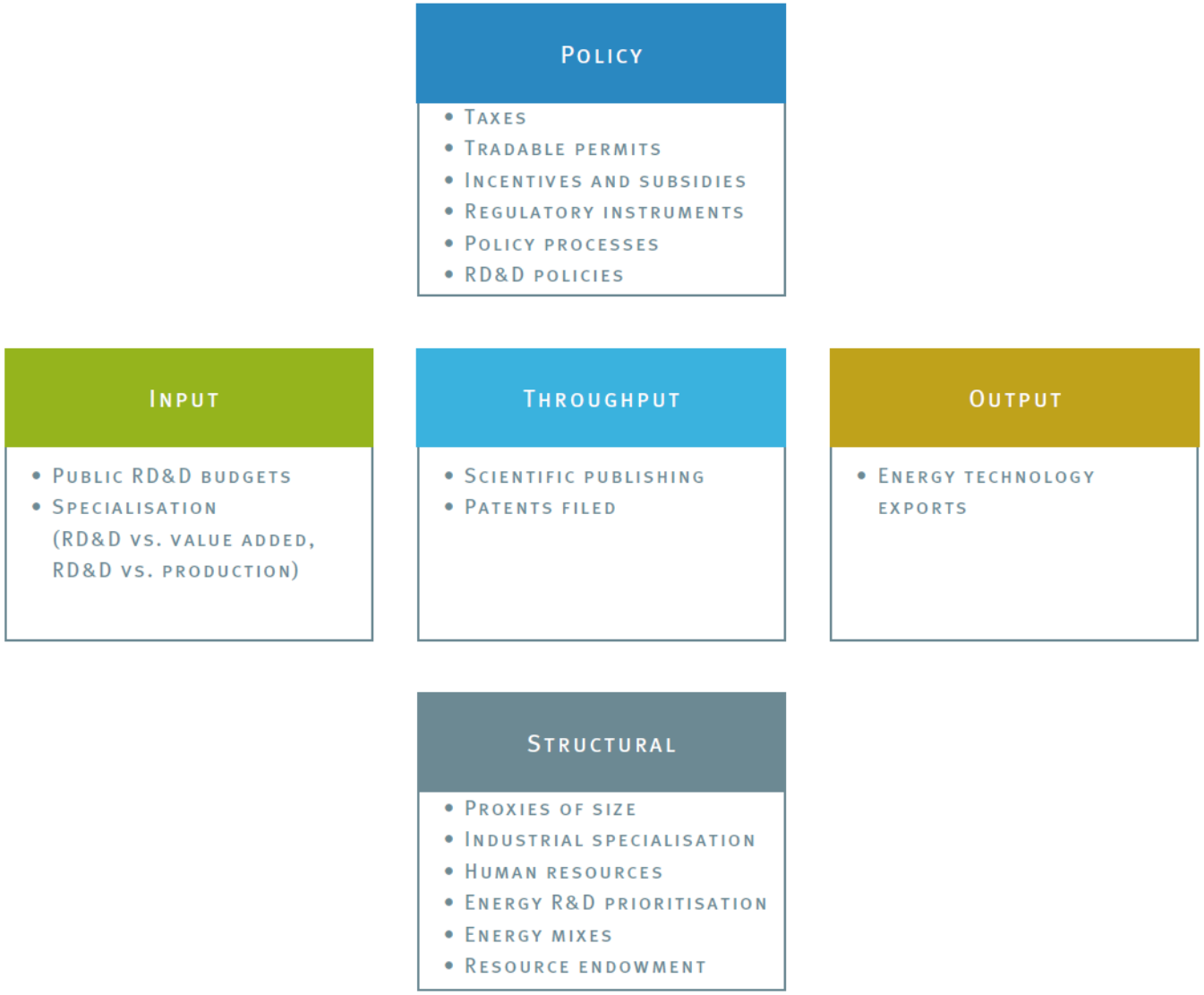
Benjamin Smith, Adviser, Nordic Energy Research

www.nordicenergy.net

A model

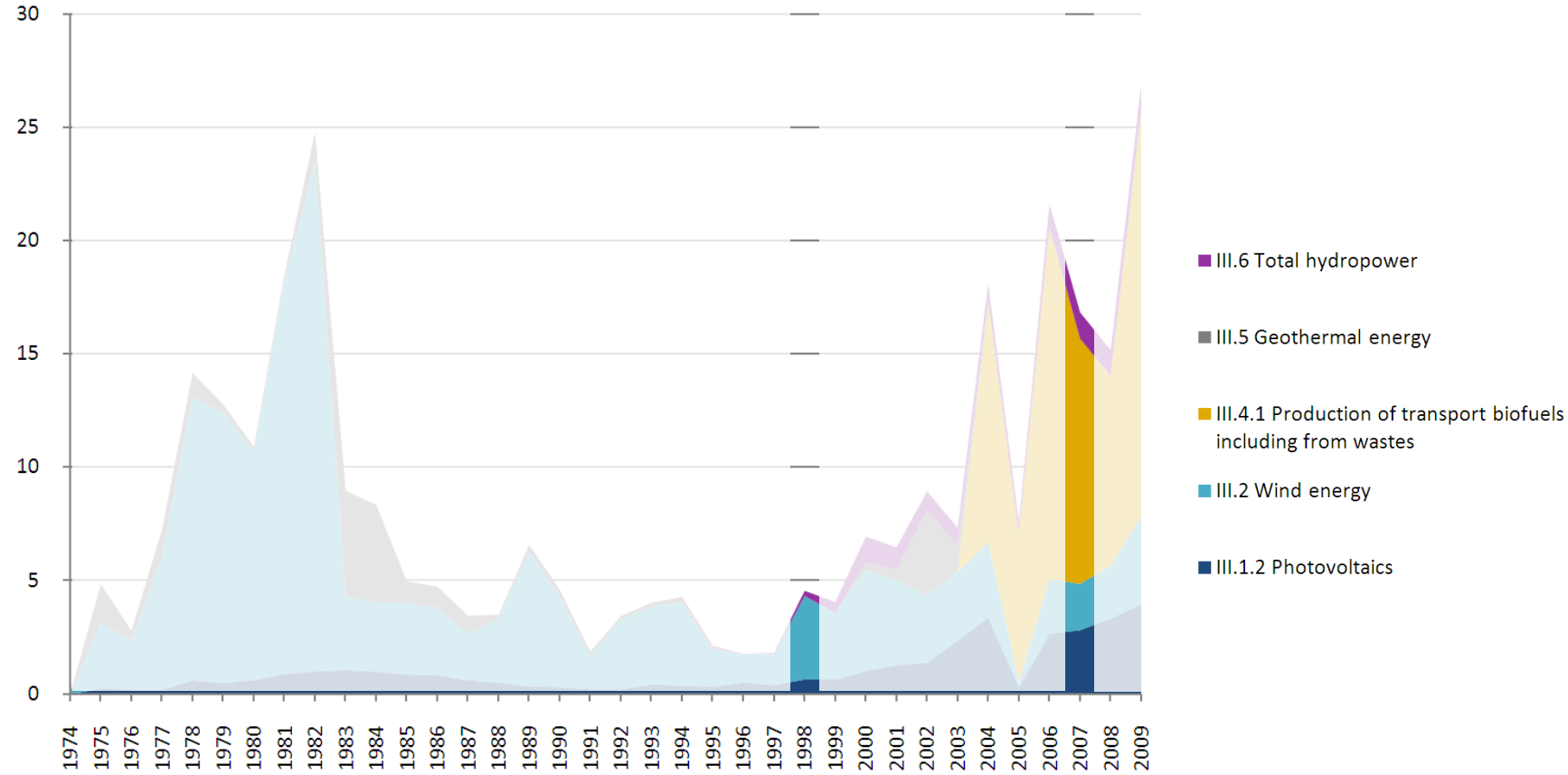

Policy
• Taxes
• Tradable permits
• Incentives and subsidies
• Regulatory instruments
• Policy processes
• RD&D policies
Input
• Public RD&D budgets
• Specialisation (RD&D vs. value added, RD&D vs. production)
Throughput
• Scientific publishing
• Patents filed
Output
• Energy technology exports
Structural
• Proxies of size
• Industrial specialisation
• Human resources
• Energy R&D prioritisation
• Energy mixes
• Resource endowment

Input indicators: Public RD&D budgets

INPUT

- PUBLIC RD&D BUDGETS
- SPECIALISATION (RD&D VS. VALUE ADDED, RD&D VS. PRODUCTION)

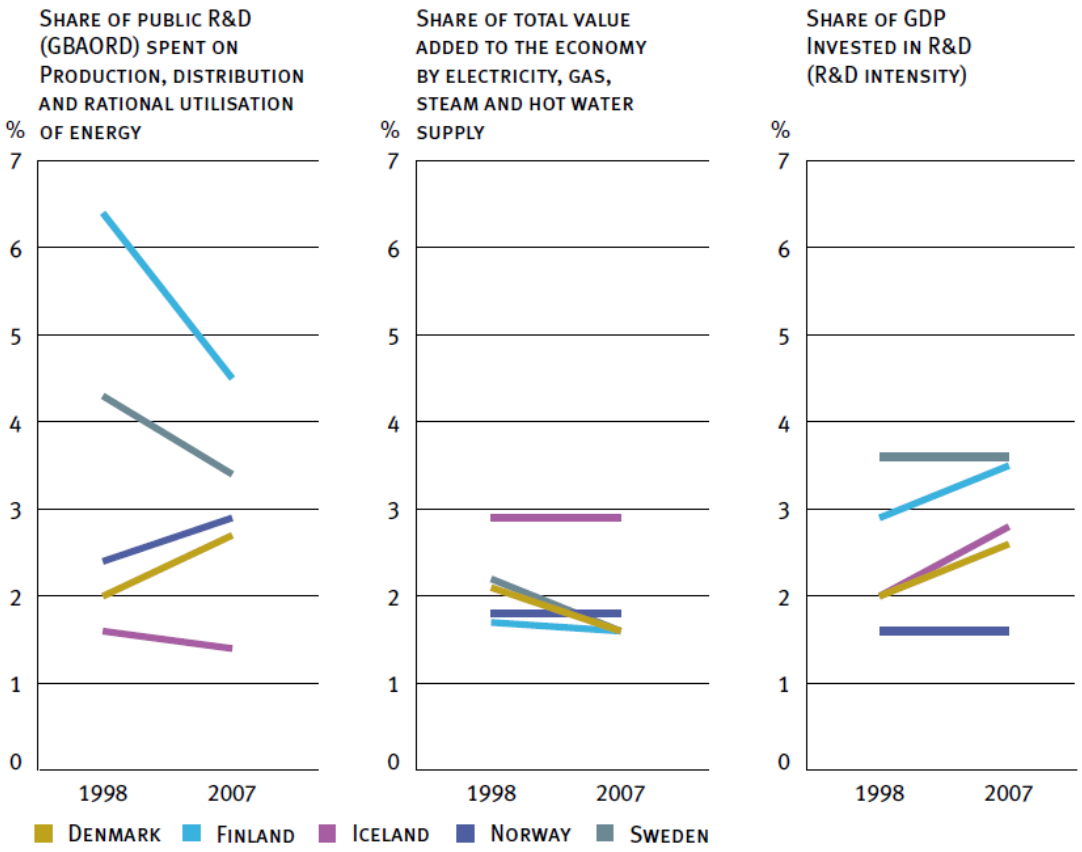
FIGURE 19: SWEDEN, DISTRIBUTION OF LOW CARBON ENERGY RD&D BUDGETS, MILL €. 1975-2008.



Source: IEA.

Structural Indicators: Energy R&D Prioritisation

FIGURE 9: ENERGY R&D PRIORITISATION AND FRAMEWORK CONDITIONS. SHARES OF TOTALS. 1998 AND 2007.



Sources: Eurostat, OECD STAN database.