Political momentum for renewable energy policies: Lessons from the UK, Germany and Denmark

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Thailand’s Solar PV Roadmap Initiative and the Governance of Energy Transition, Bangkok, April 2015
Electricity from renewable sources as a proportion of total production of electricity

Source: IEA Renewables Information 2013
A political puzzle....

<table>
<thead>
<tr>
<th></th>
<th>Cost of renewables as % of GDP in 2010*</th>
<th>EU 2020 package target for renewable energy</th>
<th>National targets</th>
<th>Position on national renewables targets in EU 2030 package</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>0.06</td>
<td>15%</td>
<td>No</td>
<td>No binding targets</td>
</tr>
<tr>
<td>Germany</td>
<td>0.22-0.27</td>
<td>18%</td>
<td>Yes (2025, 2035, 2050)</td>
<td>30% binding target</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.09</td>
<td>30%</td>
<td>Yes (2020, 2050)</td>
<td>30% binding target</td>
</tr>
</tbody>
</table>

* Source: OECD 2013
Understanding differences in policy

- Subsidy (e.g. RPS, FiT, market premium etc.)
- Technology cost and availability
- Sale (liquid market, PPA, forced purchase etc.)
- Finance policy inc. state banks
- Planning policy
- Network regulation
- Renewable deployment support policy
- Trade and industrial policy
- Electricity market policy
- Financing
- Planning
- Network connection and use charges

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Understanding differences in policy...
…within the wider political context

Policy makers

- Influencing
- Electoral/political pressure

Energy users (households/voters, business)

- Energy
- Employment
- Supply chains
  - Manufacturing
  - Fuels

Energy providers

- Policy and regulation
- Influencing
- Energy
- Employment

Energy infrastructure outcomes
- Technological change
- GHG emissions

Investments

- Vested interests
- Costs
- Demand pull

Electoral/political pressure

- Payment for energy and policy rents
Denmark – Political dynamics of ownership

• Simple, low-risk accessible deployment support policy
  • Capital grants 1981 to 1988
  • 1984-91 FiT linked to retail price
  • 1991-2000 Fixed FiT
  • 2001-2009 Premium FiT
  • 2009- Premium FiT + balancing cost subsidy

• Creates widely dispersed local ownership
  • Early programmes specifically required local ownership (within 3 km of turbine), then progressively relaxed from 1985
  • Cooperative ownership dominated, building on strong institutional history; by 2001, cooperatives had installed 86% of turbines, and 150,000 households had a share in wind ownership (out of total of c.2.5 million)
Denmark – Political dynamics of ownership

• Facilitated by supportive financial sector and policy…
  • Small-scale investments financed through low-interest loans from mortgage banks, or backed by local municipal guarantees
  • Individual’s share of interest payable on loans can be deducted against income tax

• …and proactive supportive planning policy
  • Planning Law 1994: Requirement on local planners to identify suitable sites for wind
  • Requirement for public hearings prior to applications for projects
  • 2009 Act includes a ‘loss of value’ compensation scheme for individual neighbours

• Produces strong lobby and minimal opposition
  • Danish Wind Turbine Owners Association (Danmarks Vindmølleforening) formed strong lobby early on
  • Less planning opposition (“Your own pig doesn’t smell”)
Denmark – Political dynamics of ownership

• Is the model unravelling?
  • Move to premium FiT as more market oriented government came to power, and model became more commercial
  • Shift towards greater ownership by individual farmers from late 1990s; by 2005 12% of capacity owned by utility/corporates, 63% farmers and 25% cooperatives
  • Repowering with much larger turbines (in 1990 the average turbine capacity was around 50kW, by 2000 this had risen to 300kW and by 2012 it was almost 1MW)
  • Rising opposition as ownership model changes?
  • But also a counter-movement to restore local ownership and smaller scale? (Hvelplund et al 2013)
Denmark – Political dynamics within energy industry

• **Renewables imposed on grid companies**
  • Low cost grid connection for renewables was mandated and costs socialised
  • 1992 law requires on distribution network companies to connect
  • Project pays only for cost of nearest transformer; additional costs borne by network utility

• **From 2001 wind competes with existing conventional power plants**

• **But relatively little counter-lobby**
  • No large corporate interests involved
  • Distribution companies non-commercial, locally owned
  • Thermal plant also often owned by conglomerates of municipalities or cooperatives
  • Main large generator from 2005 = state owned DONG
  • Increasing involvement of utilities as scale increases and move offshore
Denmark – Political dynamics of supply chain

**Nascent wind industry had significant support**
- Quality certification
- Public support to wind R&D
- Tax relief on investment
- Government-backed Wind Turbine Guarantee on financing for projects using Danish-made turbines
- Customs duties protecting turbines
- Export credit assistance, including via DANIDA

**Leading to strong domestic employment and export earnings effects**
- Supply chains mostly domestic; EWEA estimates 23,500 employed in wind industry in 2009, many highly-skilled
- Two large turbine manufacturers – Vestas and Bonus (later Siemens) – but main employment is in the components and services supply chain
Denmark – wider political context

- **Electoral system**
  - Proportional representation gives a strong voice to environmentally minded voters through small ‘green’ minded parties often in governing coalitions
  - Social Liberal Party important for support of FiT in 1990s

- **Low inequality and generous welfare payments**
  - Cost of renewable energy support low on political agenda

- **No coal lobby and little energy-intensive industry**
Germany

Source: IEA Renewables Information 2013
Germany – Political dynamics of ownership

• **Simple, low-risk accessible deployment support policy**
  • 1990-2014 Fixed FiTs, aimed explicitly at smaller actors
  • Utilities excluded in their home areas
  • Tariffs for wind skewed to low wind areas
  • Technology specific: decision taken in early 2000s specifically to support solar PV
  • 2014 onwards move to premium FiT on market price

• **Creates widely dispersed ownership**
  • Range of investors including regions (Lände), municipal Stadtwerke, small companies formed by individuals
  • >1 million owners of rooftop solar PV by 2015
Ownership of renewables (except hydro) in Germany 2010

Source: Lauber (2013)
Germany – Political dynamics of ownership

• Facilitated by supportive financial institutions…
  • Subsidized loans from state-owned bank (previously Deutsche Ausgleichsbank now KFW)
  • 20 year low-interest loans up to 100% of investment costs
• …and proactive supportive planning policy
  • Planning law reforms 1996: wind energy becomes part of regional and municipal master plans
  • Pro-active identification of priority, restricted and excluded areas
• Produces strong lobby and minimal opposition
  • Interest group effects, including highly organised renewable energy associations, trade unions, manufacturing employers associations
  • When reduction in FiT rates proposed in late 1990s, Green Party mobilised a wide coalition of environmental groups, solar industry associations and companies, trades unions and regional politicians to successfully oppose the changes.
Germany – Political dynamics within energy industry

• **Renewables imposed on grid companies**
  • Guaranteed connection and priority access for renewables under the feed-in law (Mitchell et al 2006)
  • Higher voltage networks owned by 4 large utilities

• **Opposition from large incumbent utilities**
  • Stagnant demand means renewables displace conventional plant
  • Utilities opposed rather than joined renewables growth (Stenzel and Frenzel 2008)
  • 1994 – energy utility association (VDEW) argued for abolition of FiT
  • Refusal to pay FiT and connect renewables led to court cases, inc. European Court of Justice, and lobbying of European Commission to challenge FiT
  • From late 1990s utilities begin to change strategy and invest, especially in wind, especially offshore more recently
Germany – Political dynamics of supply chain

• **Wind and solar PV industries had strong support**
  • Policy paradigm allowed technology specific design and industrial policy more easily - ‘ecological industrial policy’
  • 100MW/250MW program: 10-year federal subsidy to raise technical standards in German wind industry
  • Regional (Lände) level support to wind industry
  • Public support to wind R&D, including Solar Valley *MittelDeutschland*
  • Export credit assistance

• **Leading to strong domestic employment effects**
  • Supply chains mostly domestic (until late 2000s)
  • 38,000 employed in wind (EWEA) and almost 90,000 in solar PV (Lutkenhorst and Pegels 2014)
  • Strong employment effects and industrial lobbies, but solar PV undercut by China at end of 2000s and many jobs have gone
Solar PV manufacture in former East Germany

Source: Grau et al 2011
Germany - Wider political context

- **Electoral system**
  - Proportional representation gives a strong voice to environmentally minded voters through Green Party, in governing coalitions 1998-2005

- **Low inequality and generous welfare payments in 1980s but changing over time**
  - Cost of renewable energy rises up political agenda in late 2000s and early 2010s

- **Strong coal lobby and large energy-intensive industry**

Source: Fraunhofer Institute
UK

Source: IEA Renewables Information 2013
UK – Political dynamics of ownership

• **Complex risky deployment support policy**
  • Policy influenced by liberal market paradigm (technology-neutral. ‘government shouldn’t pick winners’)
  • 1990-2002 NFFO (auctions)
  • 2002-2017 RO (RPS)
  • 2010- Fixed FiTs for <5MW
  • 2014- CfD FiT for >5MW
  • Incentivised clustering of wind in windy (sensitive) spots because this maximised ROC revenue

• **Creates concentrated ownership**
  • Small actors unwilling or unable to take on risk and complexity
  • Investment dominated by wind and by Big Six and large developers – in 2005 98% of wind capacity owned by corporate developers or utilities; 1% by farmers and 1% by coops (Toke 2006?)
UK – Political dynamics of ownership

- Absence of supportive finance for small-scale investment…
  - Price risk and policy uncertainty meant investments largely financed by utilities in-house (Stenzel and Frenzel 2008)
  - No institutions for smaller scale investors
  - Post-financial crisis, retail equity/bonds for small scale wind and solar projects have taken off

- …and absence of proactive planning framework
  - Local authorities have responsibility for projects of <50 MW
  - Guidance differs across the 4 nations, England is most ad hoc
  - Voluntary scheme for ‘community benefits’ payments by wind developers
UK – Political dynamics of ownership

• Weak lobby and strong opposition
  • Rents accrue to large developers and Big 6 energy corporates
  • Energy industry heavily disliked by public, worse than banks
  • Splintered renewables lobbies
  • Local planning opposition - move to offshore but cost increases
  • Increasingly opposition esp. to wind becomes part of right-wing political identity
UK- Political dynamics within the energy industry

- Decisions on connection and charging delegated to network companies
  - Connection decisions delegated to efficiency regulated network companies; mixed incentives for DG connection until 2010
  - ‘Shallow’ connection charges for distribution connected generation, but charging methodology not transparent or predictable
  - Grid access delays for Scottish wind until ‘Connect and Manage’ in 2009
  - Resistance to any type of coordination, but off-shore wind is an exception where the Crown Estate plays a key coordinating role (Kern et al 2014)

- Utilities ambivalent towards renewables
  - Vertically integrated Big 6 utilities were required to buy power from renewables, but also invested in wind However, politically ambivalent because they have split portfolio
  - No incentive to overachieve RO targets (Stenzel and Frenzel 2008)
UK – political dynamics of supply chain

• **Relatively weak support to supply chain**
  • Dominant policy paradigm strongly opposed to industrial policy (especially in HMT)
  • Public support to R&D (especially after mid-2000s)
  • Minor support through RDAs in 2000s
  • Offshore wind industrial strategy 2013 and Green Investment Bank financing support

• **And weak employment effects**
  • Supply chains mostly foreign – in 2009 only 4,000 employed in wind
  • Weak industrial lobby – may change with offshore boom
UK wider political context

• **Electoral system**
  • Majoritarian voting for Westminster Parliament
  • Weak ‘green’ party political voice (Green Party has only 1 seat and none before 2010)
  • Although Scottish and Welsh Assemblies now have forms of PR

• **High inequality, stagnant/falling median real incomes and low levels of welfare provision**
  • Household cost concerns strong in public debate - fuel poverty problem and excess profit narrative

• **Coal lobby destroyed in 1980s, but significant energy-intensive industry**
UK - Signs of change?

Source: DECC (2014) Energy Trends Table ET 6.4

- Surge in solar PV ownership from 2010
- ~40 energy cooperatives by 2014
- Community and Renewable Energy Scheme in Scotland

- Support to offshore supply chain investments beginning to come through
- Siemens turbine manufacturing plant in Hull
- Jobs in offshore double 2010-2013 to ~7,000

Source: Digest of UK Energy Statistics (2014) Table 6.1
Conclusion and policy implications

• Think about the *political* implications of policies, especially distribution of costs and benefits = ‘policy feedback’ (Pierson, Béland)

• Effects depend on *policy design* and *institutions*, including political institutions

• Policy feedback can be positive (leading to ‘increasing political returns’ and take-off) or negative (leading to stagnation) (Weaver 2010)

• In the absence of *any* positive feedback effects, sustaining an expensive renewables support programme may be difficult

• Renewable technologies offer lots of potential for dispersed ownership and employment effects through installation, manufacture and supply chains (although global competition is also keen)

• For PV, don’t forget rooftop in rush to solar parks (lessons from India?)
References

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• Kern et al (20XX) on offshore wind
• Lauber, V. (2013) ‘Current and upcoming challenges for Germany’s Energiewende’ Presentation to Science Policy Research Unit, University of Sussex
References


• Meyer (2006) Learnings from wind energy policy in the EU, with focus on Denmark, Sweden and Spain European Environment?


• OECD (2013) Effective Carbon Prices, OECD, Paris


References


Extra slides
Higher costs not due to inefficient support policies

Source: OPTRES, 2007
Wind generation per 1,000 inhabitants in 2007

Source: EWEA