Improving the framework conditions to promote renewable energy production (and its territorial impacts) in rural regions -

Institutional issues, Value-added, Innovation capacity, Skills, Investment, and Infrastructure

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Outline

A. Institutional and policy provisions
B. Value-added in renewable energy production, & improving the territorial income component
C. Regional Innovation capacity and performance
D. Human skills and capabilities
E. Investment
F. Infrastructure issues
G. Social attitudes to renewable energy
H. Reflections on capacities for renewables as regional policy

A few prior observations

- Investment in renewable energies other than large hydro power grew from $22bn in 2002 to $173bn by 2008
- Compares with FAOs $83bn pa I in ag. to ‘feed the world by 2050’
- Renewables are mostly rural resources
- Value-added is mainly rent, interest and profit: GDP hugely overstates regional benefit.

Prior Observations (cont)

- Most rapidly growing investment in both capacity and R&D have been
  - Wind (56% of total investment),
  - Solar (20%), and
  - Bioenergy (biofuels, biomass and waste) (11%).
  - marine and small hydro power investment grew by 53% between 2004 and 2008, while investment in wind power increased by 51% over the same period.
- Bloomberg expects geothermal to increase by over 40%, and biomass by over 33% by 2013. Marine based energy is also expected to grow rapidly as new technology is proven.
- Heyerdahl (2010) argues that biomass will be increasingly diverted to liquid fuel production for transportation.

A. Institutional & Policy Issues

1. Favourable treatment of different groups of investors
2. Feed-in rights and tariffs
3. Taxation provisions
4. Innovation and the Patenting of technology
5. State partnership or investment
6. State grants for investment
7. Operation of carbon markets & renewable energy certificates (RECs)
8. Conflicts or synergies between regional/ State policies and national policies
9. The creation of ‘legitimacy’

1. Favourable treatment of classes of investors

- In some countries (e.g. Netherlands, UK, USA) large corporate investors and/or very wealthy individuals have been favoured by public subsidies
  - especially tax incentives
- In others (e.g. Denmark, Sweden, Finland, Germany) communities (and cooperatives) and small private investors have been favoured
  - Especially by direct investment subsidies and regulatory provisions

2. Feed-in rights and tariffs

- The most important policy tool for encouraging the development of solar, wind. Also important for small scale hydro and bio-energy.
  - "FITs are responsible for approximately 75% of global PV and 45% of global wind deployment". (Deutsche Bank, 2010)
  - Denmark 1984 law to obligate utilities to buy wind power at 85% of the retail price
- FITs often tailored to meet range of policy goals
  - territorial development, location and choice of technology

2. FITs…

- Typically include three key elements
  - guaranteed grid access;
  - stable, long-term purchase agreements (15-20 years);
  - payment levels based on the costs of renewable generation
- In some countries, e.g.Germany, include streamlined administrative procedures that reduce transactions costs & speed implementation.
- European FIT policies typically
  - 20 years +
  - extend eligibility to anyone with the ability to invest,

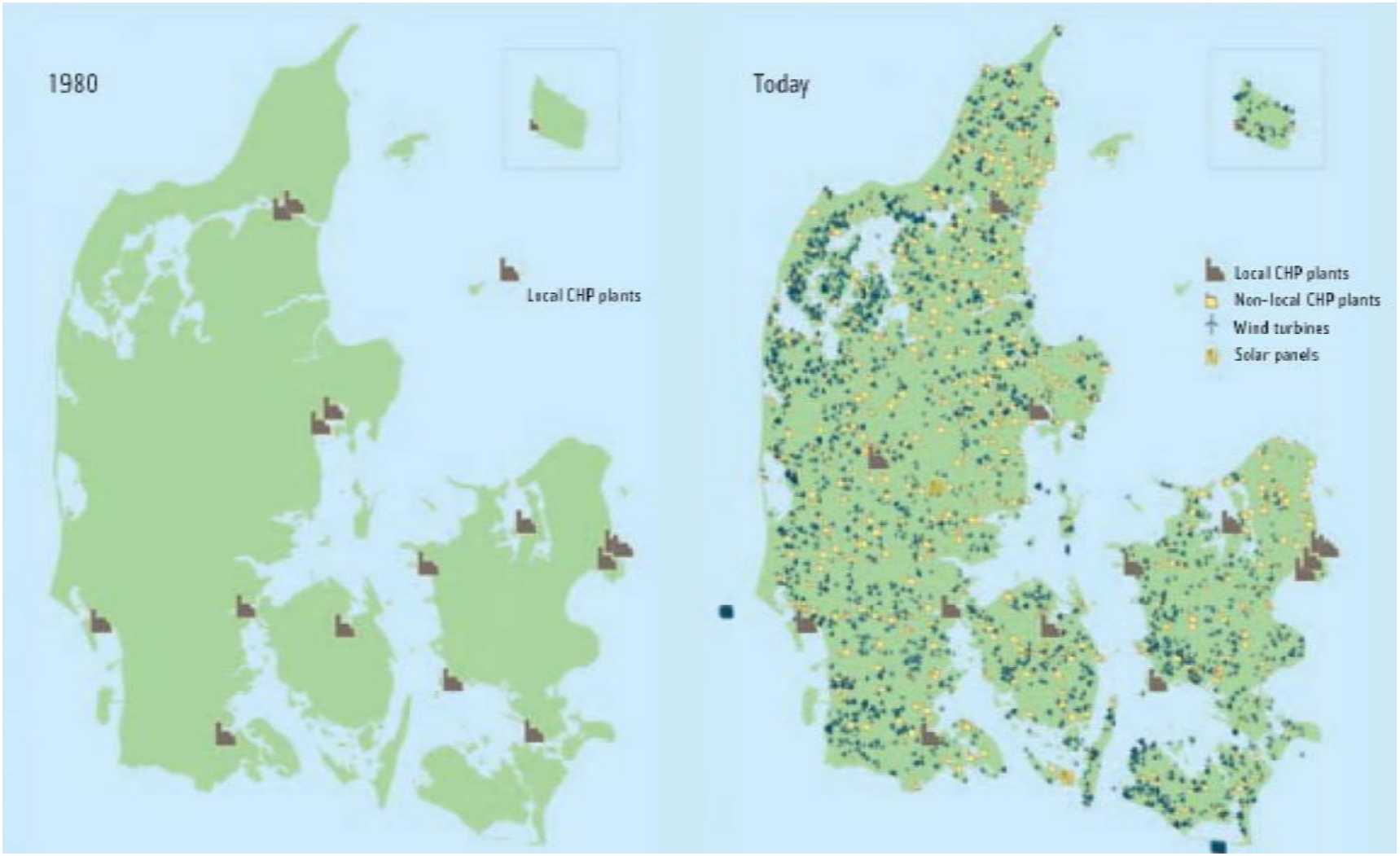
3. Taxation provisions

- V. important in several countries, e.g. USA,
  - Federal support for wind power has come mainly from production tax credit (PTC), &
  - 5-year accelerated depreciation
- Favours wealthy individuals and corporations
- Does not encourage community, non-profit & citizen involvement
- Does not foster popular legitimacy

Table 1. Community Wind Power Development in Select European Countries (2000)

	Total Wind Capacity (MW)	Community-Owned Wind Capacity (MW)	% Community-Owned	Number of Household Investors
Germany	6,161	~5,400	88%	~100,000
Denmark	2,268	~1,900	84%	~175,000
Sweden	240	~30	13%	~15,000
The UK	414	~3	1%	~2,000
Total	**9,083**	**7,333**	**81%**	**292,000**

Denmark, 1980 and 2009 : 5,200 windturbines today, located off shore and in rural areas



Source: Energinet, Denmark. Windpower to Combat Climate Change. www.energinet.dk

Table 2. Historical Drivers of Community Wind Power Development

	Denmark	Sweden	Germany	UK
Feed-In Laws	✓	✓	✓	
Standardized Interconnection	✓	✓	✓	
Tax-Free Production Income	✓	✓		
Energy/CO_2 Tax Refund	✓	✓		✓
Flow-Through Depreciation			✓	
Wind Turbine Manufacturing Industry	✓		✓	
Ownership Restrictions	✓			
Permitting Denials				✓

Source: Bolinger, M., Wiser, R., Wind, T., Juhl, D., & Grace, R., 2004. A Comparative Analysis of Community Wind Power Development Options in Oregon. Report prepared for the Energy Trust of Oregon July 2004

Danish Government Aims

•20% of Danish energy use in 2011 to be based on renewable energy…

• 40 to 50% in 2025•

•2012 –emphasis on larger sea-based windfarms

Source: Refsgaard, K (2010) Presentation for International Comparative Rural Policy Studies Summer Institute, Oregon, June.

C. Regional Innovation and Performance

- Kamp (2002) - regional innovation systems approach
  - comparing technical lead of Danish over Dutch in windmill technology.
- Key issues are
  - the learning processes
    - depend on “producers, users, & interaction between them
    - + the geographical, policy & institutional milieux
- Kamp found that
  - Dutch relied more on ‘learning by searching’, thanks to larger R&D subsidies,
  - learning by doing far more important in Denmark. Top down or bottom up?
- ‘big bang’ innovation or ‘learning process’
- Patenting…. A hinderance? Increasingly irrelevant?

Example of the Nordic Folkecenter for Renewable Energy

- Independent, not-for-profit
- Wide range of renewable technologies
  - R&D, training, technology transfer
  - Wind, solar, biogas, hydrogen, plant oils, ww treatment
- Pioneering technologies
  - Windmills to 525 KW
  - Advanced Farm Biogas Digesters
  - Wind based hydrogen
  - Integrated Solar
- Remote rural location (NW Jutland, Dk); 27 years experience in tech transfer; industry, govt and local support and global activities

D. Human skills and capabilities

- Renewables need a range of skills for invention, innovation, planning, construction and operation, as well as the institutional and policy dimensions.
- Educational institutions have responded to the need for construction, operation, and maintenance
  - Local colleges play an important role
- Weaknesses in education around institutional and policy dimensions in particular
- ‘Barefoot’ and hands-on training is important (Poul Le Cour; Barefoot College, Nordic Folkecenter)

E. Investment

- Subsides commonly used
  - Denmark - 30% investment subsidy for new wind turbines
  - gradually reduced over time and finally abandoned ten years later
  - detail of investment subsidy schemes important for their success on the ground.
- E.g. Are they based on installed kilowatts (US), or on produced kilowatts-hours (Denmark)?
  - KWh basis favours wind cooperatives

E. Investment (cont)

- Are I-policies stable and reliable?
  - US case - 6 different instruments for wind energy which you could choose from.
  - ALSO normally replaced about every two years
    - Financiers normally found the institutional risk to invest too high
- in the Netherlands & UK cf Denmark - large power utilities favoured over farmers and communities
  - Damaging legitimacy, leading to delays

F. Infrastructure

- Shift from centralised to decentralised energy production
- Shift from few to many producers, who are also consumers
- Grid capacity and coverage remains important, and needs reconfiguration and new rules, eg
  - computation of grid losses is changing competitive advantage
  - popular legitimacy needed
- New technology (and pricing arrangements) developed for metering, feed-in rights & tariffs

G. Social Attitudes

- Anti renewable energy movements exist in many countries
  - oppose new projects and infrastructure, often delaying progress
- UK and Netherlands can be contrasted with Denmark, Germany, Sweden and Finland
  - In both UK & Netherlands beneficiaries were seen to be large utility companies and corporate investors, failing to secure popular support.
- Local content of Value Added generally very small, being limited to eg land leases and wages.
  - Community involvement in ownership/financing is the key.

H. Reflections on Capacities for Renewables as Regional Policy

- Policy and institutional framework crucial to secure net regional development benefits
  - Investment support
  - FITs – long term guarantees
  - Infrastructure for decentralised energy
  - Priority to community renewable energy
  - Avoiding conflict between territorial goals and energy security goals
- Community engagement needs development of skills training, but also education in institutional and policy issues, and negotiation skills (with Utilities etc)
- Establishing popular legitimacy in the regions.

Optimising Territorial Rural Benefits from Renewables

- How to get the correct policy-mix?
- What is the most appropriate regulation?
- How to get focus on regional/ districts policy and not only energy policy, as well as coordination and agreement?
- How to gain popular engagement and legitimacy?
- How to build regional capacities – skills, cooperation, investment, RT&D
- How to sustain a long term view and policy structure?