

# Renewable Energy and Regionalisation

1. Trend in the EU countries
2. Performance in periphery region
3. Opportunities for periphery

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Tijmsma (Frisian province) for comments

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Advertisement

# EUROPE

The Netherlands  
Leeuwarden



# THE NETHERLANDS

Friesland



**Worlds most famous Frisians**

# Some international relations

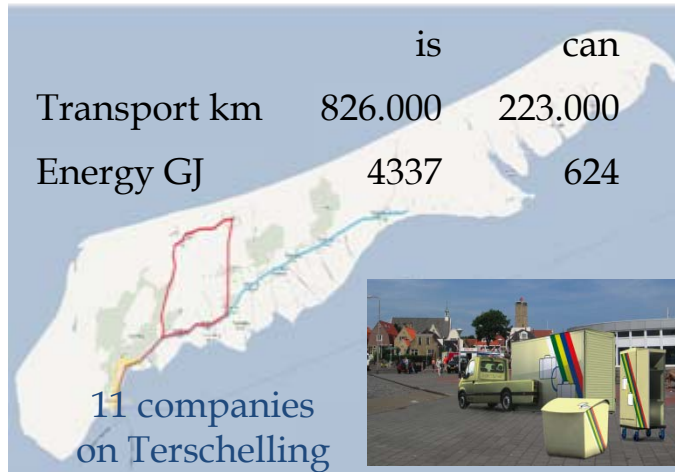


# For example: solar energy use in mobility

Frisian  
Solar  
Challenge



Sustainable  
Tourism



Consumer  
Products



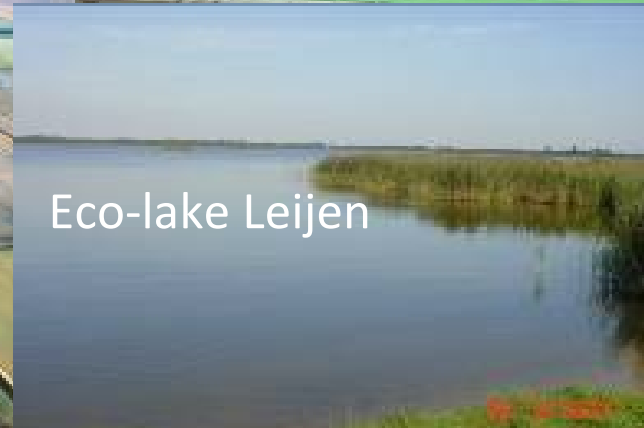


# For example: experience in waterworld

Cultural  
waterway E27



Enabling  
nature



City Nature  
services



# Envisioning of Sustainable Innovations

Landmark on the Afsluitdijk: Theme Park, Experts center, Mall, Conferences, Hotels, Arts, Tours



“Act Now” : global interaction on climate change



End of advertisement



# Renewable energy: starting point

- General view: necessary but too costly
- Question: how to overcome the costs?
- Theory: innovation has two effects:
  - Lower costs : CO2 pricing needed
  - Higher grade: tuning to markets
- Does renewable energy provide higher grades and do the periphery regions perform well?

# Does renewable energy increase prices?

- Correlations: EU countries' consumers electricity prices with renewable energy share in use 2007, or annual growth renewable of this share 2004-2007.
- Above EU share (16%) in : Austria -0.9, Sweden 0.09, Latvia 0.13, Portugal 0.27, Denmark 0.44, Finland 0.38, Romania 0.09, Slovenia -0.56, Spain 0.34, Slovakia -0.33.
- Well-above EU growth (1.7%) in : Hungary 0.43, Estonia, **0.98** Belgium -0.96, Netherlands 0.55, Germany -0.89, Poland 0.48, UK -0.82'; aside Germany **very** low-share.
- **Low correlations. No direct effect of (more) renewable energy in use on the consumers' electricity prices. The cost impact is negligible.**

# Is there renewables higher grade output?

- Hypothesis: (a) cost is decisive if the growth in EU countries' renewable production converges, (b) the regional conditions decisive if the growth diverges.
- Indicator: standard deviation in the countries growth 1996-2001 and 2002-2006. If the standard deviation increases then the diverging trend in the growth.

| Standard deviation of countries average annual growth | 1996-2001 | 2002-2006 |
|---|-----------|-----------|
| Intensity, t.o.e. per € mln GDP                       | 0.009     | 0.010     |
| Fossil fuel primary production                        | 0.027     | 0.030     |
| Renewable production total                            | 0.014     | 0.026     |
| Biomass & Waste                                       | 0.025     | 0.031     |
| Hydro   | 0.025     | 0.038     |
| Geothermal  | 0.048     | 0.058     |
| Solar   | 0.025     | 0.035     |
| Wind  | 0.099     | 0.083     |

**1. Growth diverging trend**

**2. Wind: differences in EU**

**3. Tuned to region resource**

# Have periphery regions advantages?

- Expectation: lower land and labor costs enable more renewable energy use and production; compared five regions in North Europe with its country's performance

| Ratio region to country |             |              |          |              |            |
|-------------------------|-------------|--------------|----------|--------------|------------|
| Energy in MWh/capita    | Denmark     | Germany      | Netherl. | Sweden       | UK         |
|                         | Nordjylland | Schles-Holst | Fryslân  | Västra Götal | Aberdeensh |
| million people          | 11%         | 2%           | 4%       | 31%          | 0.3%       |
| €/capita                | 0.89        | 0.88         | 0.80     | 0.96         | 1.02       |
| Energy use              | 0.98        | 1.42         | 0.78     | 0.44         | 1.52       |
| Renewable use in grid   | 0.67        | 0.76         | 0.88     | 1.64         | 2.55       |
| Renewable production    | 0.83        | 0.99         | 0.40     | 0.28         | 2.08       |
| Biomass                 | 0.65        | 0.41         | 0.19     | 0.38         | 1.70       |
| Hydro                   | -           | 0.01         | -        | 0.10         | -          |
| Geothermic              | -           | -            | -        | -            | -          |
| Solar                   | 0.61        | 0.20         | 0.88     | -            | -          |
| Wind                    | 1.66        | 5.35         | 2.20     | 0.15         | 7.95       |

**Periphery regions are underperforming, except wind**

**Know-how and business capacities decisive?**

# How to foster business opportunity in a periphery?

Present national in the Netherlands

- the Dutch average the EU use: 205 GJ/person
- Now 4% of all uses are from local renewables,
- Aims for 2020 are 20% saving, 20% renewable

Agreement Government – North Netherlands provinces

- Aim 2011: 50PJ renewable, 5 mln ton less CO<sub>2</sub>
- Case Friesland covers about 30% of the aim  
≈ 100.000 zero energy houses

# Possible actions: based on workshops 70 experts

Italic: only CO<sub>2</sub> ; ( ) investment

## Users

### Households

- *Isolation existing houses (447),*
- Heat-exchange pumps & storage (98),
- Sun boilers (56),
- *Micro co-generator (63),*
- Photovoltaic energy (157),
- *Light economy (17),*
- CO<sub>2</sub> low/neutral new houses (168).

### SME's

- Wind on industry parks (70)
- Greenhouses (68)
- Others (11)

## Mobility & producers

### Transport \* total arbitrarily divided

- *Fifty bio-fuel & gas stations (15),*
- Hybrid cars (81),
- *Natural gas for fossil fuel (244), (\*)*
- *SNG for fossil fuels (244), (\*)*
- *CBG for fossil fuels (244), (\*)*
- Bio-diesel for diesel (49),
- *EU CO2 standard (98).*

### Biowaste to bio-fuel production

- Incinerator: electricity & heat (150)
- Digester, Pyrolysis, Gasifiers (331)
- Others (5)



# What are costs and benefits of the actions?

| Summary                                   | Fossil PJ |        | Less CO <sub>2</sub> | Investment         | Ann. costs         |
|---|-----------|--------|----------------------|--------------------|--------------------|
| In € mln                                  | Total     | Renew. | mln ton              | € mln              | ( ) is revenue *   |
| Housing                                   | 8,1       | 4,2    | 0,48                 | 1.016              | 110 (-10)          |
| Mobility                                  | 16,3      | 9,1    | 0,94                 | 974                | 136 ( <b>110</b> ) |
| Industry                                  | 3,8       | 3,8    | 0,22                 | 70                 | 28 ( <b>20</b> )   |
| Greenh.                                   | 0,2       | 0,2    | 0,02                 | 68                 | 10 (-8)            |
| Subtotal                                  | 28,4      | 17,3   | 1,66                 | 2128               | 275 ( <b>112</b> ) |
| Bio-waste                                 |           |        |                      | 481                | 46 (-3)            |
| Total                                     |           |        |                      | 2609               | 321 ( <b>108</b> ) |
| Import                                    | -9,0      | -9,0   | -0,50*               | Groningen projects |                    |
| • revenues are bold, assumed 4% interest! |           |        |                      |                    |                    |

benefits: 27,000 jobs in 5 years, 0.8 bln for local business

**The challenge: how to achieve low interest on capital**

# How to arrange low interest on capital?

## Subsidies versus low interest

| Summary   | 15% interest & subsidies |         | 5% interest & no subsidies |         |
|-----------|--------------------------|---------|----------------------------|---------|
| In € mln  | Capital                  | Revenue | Capital                    | Revenue |
| Housing   | 179                      | -117    | 102                        | -41     |
| Mobility  | 194                      | 13      | 126                        | 81      |
| Industry  | 14                       | -3      | 9                          | 14      |
| Greenh.   | 14                       | -15     | 9                          | -10     |
| Subtotal  | 400                      | -122    | 246                        | 44      |
| Bio-waste | 77                       | -56     | 39                         | -18     |
| Total     | 477                      | -178    | 285                        | 26      |

**Low interest is even better than subsidies**

Option 1: state & regional community energy services

Option 2: policy arrangements for “first movers”

# Conclusions

- Low impact of renewables on electricity prices
- Renewable is a cost but creates higher grades
- Renewable fosters local energy resource uses?
- Peripheries need know-how & business capacity
- Regional renewable energy spur is attractive
- Community energy services are economic
- EU policy:
  - CO<sub>2</sub> pricing through emission trading
  - Enabling subsidies for renewable technologies
  - Inter-regional co-operation on implementation

Thank you for your patience