



INSTITUT
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INDUSTRIELLE

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Outline

1. The Renewable Energy Roadmap
2. Where are economics in the green frenzy?
3. Discounting the future
4. Micro features
5. Conclusions

1. Renewable Energy Roadmap (RER) COM(2006) 848

objective: a 20% share of renewables in the EU's energy mix by 2020.

why? Europe vulnerability due to

- i) climate change
- ii) increasing oil and fossil fuel dependence
- iii) rising energy prices

fields and targets

fields:

i) electricity, ii) transport, iii) heating and cooling

targets:

* Electricity production from renewables could increase from the current 15% to approximately 34% of overall electricity consumption.

* Wind could contribute 12% of EU electricity. One third of this will more than likely come from offshore installations.

targets (continued)

- * The biomass sector can grow significantly using wood, energy crops and bio-waste in power stations.
- * The remaining novel technologies (photovoltaic, solar thermal power, wave & tidal power) will grow more rapidly as their costs come down.
- * Renewables in the heating and cooling sector could more than double, compared with the current share of 9%.

targets (end)

* Biofuels could contribute 43 Mtoe (14% of the market for transport fuels). The growth would come from bioethanol and from biodiesel. Domestically grown cereals and tropical sugar cane would be the main ethanol feedstocks, later complemented by cellulosic ethanol from straw and wastes. Rapeseed oil both domestically grown and imported, would remain the main biodiesel feedstock.

2. Where are economics in the green frenzy?

- The European Council called for 15% by 2015
- The European Parliament said 25 by 2020
- Now, the European Commission says 20 by 2020
- What about 100 by 2100?

reminder: the basics of public choice

* for any decision

1. compute all the costs c and compute all the benefits b

2. if b is larger than c , DO IT! and if c is larger than b , DON'T DO IT!

* what are the benefits and costs of the "20 by 2020" objective?

costs

"The benefits will come at an additional cost of between • 10-18 billion per year, on average between 2005 and 2020, depending on energy prices.

The additional costs range between • 1.5 billion in 2006 to • 26 and • 31 billion in 2020"

from RER, p. 4

non-monetary benefits

- * "Renewable energy contributes to security of supply by increasing the share of domestically produced energy, diversifying the fuel mix, diversifying the sources of energy imports and increasing the proportion of energy obtained from politically stable regions."
- * stimulation of world-class high-tech industries.

monetary benefits

"The additional renewable energy deployment needed to achieve the 20% target will reduce annual CO₂ emissions in a range of 600-900 Mt in 2020. Considering a CO₂-price of 25 • /per tonne, **the additional total CO₂ benefit can be calculated at a range of • 150-• 200 billion.**"

from RER, p. 14

monetary benefits (continued)

But ... "The value of this significant reduction in greenhouse gas emissions would nearly cover the total additional cost under high energy prices." Therefore

- 15-• 20 billion is more likely.

from RER, p. 18

By the way, on May 3, 2007 the price was • 0.56 per ton.

Carbon prices: spot price – 1st period 2005-2007 futures price Dec.08 – 2nd period 2008-2012



monetary benefits (continued)

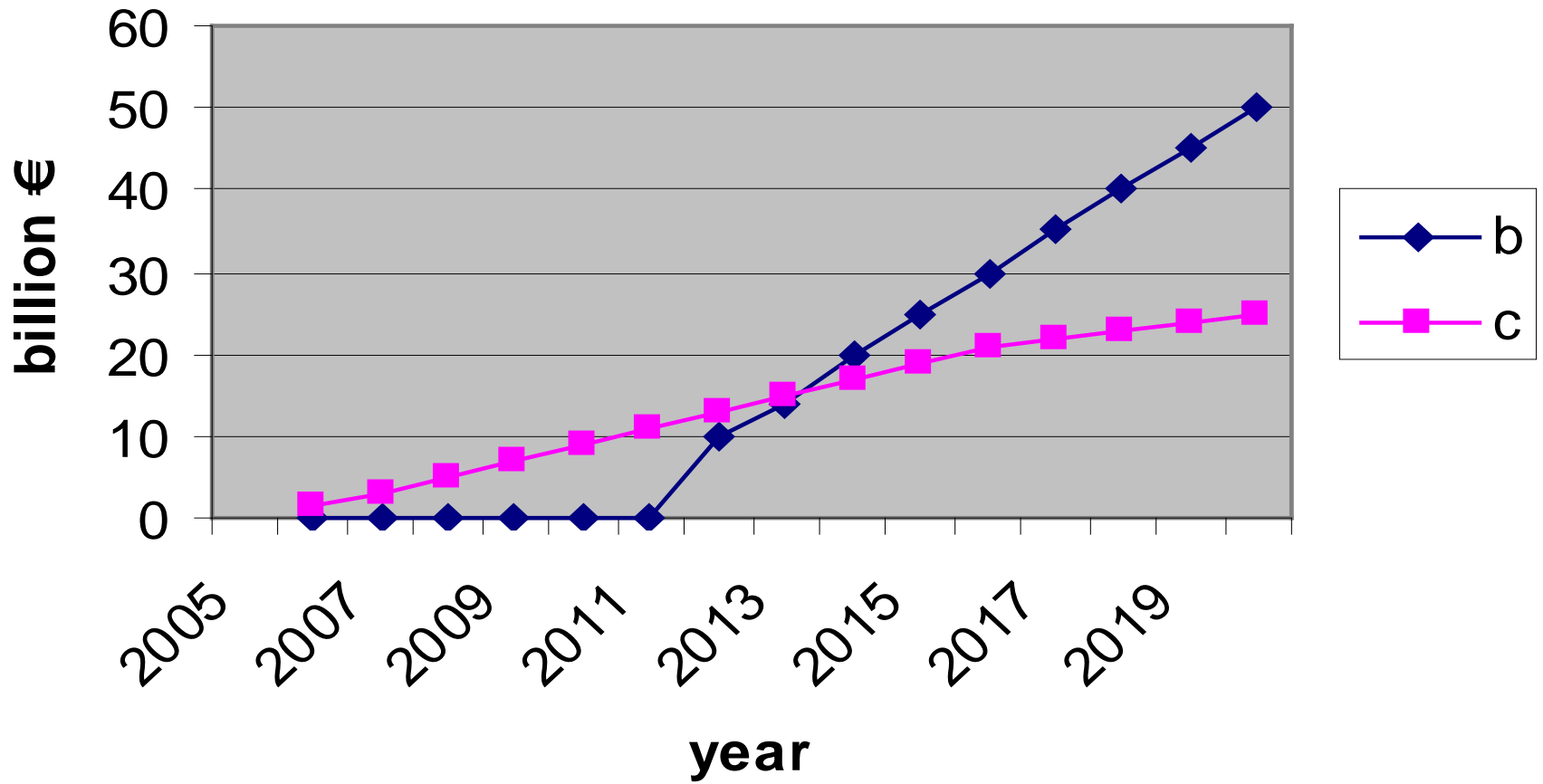
"Reaching the target will ... reduce annual fossil fuel consumption by over 250 Mtoe by 2020, of which approximately 200 Mtoe would have been imported, ..."

from RER, p. 14

Using data from '*Impact Assessment Report for the Action Plan for Energy Efficiency*' (p.4), savings on fossil fuel consumption would be around 20 billion euros annually by 2012 and would increase to around 40 billion by 2020.

from RER, p. 18

expected benefits and costs



3. Discounting the future

Most costs will be incurred in the near future, most benefits will appear in the remote futures

Rational decision requires homogenisation, that is a "rate of discount" r , to compute the discounted benefits and costs of the "20 by 2020" plan.

$$C = \sum_{t=2006}^{2020} \frac{c_t}{(1+r)^{t-2005}} \stackrel{?}{\approx} B = \sum_{t=2006}^{2020} \frac{b_t}{(1+r)^{t-2005}}$$

which rate of discount?

No trace of any rate of discount either in the Road Map or in the Impact Assessment !!!!

First-aid tool: the rate of return

$$\sum_{t=2006}^{2020} \frac{b_t}{(1 + \rho)^{t-2005}} - \sum_{t=2006}^{2020} \frac{c_t}{(1 + \rho)^{t-2005}} = 0$$

With the above data $\rho = 11\%$

profitability

As regards "green policy", the economists almost agree on a discount rate around 6%

With this figure, the net present value of the "20 by 2020" operation is above • 180 billions.

$$B(6\%) - C(6\%) = \text{€}13 \text{ billion}$$

Question

If it is profitable, why do we need Brussels' intervention?

Answers:

private entrepreneurs are myopic, or are not interested by profit, or ...

vs.

Eurocrats are overconfident, or try to attract attention at any cost, or ...

4. Micro features

Goods should be defined by

- i)* economic attributes: 10MWh from photovoltaic plant
- ii)* location: injected in South Spain
- iii)* time: tomorrow between 1pm and 2pm
- iv)* state of nature: if it is not windy in North Spain

location

Storage, transportation and delivery networks have been designed for centralized sources of energy: large volumes, high voltage or high pressure, etc.

Where are the costs of network redesigning to withstand decentralized energy?

time

All sources of primary fuel are not substitutes in terms of time availability: starting costs, ramping rates.

The promotion of renewables in the energy mix should take account of the time structure of demand.

Where is the cost of real-time despatching?

state of nature

Electricity is not storable; happily primary fuels are ...
except for wind.

Relying heavily on "natural flows" is by no means a
progress.

Where is the cost of backup technologies?

5. Conclusions

- As of the Roadmap:
 - ❖ lack of economic arguments: *i*) need for a rate of discount (Stern, Nordhaus, Weitzman, Salanié), *ii*) need for micro arguments
 - ❖ we need more market and less planning
- As of Commitments for the Future:
 - ❖ increase the cost of non-renewables rather than decrease the cost of renewables
 - ❖ need for a surrogate of missing demand:
Global Fund for Future Generations

Postface

« Nous savons tous exactement ce qu'il faut faire.
Ce que nous ne savons pas, c'est comment nous
faire réélire une fois que nous l'aurons fait. »

Jean-Claude Juncker