



Green Electricity

The problem

- Electricity production in Europe today is based on polluting sources of energy: in 2006 coal (30.4%), nuclear (29.5%), and gas (20.3%) were the most important sources for electricity production in the EU-27. Less than 5% of European electricity is produced by new renewable sources, such as wind and solar power.

Policy Relevance

- A 1997 White Paper on renewable energy sources from the European Commission.
- Directive 2001/77/EC on the promotion of electricity from renewable energy sources in the internal electricity market, which follows on from the 1997 White Paper.
- “Climate action and renewable energies package”: a new Directives called 20-20-20, finally adopted in April 2009, which forms the pillar of European policy in fighting climate change and the promotion of renewable energy sources.

Good Experiences

- Total installed wind energy capacity increased by 15% in 2008 and electricity production deriving from wind is equivalent to the needs of 35 million European families.
- By the end of 2008, world photovoltaic cumulative capacity exceeded 14 GWp and the EU contributes about 50%: 2 million European families get electricity from solar energy.

Links and References

The problem

Electricity production in Europe today is based on polluting sources of energy: in 2006 coal (30.4%), nuclear (29.5%), and gas (20.3%) were the most important sources for electricity production in the EU-27. Less than 5% of European electricity is produced by new renewable sources, such as wind and solar power.

In 2006, about 10% was produced by hydropower, less than 3% from wind and less than 2% from geothermal energy. Another problem is European dependency on imported fossil fuel: we import about 56% of our sources of energy and this figure is likely to increase to 70% within the next two decades unless Europe changes direction. By 2030, the EU could import 94% of oil, 84% of gas, 59% of coal. But we live in a very important moment in history for electricity systems all over Europe: by 2030, Europe will have installed new electric power plants accounting for more than 800 GW, half of them replacing old plants that will have reached the end of their life (mainly nuclear, coal and oil), and half for meeting the increase in electricity consumption. A major part of this new power, greater than all the power installed today in the Continent (723 GW), could derive from renewable energies: there is no reason for postponing a stronger penetration of renewable energy sources in the electricity market.

Energy source	Production in 2006 (TWh)	Projections of production in 2010 (TWh)	Potential in 2020 (TWh)	Power potential in 2020 (GW)
Wind	82	176	477 (34.8%)	180
Hydropower	357.2	360	385 (28%)	120
Solar Photovoltaic	1.5	20	180 (13.1%)	150
Biomass	89.9	135	250 (18.3%)	50
Geothermal	5.6	10	31 (2.3%)	4
Solar thermal electricity	-	2	43 (3.1%)	15
Sea	-	1	5 (0.4%)	2.5
Total renewable sources	537.2	704	1.370	521.5
Consumption EU-27	3,361.5	3,568	4.078	
Consumption trends in EU-27 with energy efficiency measures			3.391	
Share of renewable sources on total consumption	16%	19.7%	33.6%-40.4%	

EREC-European Renewable Energies Council: "Renewable energies technology roadmap: 20% by 2020.

Ministers for the Environment of the G8 countries in April 2009 in Syracuse, agreed to reduce CO₂ emissions by 50% by 2050, thanks to four different factors: better energy efficiency accounting for more than 50%; the use of renewable energy sources accounting for 21%; Carbon Capture and Storage (CCS technology) accounting for 19%; and nuclear power accounting for 6%. Events that are taking place in the United States make up another important political element, where thanks to recent decisions taken by the Obama administration, the production of electricity from renewable energy sources (solar, wind, or geothermal) must account for at least 10% of demand in 2012 and 25% in 2025. In order to reach these targets, the PTC (Production Tax Credit) has been extended for five years. Specific incentives will be introduced and dedicated, in particular, to companies active in the field of marketing technologies of renewable energy sources, accelerating growth in the market and economies of scale.

Policy Relevance

The 1997 White Paper on renewable energy sources from the European Commission set a target of 12% of gross inland energy consumption from renewable energy sources for the EU-15 by 2010, of which electricity would represent 22.1%. With enlargement in 2004, the EU's overall objective became 21%.

Directive 2001/77/EC on the promotion of electricity from renewable energy sources in the internal electricity market, which follows on from the 1997 White Paper, constitutes an essential part of the package of measures needed to



comply with the commitments made by the EU under the Kyoto Protocol. In accordance with Directive 2001/77/EC, all Member States have adopted national targets for a proportion of electricity consumption from renewable energy sources. Although some Member States are on track to meet their target, it seems that the majority of countries are behind schedule, and the EU will only manage to produce 19% of its electricity from renewable sources by 2010. In March 2007 the Council of Europe asked the European Commission to elaborate some propositions so as to reach the following targets by 2020: 20% of energy production from renewable sources, a 20% improvement in energy efficiency and a reduction of at least 20% of CO₂ emissions.

After a long negotiation between the Member States and the EU Commission, a “*Climate Action and Renewable Energies Package*” was presented to the European Parliament and the European Council on January 23rd 2008, containing measures needed in meeting these targets. In mid-December 2008, an agreement between the European Commission, the Council of Europe and the European Parliament was reached and the package became binding in April 2009. It represents the pillar of European policy in fighting climate change and adopting renewable energy sources. In June 2009, the EC adopted new Electric and Gas Directives to strengthen the EU's internal energy market, providing consumers with more protection. Member States now have 18 months to transcribe the new rules into national law. A new European Agency has been created to improve collaboration between the national Authorities for electricity regulation and a fast and easy access to the electricity grids for European companies.

Good Experiences

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Europe is the homeland of renewable energy sources, representing almost 60% of all new power in the EU in 2008. Europe is the world leader in total installed wind energy capacity, which increased by 15% in 2008 to reach 64,949 MW. Electricity production from wind is equivalent to the needs of 35 million European families (4.2% of total electricity demand in the EU).

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By the end of 2008, world photovoltaic cumulative capacity exceeded 14 GWp and the EU contributes about 50%: 2 million European families get electricity from solar energy. Europe is also leader in Concentrated Solar Power (CSP, about 500 MW already installed), small hydropower plants (17,200 plants, 11 GW installed), geothermal (820 MW) and researches in wave and tidal energy. In Europe, renewable energy sources employ more than 450,000 people and have an annual turnover of Euro 45 billion. The first legislation in Europe on renewable energy sources dates back to 1997 and forms the basis for the recently adopted EU Renewable Energy Directive: 20 % of renewable energy sources by 2020, the most ambitious legislation in the world in this sector. In terms of electricity, renewable energy should provide about 35% of power in the EU by 2020. The European Union aims to have 21% of its electricity deriving from renewable energy by 2010, as established in Directive 2001/77/EC. Thanks to this Directive, Member States have to provide better grid access for renewable energy and facilitate authorisation procedures.

Links and References

- EREC-European Renewable Energies Council, 2008, “Renewable energies technology roadmap: 20% by 2020” (http://www.erec.org/fileadmin/erec_docs/Documents/Publications/Renewable_Energy_Technology_Roadmap.pdf)
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