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International Network for Sustainable Energy



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# **INFORSE-Europe Sustainable Energy NGO Seminar**

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**EREF**

European Renewable Energies Federation

# **Grid Integration of Renewables - Managing the Paradigm Shift – and the way towards 2030**

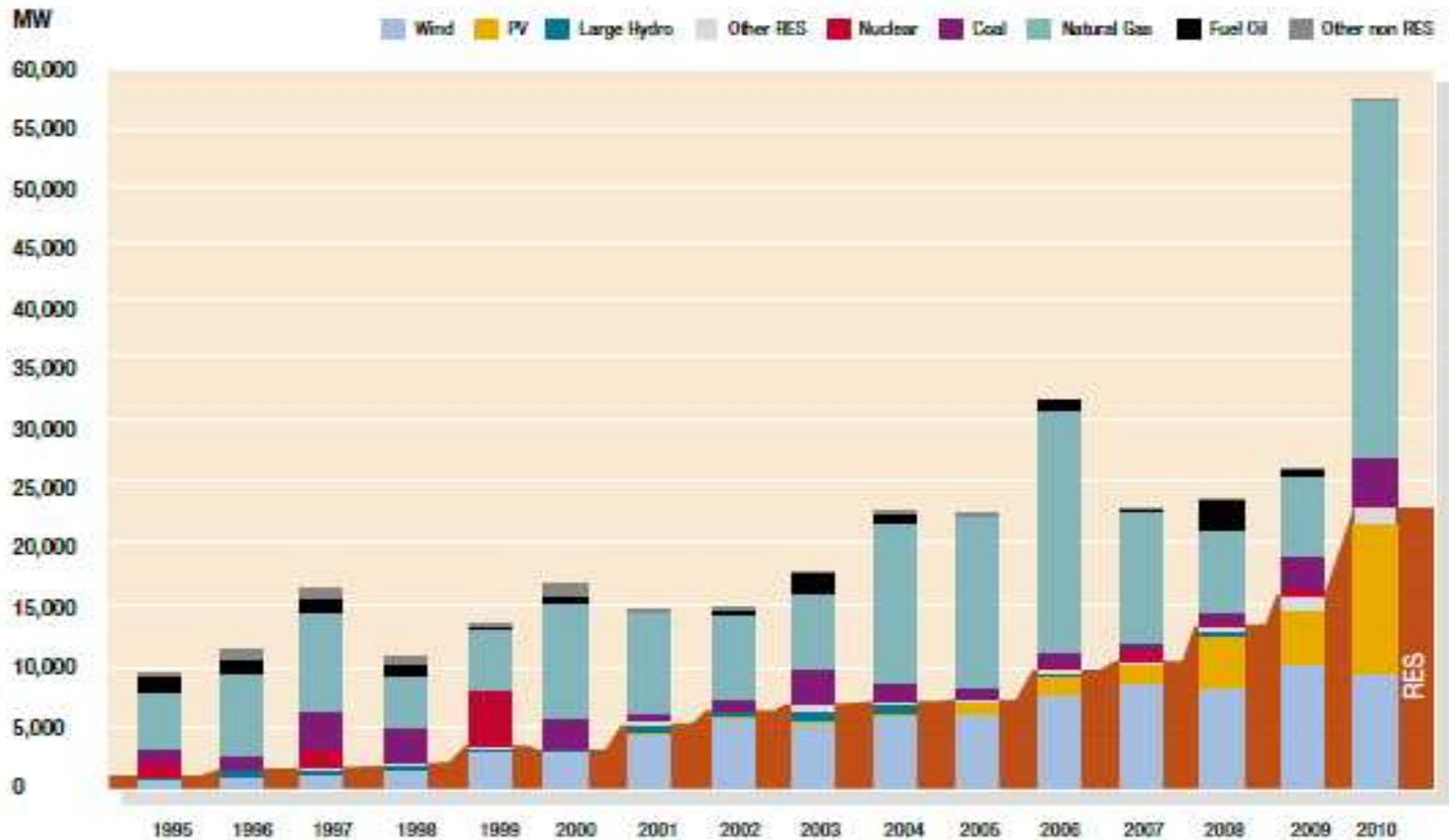
Dr. Dörte Fouquet  
- EREF Representing Director -

INFORSE, Hamburg 2011

## About EREF

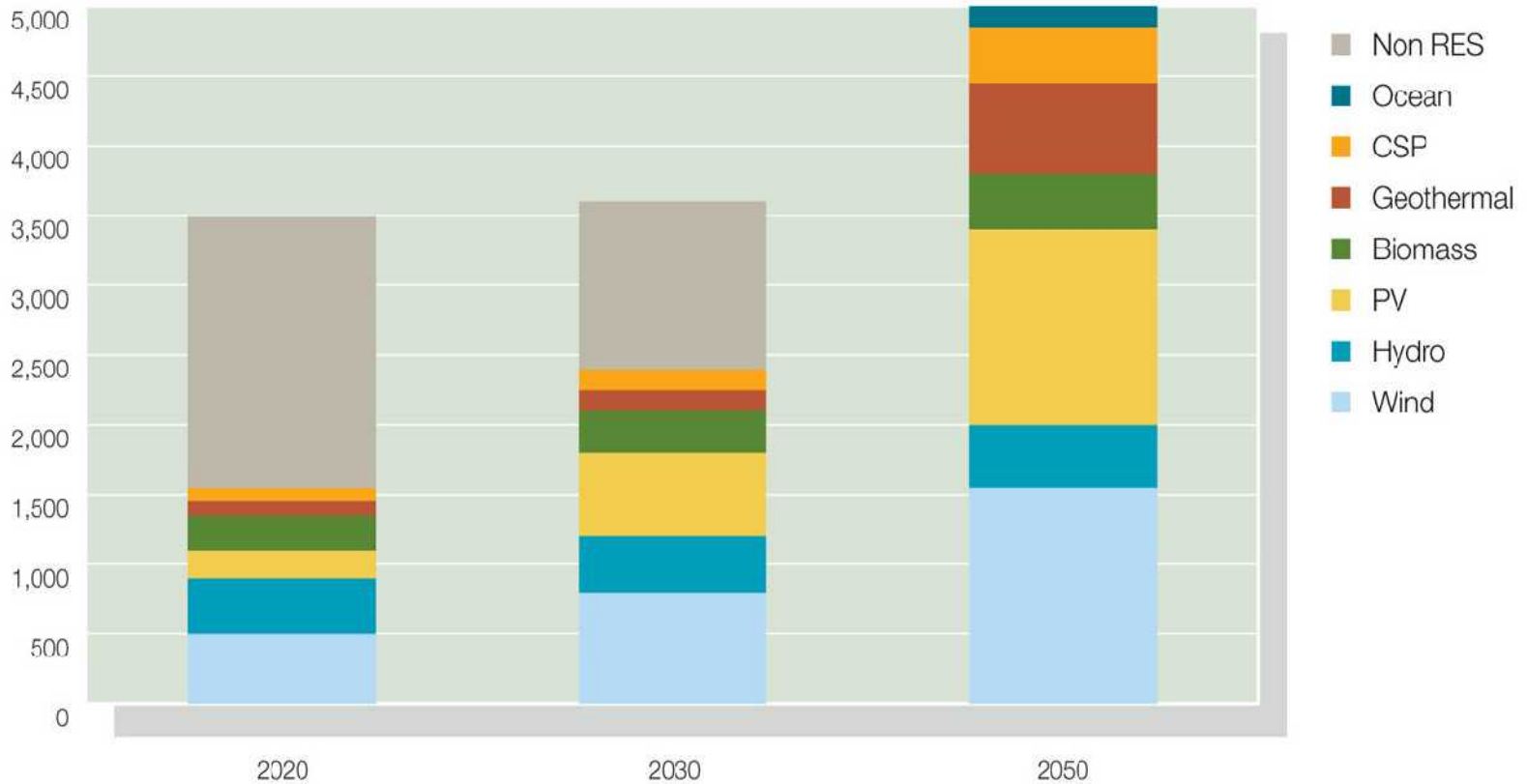
- Federation of associations from EU Member States, working in the sector of energy produced from renewable sources
- Representing more than 50,000 MW of installed power capacity and a growing capacity in other sectors
- Voice of Independent Producers of Energy from Renewables
- Member of EREC (European Renewable Energy Council)

## New installed power capacity per year (MW)



Source: EWEA (2011)

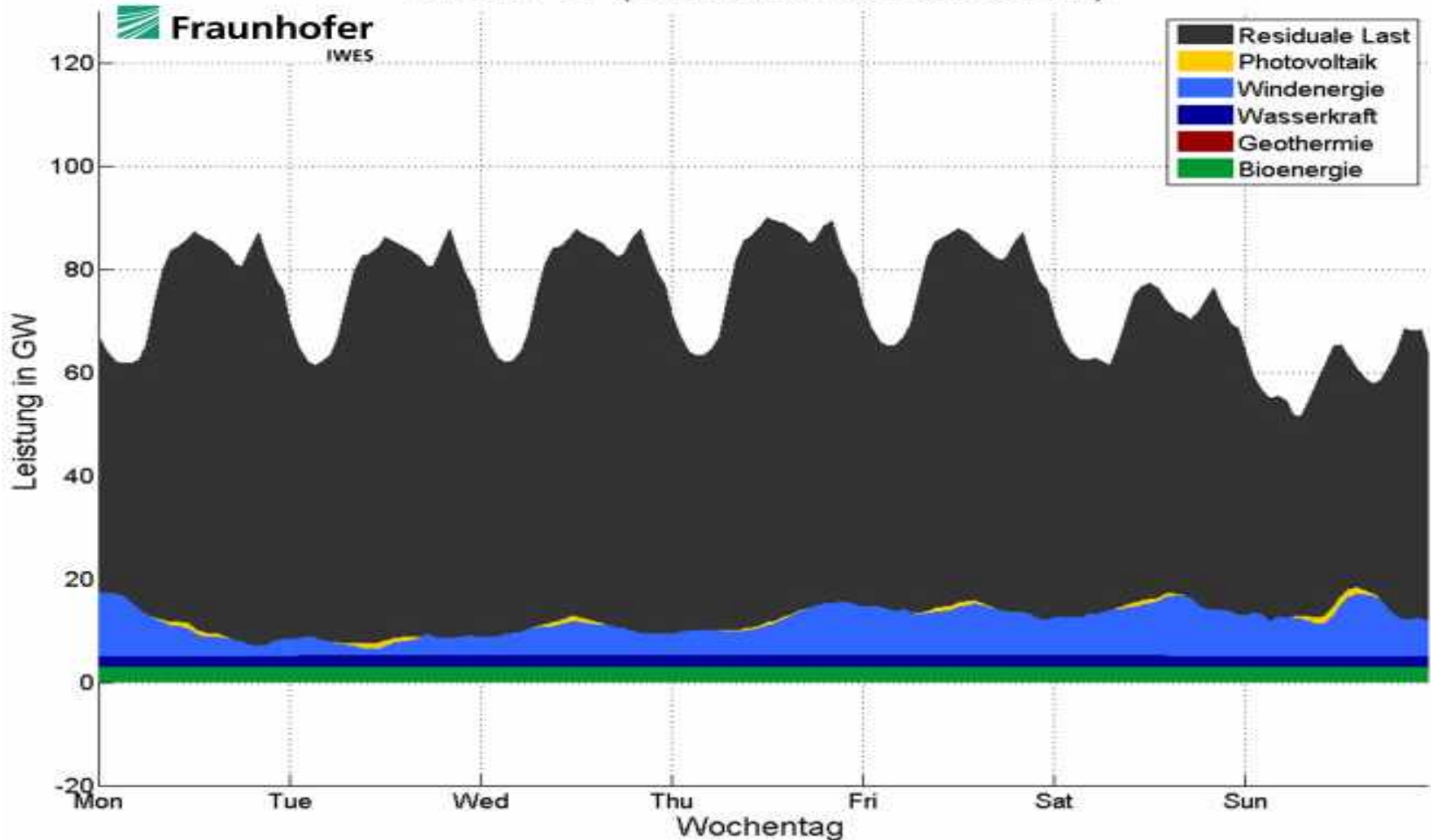
## Contribution of Renewable Electricity Technologies to Electricity Consumption (TWh)



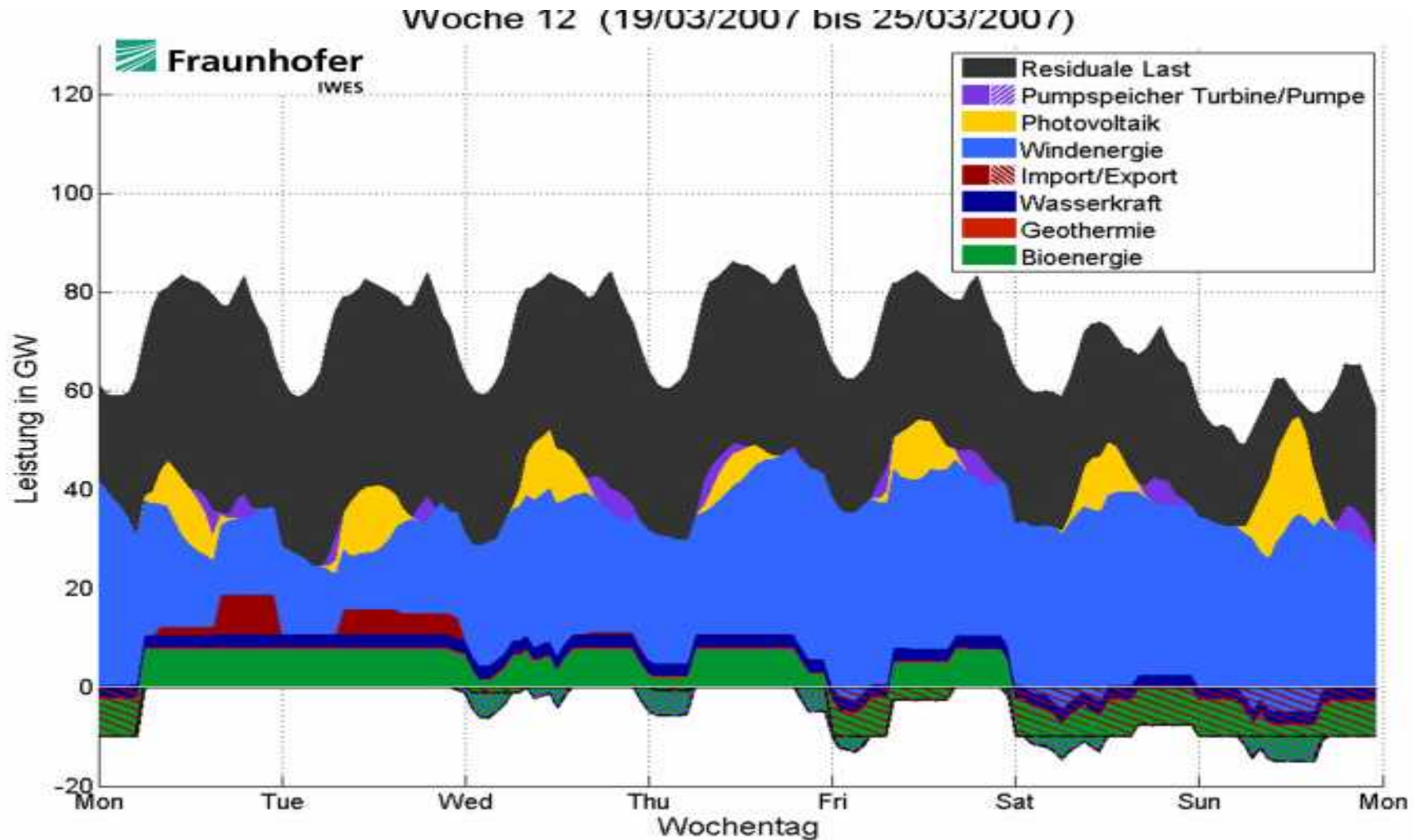
Source: EREC

## Paradigm Shift: Demand, Supply, Residual Load

Woche 12 (19/03/2007 bis 25/03/2007)



## ... towards 50% and more Renewables.



## Status Quo

In most Member States, the grids are still able to accommodate all renewables fed in.

But shares of variable and dispatchable renewables are increasing.

Great job is done by grid companies on all levels to ensure a safe European grid reality – despite a severe lack of guidance, policies and funding.

**Member States and grid owners have not fully accepted their responsibilities to manage the transition to a renewables based power system.**

## Some Elements of Future Grid Management

- Integration of distributed energy production and centralized grid design
  - Guarantee of grid stability, avoid black-outs
- Processing local and system-wide input
- Facilitating rapid communication, decentralized input, centralized diagnostics
- Availability of high quantities of information about system status
- Direct involvement of private households and business
- Triggering active role of citizens in energy demand and supply.

## The Transition Need: Integrating Renewables

- Transition towards a fully renewables-based electricity system requires unambiguous policy decisions and a higher pace of expansion of the electricity grid on all levels, domestic and cross-boarder.
- Lack of national commitment to interconnect – a hidden obstacle
- Electricity infrastructure to be adjusted to more decentralized and more variable power generation.
- Major obstacles to be overcome:
  - Political and economic obstacles arising from grid regulation
  - Planning approval procedure delays
  - Public acceptance issues

## Three Preliminary Conclusions:

- A **clear vision** is needed for the for the energy mix (100% RE) and for the electricity grid of the future – integrating all sources of RE, centralized and decentralized, large and small.
- Remaining **barriers** for swift planning and implementation have **to be removed** – incentives and financing rules to be adjusted.
- **Clear and unambiguous policy decisions** needed for smooth and rapid grid extension and enhancement – with the **Member States in the driver seats**.

## Some Policy Suggestions:

- Provide local and regional grid development plans.
- Safeguard investment for DSO level.
- Optimize grid integration by equipping DSO's.
- Incentivize Smart Grid development.
- Facilitate exchange between TSO's and dialogue TSO/DSO/RE-power producers.
- Stabilize framework for supply security through RE-capacity (physical energy flow vs. certificate trade; priority access and dispatch).
- Install a European Coordinator for decentralized and distributed power generation.

EREF

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# The way towards 2030 and 100 % RES

## Purpose of DIRECTIVE 2009/28/EC

- Overall goal of directive:
  - EC energy consumption by 2020
    - 20 % share of RE
    - 10 % share of RE in transport
- Measures to achieve goal:
  - Control of European energy consumption
  - Increased use of energy from renewable sources
  - Energy savings and increased energy efficiency

## Contents of DIRECTIVE 2009/28/EC

- Art. 3 and 4:
  - Establishment of *mandatory* national overall targets and national RE action plans (consistent with EC gross final use by 2020)
  - Measures to achieve targets
    - support schemes and measures of cooperation
- Three types of cooperation:
  - Statistical transfers (art. 6)
  - Joint projects between Member States (art. 7, 8)
  - Joint projects between Member States and third countries (art. 9, 10)

## 2. The way towards 2030 and 100 % RES

## Background

- Europe's energy system must undergo radical change.
- EU's commitment to reducing greenhouse gas emissions by 80-95% by 2050 and the need to go negative in emissions after 2050. The other quest is to change for sustainable supply security in energy.
- With today's policies, EU is set to fail meeting its long-term climate ambition!
- European Commission: continuation of current trends and policies would result in only a 40% reduction in greenhouse gas (GHG) emissions by 2050. EU energy policy, building upon its 2020 targets, needs to be geared up to reach significant greenhouse gas emissions reductions by 2050, while increasing energy security and competitiveness for the benefit of European citizens.
- Renewable energy sources and energy savings are the most straightforward means to both reduce emissions and improve supply security. Energy related CO<sub>2</sub> emissions have already been reduced by more than 20% against 1990 levels - thanks to the deployment of renewable energy technologies.
- Directive 2009/28/EC set binding targets only until 2020.
- Now it is time to take the next step and lift up our ambitions for the post-2020 decade.
- Call for a legally binding EU target of at least 45% renewable energy by 2030.

## Stepping up ambitions – post 2020

- Current reactions from Commissioner Oettinger and President Barroso have given positive support to the RES industry call for a legally binding EU target
  - 45 % (plus) renewable energy target for 2030
- Also needed:
  - a binding 20% energy savings target and a 30% domestic GHG reduction target for 2020.
- This would be a „successful triangle for an 80%-95% GHG emission reduced Europe by 2050“ (EREC).

## Investment security is key

- Photovoltaic electricity, reached a cumulative installed capacity of almost 30 GW in the EU in 2010. This is more than nine times higher than the target foreseen in the 1997 EU White Paper.
- At the same time, geothermal heat exceeded three times the projected installed capacity of 5 GWth, achieving about 15 GWth
- Wind industry had already installed the 40 GW envisaged by the White Paper in 2005, five years ahead of the Commission's target. Wind power's cumulative installed capacity accounted for 85 GW in 2010, more than twice the White Paper target.
- On the contrary: Only modest market development of renewable heating and cooling technologies due to lack of dedicated European legislation and the absence of clear and ambitious targets for the heating and cooling sector.

## RES triggers financial transactions

- In the 2000-2010 decade, financial transactions – thus investments – in renewable energy rose strongly, amounting to €55 billion and €62 billion in 2008 and 2009 respectively.
- BUT: Economic crisis e.g. in Greece blocks new investment and financing deals and endangers stable and predictable environment for the RES financing.
- RES investments are vital to meeting the 2020 target
- Forecast: RES investments of about €60 to €70 billion annually, on average and for EU 27. (Ecofys)

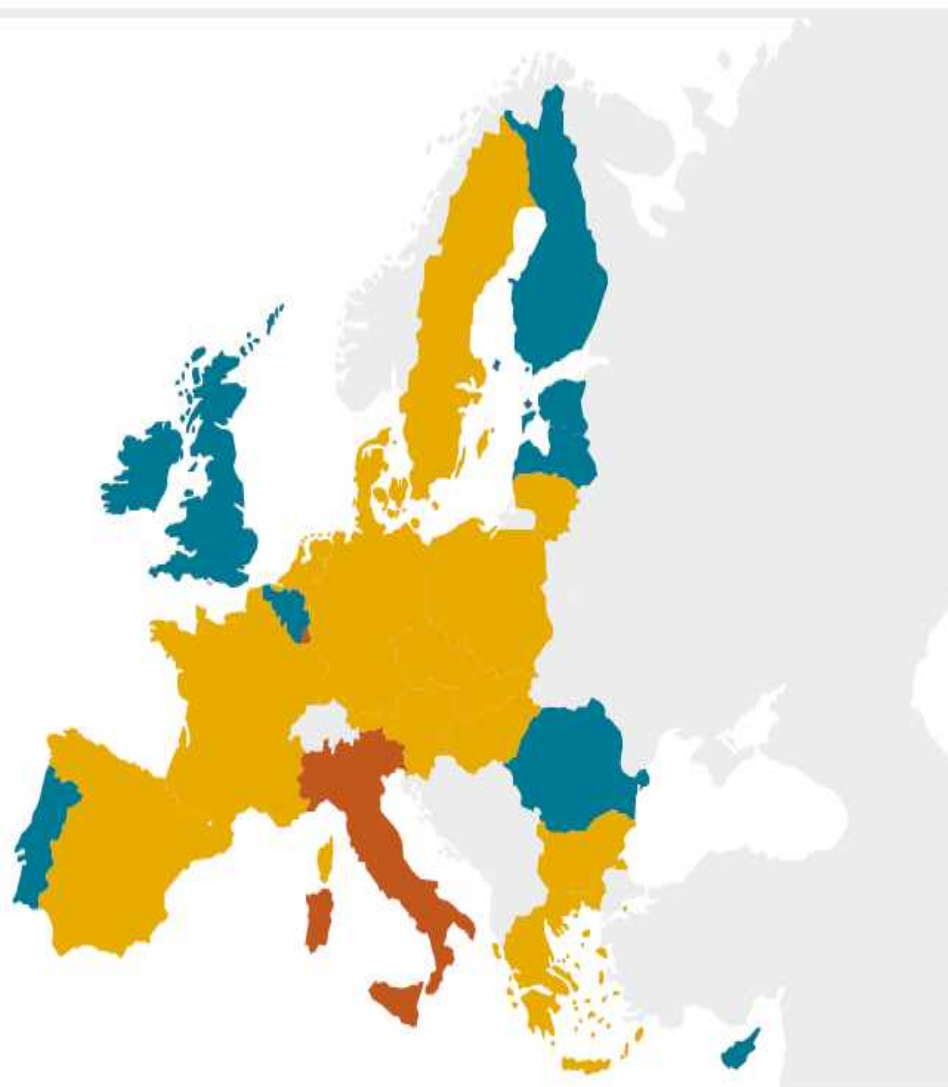
## Expectations for 2020

- According to the 27 plans that Member States submitted to the European Commission in 2010, the EU would be able to exceed its target of 20% renewable energy - if MS deliver.
- Total renewable energy use will more than double from 96 Mtoe in 2005 to about 245 Mtoe in 2020. This represents a 20.7% share of renewable energy in 2020 final energy consumption.

Figure 6

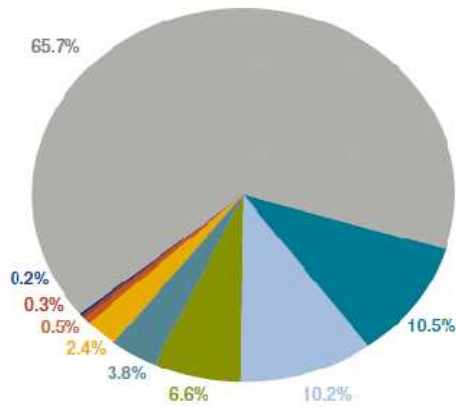
Member States' NREAPs projections  
for 2020

- Countries meeting their 2020 targets
- Overachieving countries
- Underachieving countries



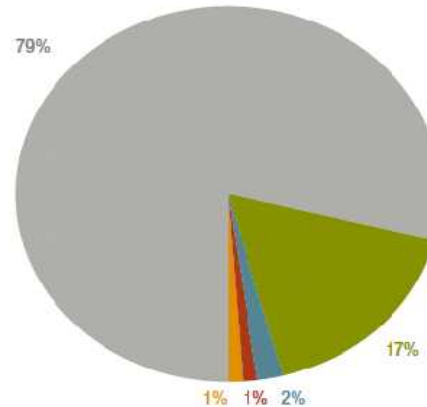
Source: EREC based on NREAPs

**Figure 7**  
Renewable Energy Sources  
in the Electricity Mix in 2020



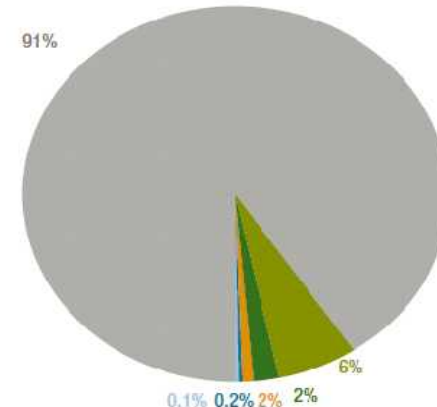
- Hydro
- Bioelectricity
- PV
- CSP
- Wind onshore
- Wind offshore
- Geothermal Electricity
- Ocean
- Conventional Energy Sources

**Figure 8**  
Renewable Energy Sources  
in the Heating Mix in 2020



- Geothermal
- Solar Thermal
- Bioheat
- Aerothermal and Hydrothermal Heat Pumps
- Conventional Energy Sources

**Figure 9**  
Renewable Energy Sources  
in the Transport Mix in 2020



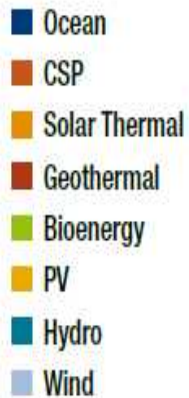
- Biodiesel
- Bioethanol/ETBE
- RES-E (non road transport)
- RES-E (road transport)
- Others
- Conventional Energy Sources

Source: EREC based on NREAPs

## New targets for 2030 – new jobs increased GDP

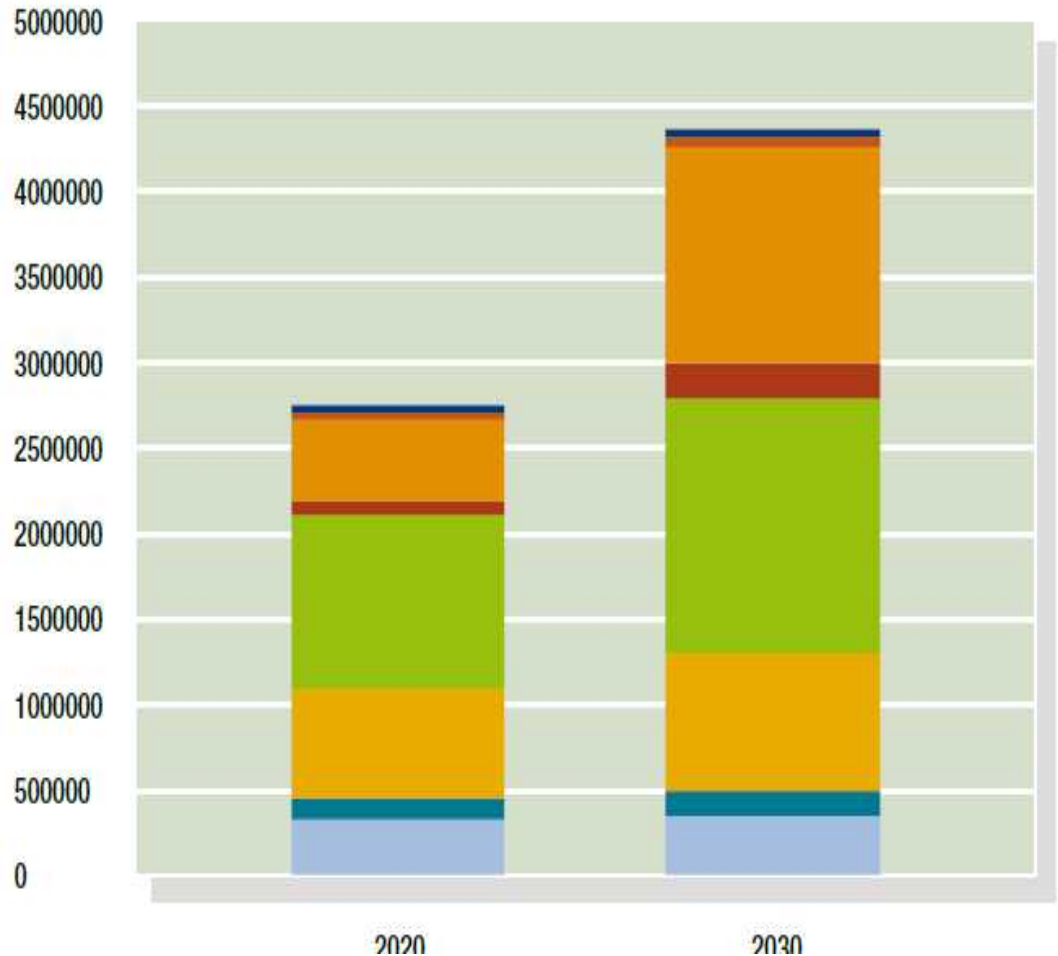
- Investment in renewable energy helps the economy by reducing energy costs, easing the over-use of precious natural resources and increasing employment in the energy sector. Variety of high-quality jobs in very different technologies, for skilled workforce.
- Considering successful achievement of 45% renewable energy in final energy use in 2030, this would provide gross employment of about 4.4 million in the renewable energy sector – an annual average growth rate of about 6% on 2020 (2.7 million employees).
- 10% increase in renewable energy share is estimated to avoid GDP losses in the range of €20-36 billion in the EU (€34-62 billion for OECD). These avoided losses offset one-fifth of the renewable energy investment needs up to 2020 and half the OECD investment projected by a G-8 Task Force.

Figure 17  
Gross Employment in the Renewable  
Energy Sector



Source: EREC (2010)

Employees



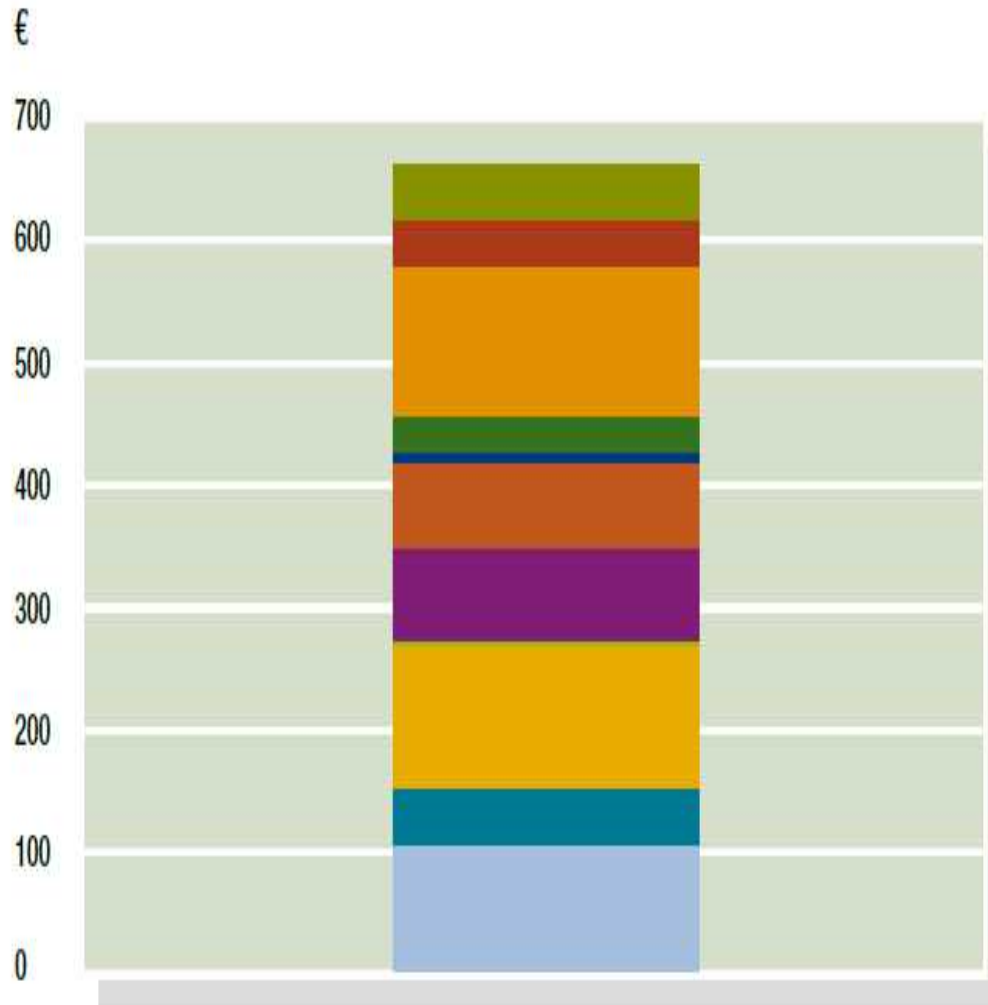


Figure 16

Additional cumulative capital investments 2030 (€)

- Biofuels
  - Geothermal
  - Solar Thermal
  - Bioheat
  - Ocean
  - CSP
- Geothermal Electricity
  - Bioelectricity
  - PV
  - Hydro
  - Wind

Source: EREC (2010)

## EU legislative competence for 45 % binding ?

- Treaty of Lisbon – art. 194 TFEU creates competence in the field of energy
  - **to be carried out taking into account environment, internal market and solidarity between Member State.**
- Also – art. 191(1) TFEU instructs EU to promote measures at international level to deal with regional or worldwide environmental problems, in particular can deal with combating climate change.
  - in fact though little addition: EU was competent to promote climate protection before already

## Acceptance by Member States?

- EU and Member States share competence on the energy sector - the choice of energy mix is left to the sovereignty of EU 27 Member States.
  - In areas of **‘exclusive’ competence**, only the EU can legislate and adopt legally binding acts. In areas of **‘shared’ competence**, both the EU and the Member States may legislate and adopt legally binding acts.
- Binding renewable targets may impact the sovereignty of Member States – limit the „room to decide what energy goes into the mix“
- This may cause conflicts especially in countries with high share of nuclear/coal in the electricity equation.

## The myth of a sovereign energy mix

- Not only the EU has committed to lower GHG emissions – so did Member States
- Events at Fukushima have heated up public discussions about energy
  - which again limits Member States „room to decide“
- EU is heavily dependent on oil/gas imports – which is expensive and endangers energy supply security
  - frequent crises in countries of supply call supply security into question even more
- A binding renewable target of 45% for 2030 would still leave 55% „sovereign energy mix“ to the Member States

45% by

The Next Step Needed:

2030

Towards a truly sustainable energy system in the EU

Thank you for listening!

Looking forward  
to your questions and comments!

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