Renewable Energy Sources

How feasible is a low-carbon based economy?

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Does the EU Carbon Trading System work?

- While the EU ETS is in theory a cost-effective tool to decrease emissions of greenhouse gases, it is currently suffering as a result of two critical issues that must be urgently addressed.

- First, unlike many other trading systems around the world, and unlike normal free markets, **the EU ETS market has no flexibility** within a phase to adjust supply in response to large changes in demand. This has meant that the market has been unable to cope with the huge surplus of over 2 billion allowances, which is still rising rapidly. In turn, we have seen a dramatic slump in the carbon price which is putting in jeopardy the ability of the EU ETS to act as the central tool for cost-effectively decarbonising the power and industrial sectors.

- Second, **the return of backloaded and other allowances to the market at the end of phase III**, is widely predicted to cause substantial market turbulence, further undermining investor and wider confidence in the EU ETS.

- Without a more stable and meaningful low carbon investment signal from the EU ETS, that engenders market confidence, we risk seeing critical low carbon investments delayed and the overall costs of decarbonisation rise unnecessarily in the future.

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What are the prospects of Clean Coal and CO_2 capture and storage applications in the EU electricity market?

The technology is largely unproven and will not be ready in time to save the climate.

- **CCS cannot deliver in time to avoid dangerous climate change**:
  Utility Scale CCS deployment is not expected before 2030.

- **CCS wastes energy**: The technology uses between 10% and 40% of the energy produced by a power station. Wide scale adoption of CCS is expected to erase the efficiency gains of the last 50 years, and increase resource consumption by one third.

- **Storing carbon underground is risky**: Safe and permanent storage of CO_2 cannot be guaranteed. Even very low leakage rates could undermine any climate mitigation efforts.

- **CCS is expensive**: It could lead to a doubling of plant costs, and an electricity price increase of 20%-90%. Money spent on CCS will divert investments away from sustainable solutions to climate change.

Is there a biofuel alternative to oil as a transportation fuel?

A pathway to greener transport includes measures such as:

- **Improved vehicle efficiency** and a **shift of transport from road to rail**.
- Increased **use of renewable electricity in road and rail transport**
- Use of **sustainable biofuels** from waste and residues, consisting mainly of **biomethane from agricultural waste and biodiesel from waste fats**.

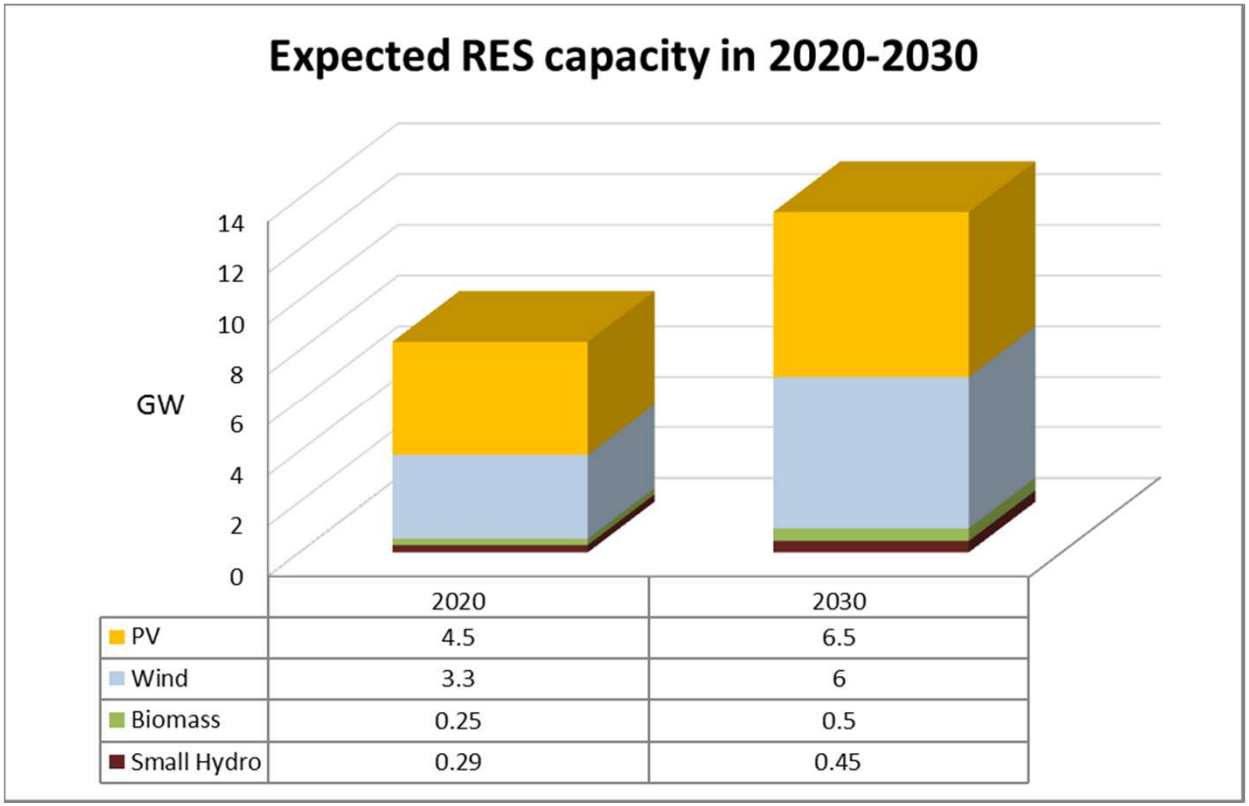
Projection of the Greek RES Market 2020-2030

- A study done for HELAPCO by Aristotle University of Thessaloniki (Bakirtzis and Biskas)

Additional RES in the Greek System result in :

- No need for Energy Storage Systems before 2027
- No negative effect (increase) in electricity price (Minimal increase in ETMEAR is netted off by decrease of the System Marginal Price)

Potential investment opportunities in the Greek RES market?



	2020	2030
PV	4.5	6.5
Wind	3.3	6
Biomass	0.25	0.5
Small Hydro	0.29	0.45

Source: Aristotle University of Thessaloniki, study for HELAPCO, June 2014

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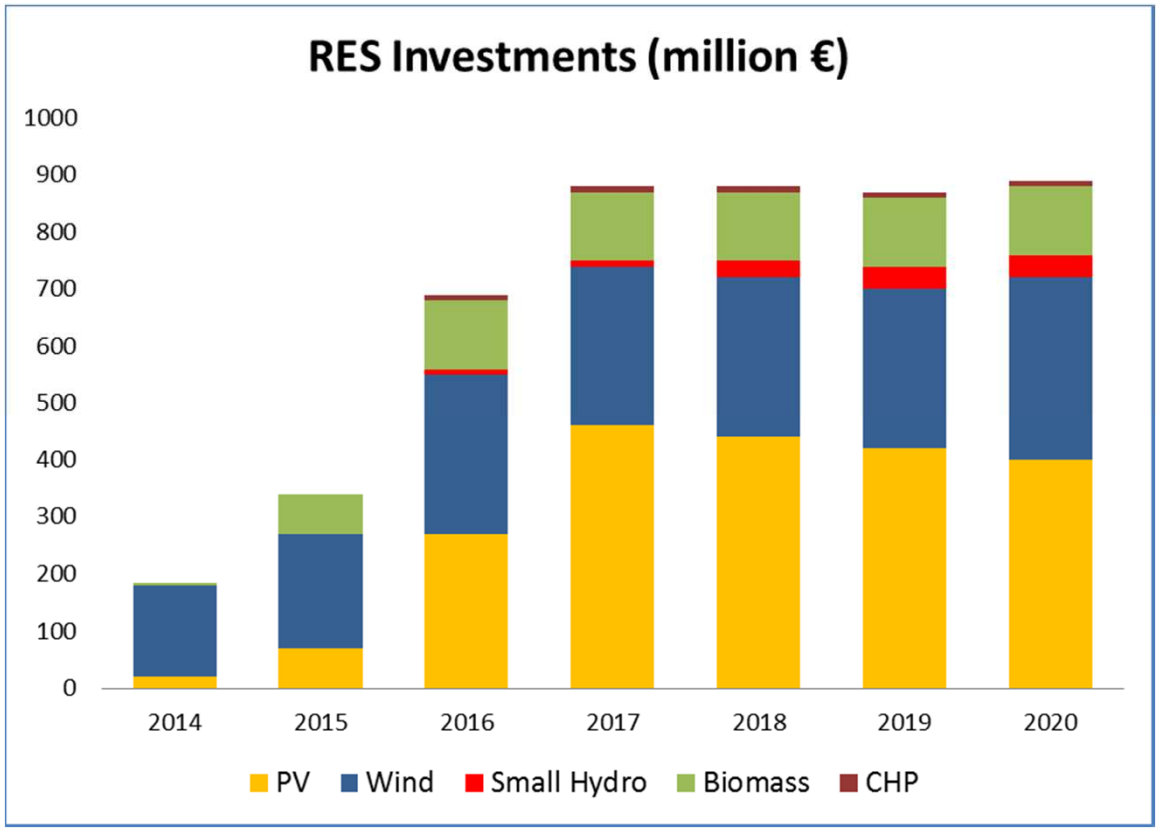

Source: HELAPCO, based on a study by the Aristotle University of Thessaloniki, June 2014