Achieving Climate Stabilization in an Insecure World: Does Renewable Energy Hold the Key?

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Meet IRENA: Renewable Energy –
Our Chance to Mitigate Climate Change
COP 15 Side Event
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RETD
IEA - RENEWABLE ENERGY TECHNOLOGY DEPLOYMENT

RETD Scenario Overview

RETD and ETSAP have modeled a scenario driven by climate and security concerns.

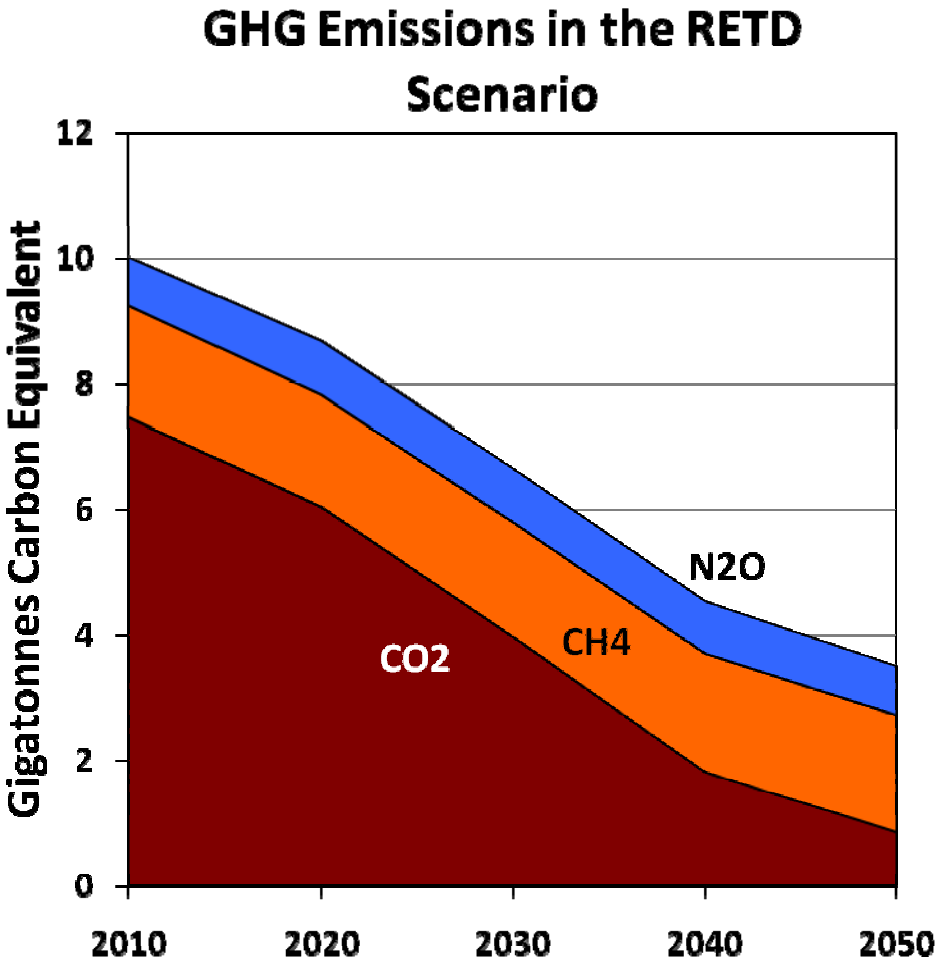
RETD Scenario Description		
Drivers	**Scenario Description**	**Key Scenario Features**
Climate Change **Security**	• Climate change and security concerns align to drive decarbonisation and energy independence • Achieving security is seen as inextricably linked to climate change mitigation	• GHG targets that achieve climate stabilization with high probability: 400ppm CO_2-eq • Constrained global trade in energy commodities, reflecting an insecure world and the desire for energy independence • Grid evolution moves quickly to support the rapid deployment of RE, EE and other low-carbon options

Achieving 400 ppm CO_2-eq is feasible.

- Requires immediate and significant action.
- A strong shift to more electricity use is key, including for transport.
- RE becomes the dominant energy source.
- Enabling technologies (e.g., Smart Grid, carbon capture and storage (CCS)) are important for achieving the climate target.
- The RETD Scenario is achieved at an incremental cost of less than 1% of cumulative global GDP through 2050.
  - In the same period global GDP grows by about 200%
  - GDP growth rates would be affected by less than 0.1% per year
  - **This does not include economic benefits such as reduced adaptation costs, rural development, clean energy jobs, enhanced security and reduced price volatility.**

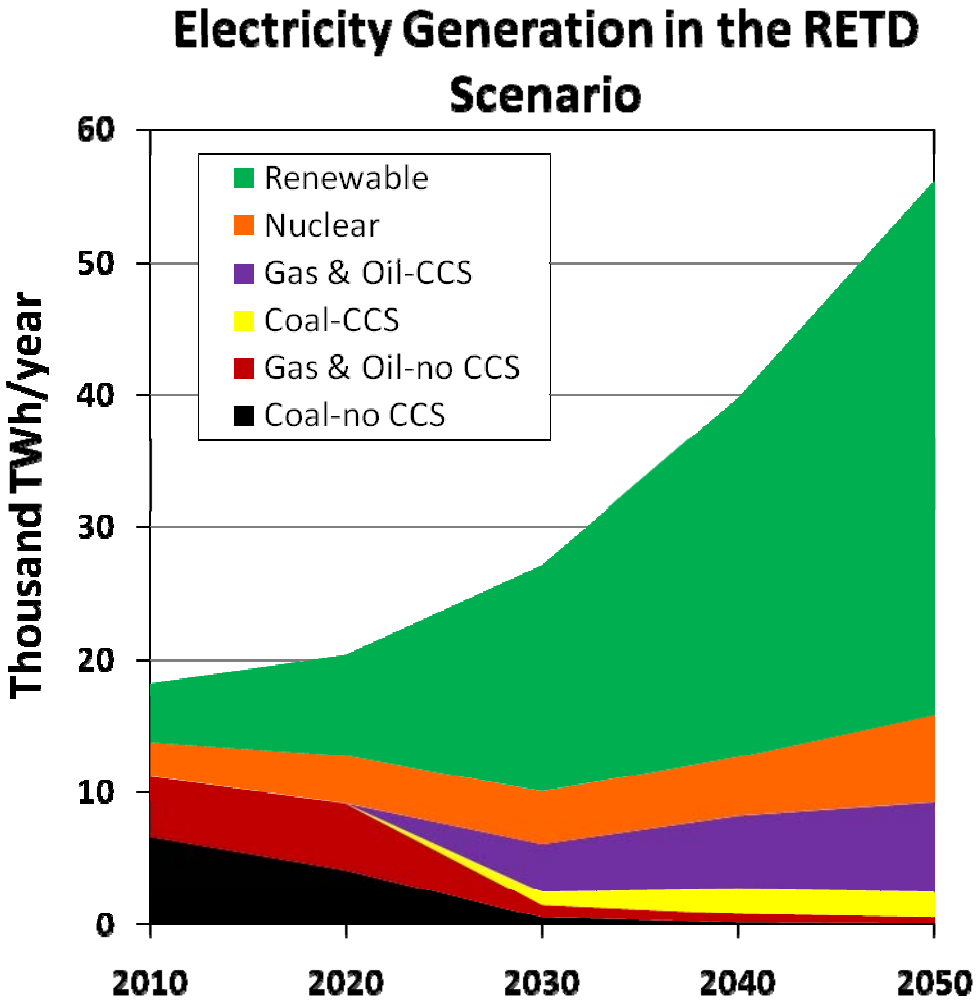
In the RETD Scenario, CO_2 emissions are reduced 85% through 2050.

- CO_2 reductions include:
  - Emission reductions from the energy system
  - Decreased emissions from land use change
  - Mitigation via reforestation
- The entire system becomes CO_2 free by 2060.
- CH_4 and N_2O mitigation are consistent with aggressive scenarios.
- GHG concentrations peak around 2030.



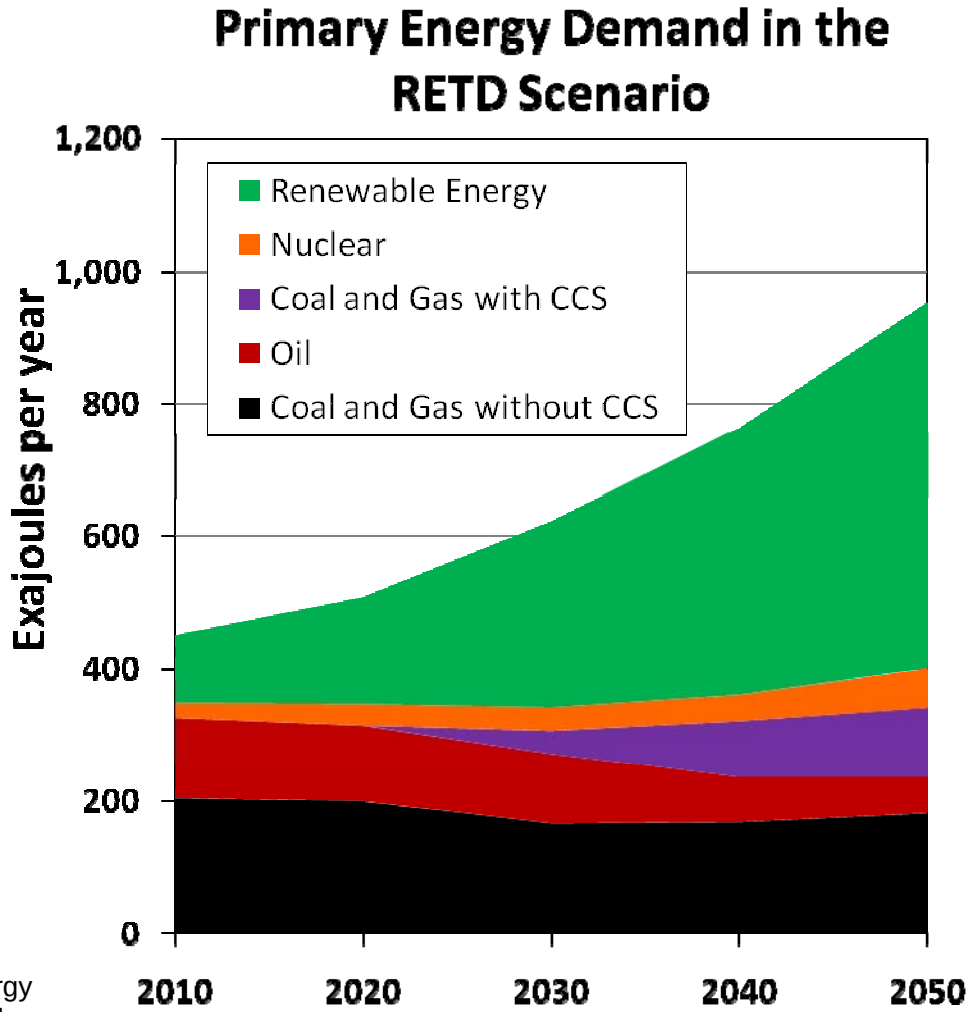
By 2050, RE produces >70% of all electricity.

- Electricity generation is virtually decarbonized by 2030.
  - It eventually becomes “carbon negative” due to biomass-CCS.
- This promotes substitution of other fuels used in buildings, industry and transport, which drives demand for electricity.



RE provides nearly 60% of primary energy by 2050.

- RE becomes the most important energy source by 2050.
- Petroleum use for energy falls more than 50%.
- Coal consumption falls by over 30%.
- CCS begins to penetrate after 2020.



Note: For non-biomass RE and nuclear energy, primary energy is estimated using a fossil fuel substitution factor of 9 MJ/kWh.

Although modeling approaches differ, the message is the same: "*tackling climate change saves you money*".

- The RETD Scenario is achieved at an incremental net-present-value cost of about $10 trillion through 2050, less than 1% of cumulative global GDP through 2050.
  - Global GDP is forecasted to grow by 200% through 2050.
- The WEO 2009 450 Scenario also shows a net savings over its Reference Scenario (undiscounted):
  - $10.5 trillion in incremental investments for 2010-2030
  - $17.1 trillion in reduced energy costs over the life of the investments
- None of these estimates include other economic benefits:
  - Job creation & rural economic development
  - Improved security & reduced energy price volatility
  - Reduced climate change adaptation costs

Conclusions

Global energy models need to be further improved to incorporate all economic costs and benefits.

- The results from the RETD's first modeling project suggest that RE holds the key to achieving aggressive climate targets.
- It is possible to adjust existing models to incorporate some of the unique economics issues affecting RE…
- …however, major modifications will likely be needed to fully account for the range of economic analyses that need to be done.

The RETD is currently formulating its plans for further modeling work.

THANK YOU

For additional information on the RETD

Online: www.iea-retd.org
Contact: IEA_RETD@ecofys.com

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Notice

RETD Notice
The RETD is comprised of ten countries: Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, and the United Kingdom. Hans Jørgen Koch, Deputy State Secretary, Ministry of Climate and Energy, Danish Energy Agency, serves as Chair of the RETD.

The RETD Implementing Agreement is one of a number of Implementing Agreements on renewable energy under the framework of the International Energy Agency (IEA). The creation of the RETD Implementing Agreement was announced at the International Renewable Energy Conference in Bonn, 2004.

The IEA Implementing Agreement functions within a framework created by the IEA. Views, findings and publications of the RETD do not necessarily represent the views or policies of the IEA Secretariat or all of its individual member countries.

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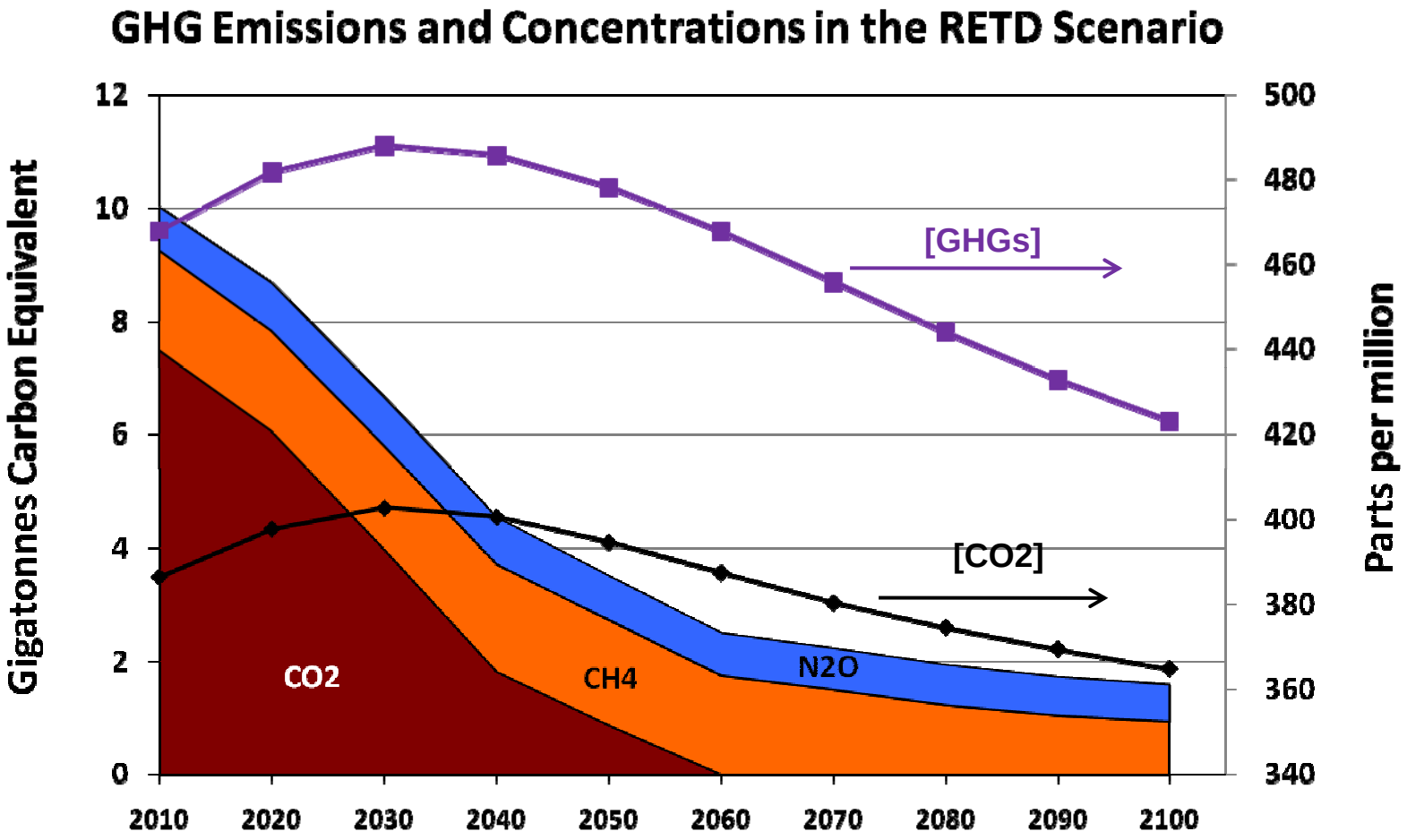
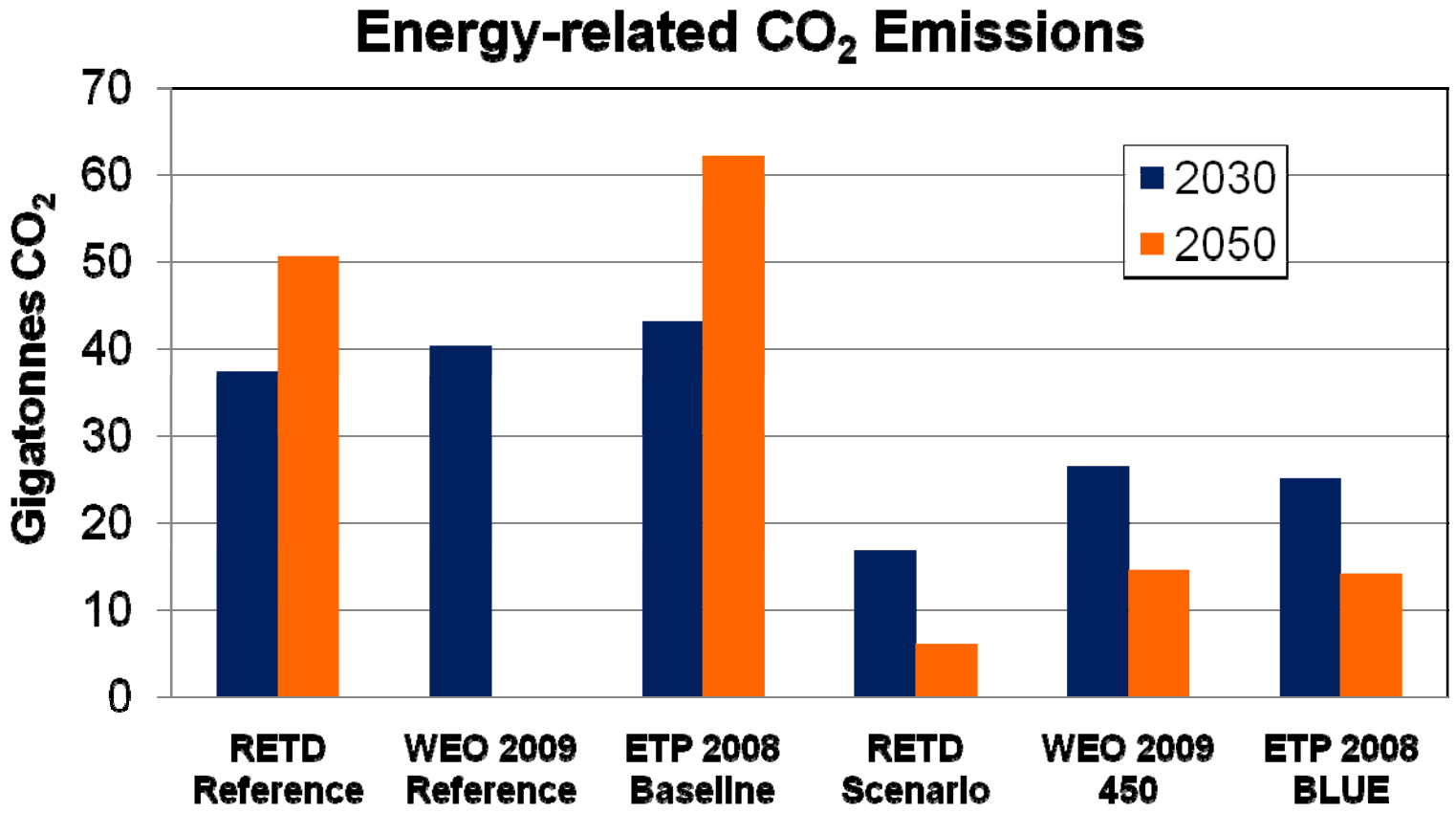
Scenario Results – Emissions

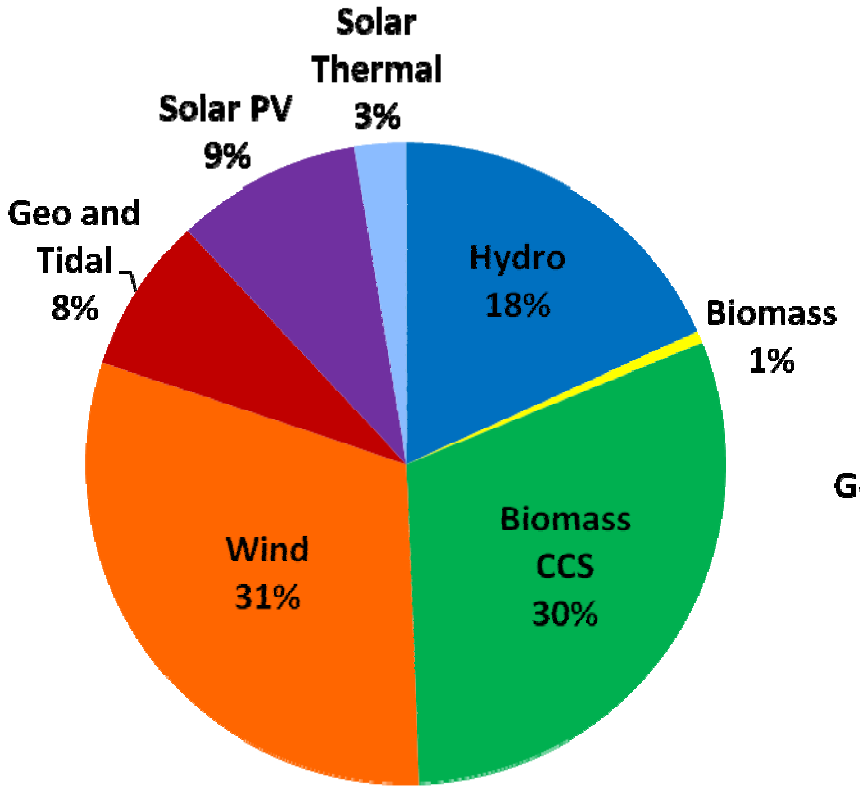


Scenario Results – Emissions



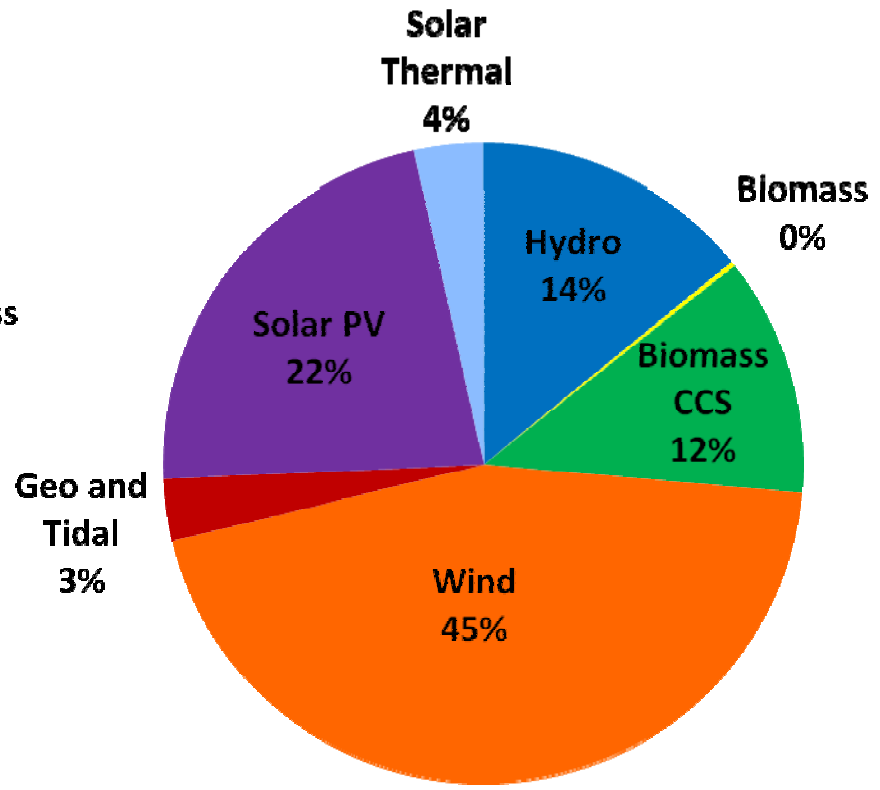
Scenario Results – Renewable Electricity

Renewable Electricity Generation in the RETD Scenario in 2050



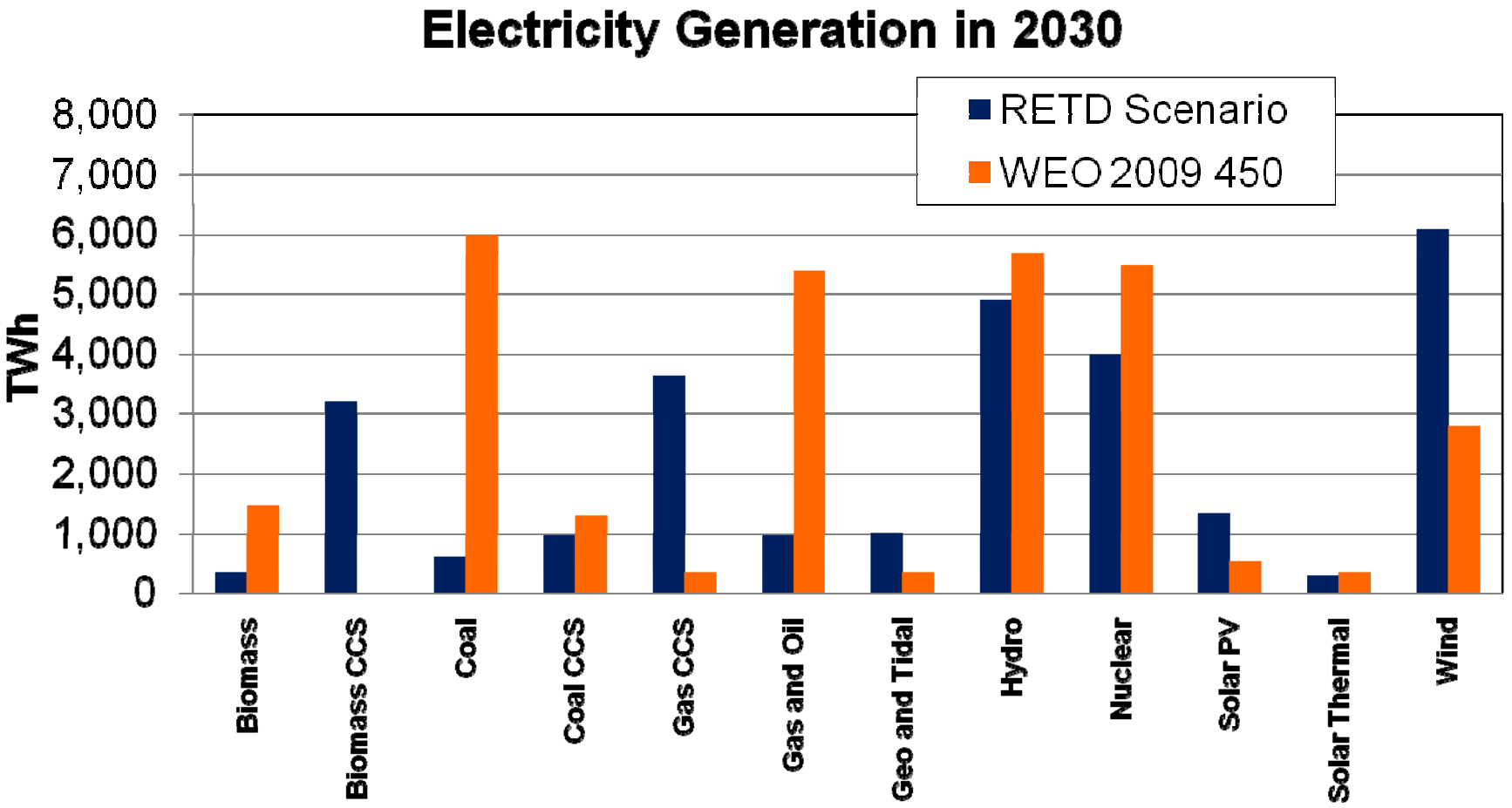
Total = 40,370 TWh

Renewable Electricity Capacity in the RETD Scenario in 2050



Total = 12,950 GW

Scenario Results – Electricity Generation



RETD Total = 27,125 TWh
WEO 2009 450 Total = 29,480 TWh