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Sustainable Fossil Fuels - The PowerClean RTD Thematic Network

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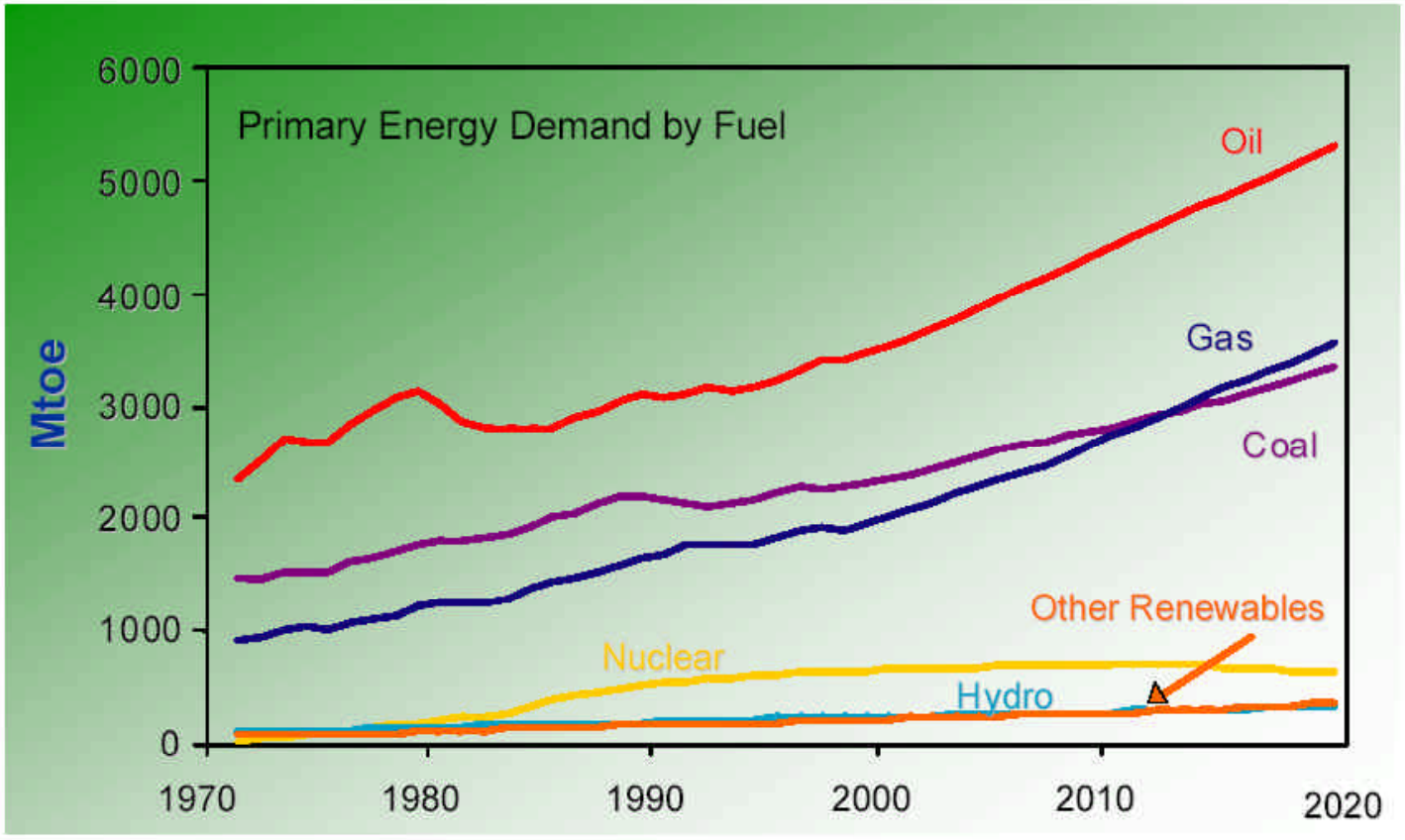
IEA World Energy Outlook



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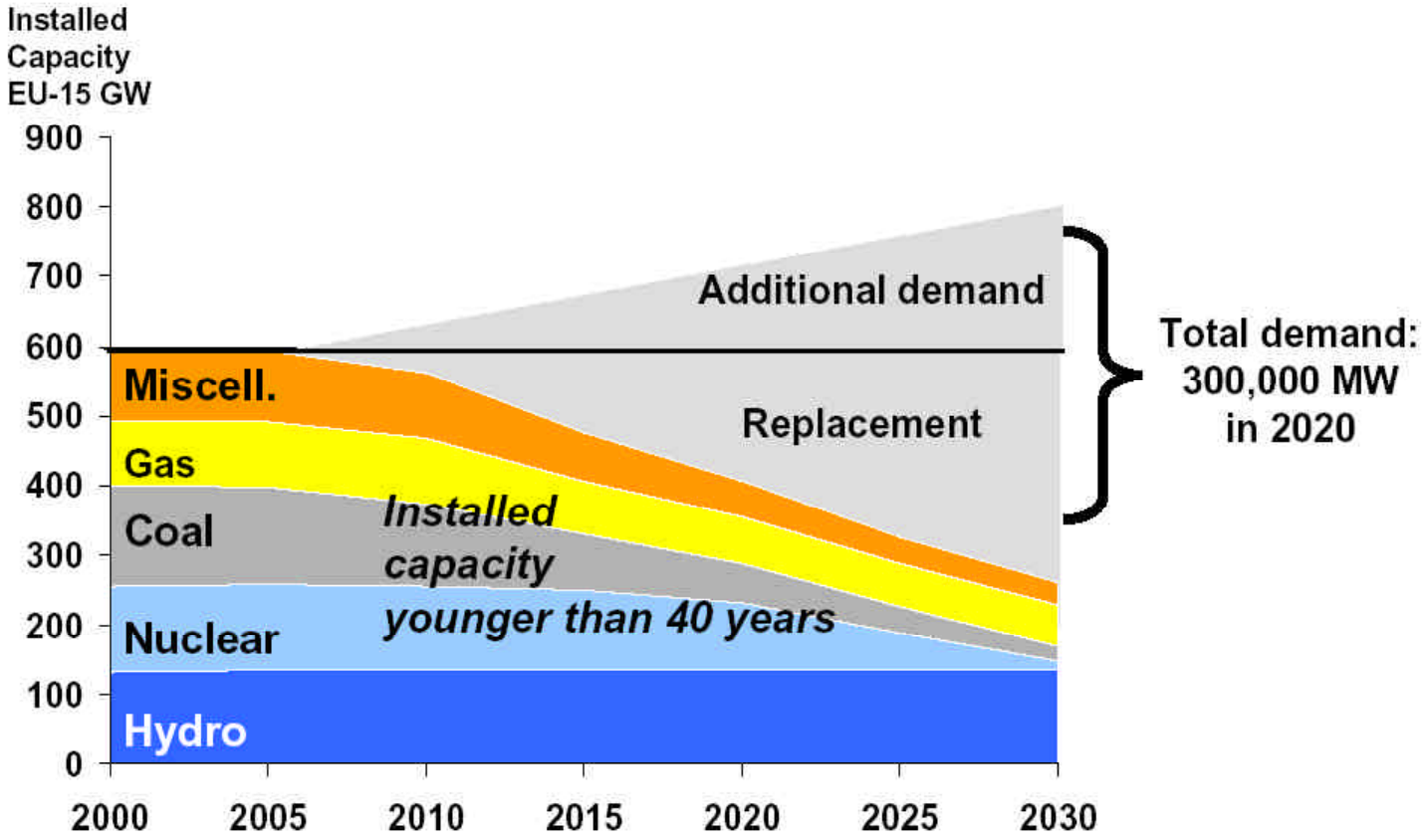
New power capacity in Europe VGB)



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The PowerClean RTD Thematic Network

Effective: 1 November 2002 to 31 October 2005

Membership: Open to companies, institutions and individuals throughout Europe. Currently, there are 32 member organisations.

Primary goals: To help maintain the technical and industrial content of future European energy-related research, to contribute to identifying future research priorities for fossil based power generation, and to try to ensure that fossil fuels are included in the Seventh Framework Programme.

Sustainability and low/no CO_2 emissions are the key!

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Four ThematicGroups

Combustion

Gasification

Systems

Materials

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What is included in “Systems”?

Systems, components and equipment in high efficiency power plants based primarily on fossil fuels and aiming to zero emissions:

- Future generation of gas fired combined cycle plants.
- Ultrasupercritical steam cycle plants: PC, PFBC, CFBC.
- Gasification combined cycle power plants: IGCC.
- Gasification and fuel cells combined cycle power plants.
- Fuel conversion plants: from coal liquefaction to hydrogen production.
- Novel "zero CO_2 emissions" power plants.

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Examples of techniques which might be used to achieve "zero CO_2 emissions" power generation

- Post-combustion CO_2 removal.
- Pre-combustion CO_2 removal.
- Chemical looping combustion.
- "Oxyfuel" combustion.
- Solid oxide fuel cell with CO_2 capture.
- Membrane separation.

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What is included in “Materials”?

- High temperature materials in gas turbines, including e.g. single crystal blading to achieve operation at higher TIT and thus higher cycle efficiency. Very high corrosion resistance is needed!
- Stronger alloys for SC and USC boiler components to allow operation at higher metal wall temperatures and at high steam pressures. Again, very high corrosion resistance is needed.
- Materials with increased erosion resistance for use in SC and USC FBC, PFBC and IGCC plants to extend component life. This can include compound materials.

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What is included in “Materials”?, cont.

- Materials with a high resistance to high temperature corrosion under ash or slag deposits.
- Construction materials in power plants incorporating novel cycle concepts, including CO_2 capture.
- High temperature particulate filters.
- Membranes for separation of gases, including CO_2 or H_2 from combustion or gasification gas streams.
- Fuel cell electrolytes.
- Other materials issues, to be defined.

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So what about the future?

- European manufacturers of power generation equipment are presently at the forefront as regards highly efficient coal-based technology.
- In order to secure that they succeed in maintaining this leading position, and thus to secure a large future market for its products, European industry will need a strong backing from the European Commission and European national funding agencies.
- R&D on low-CO_2 and no-CO_2 technologies at European technical universities is also needed in order to assure that their education matches society's needs. Again, for this they need adequate funding!

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The PowerClean RTD Thematic Network welcomes additional members. We also looks forward to close co-operation with other Thematic Networks as well as with participants in European national programmes!

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