Scenarios of Future Energy Needs & Possible Roles of Nuclear Power

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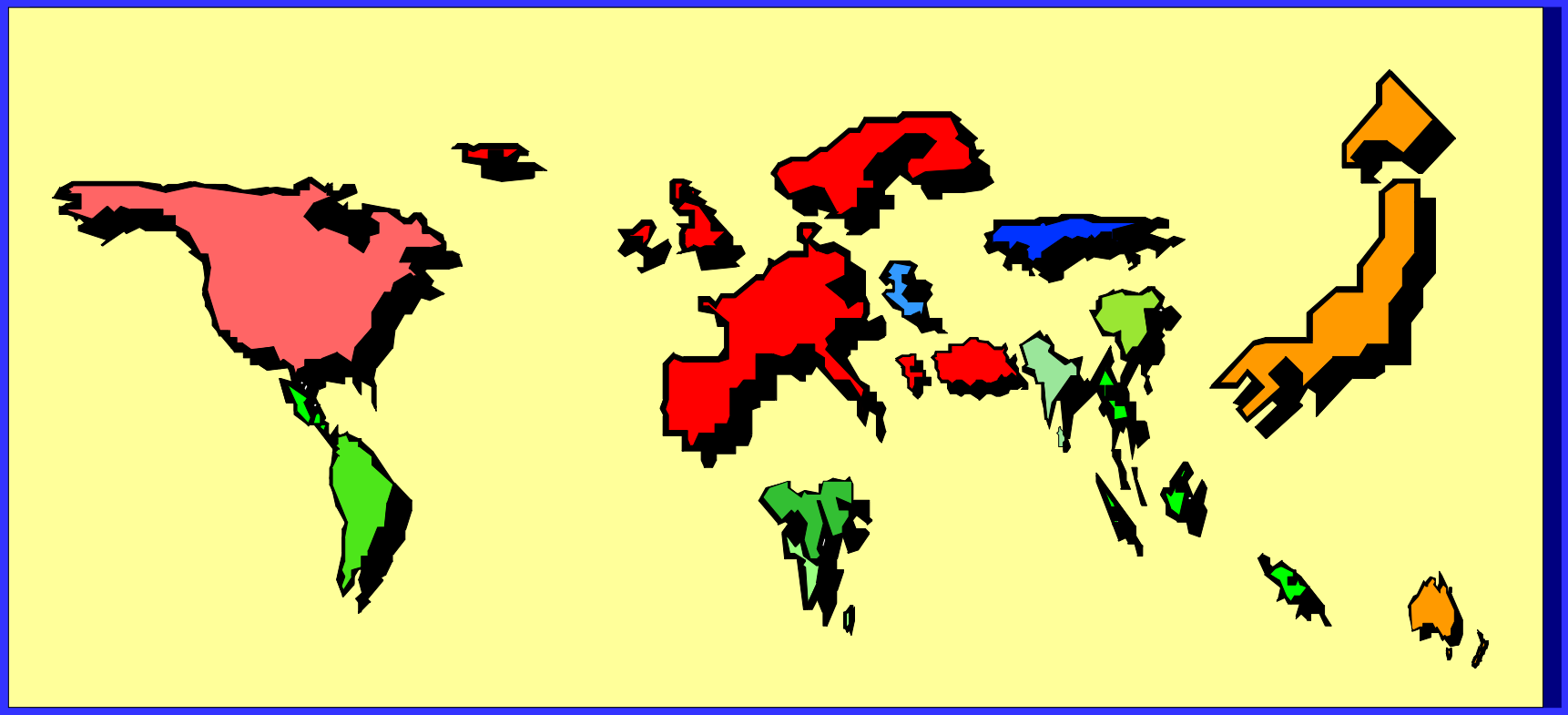
Civilian Applications under Atoms for Peace – Japan, 27. May 2003

World Economic Map

Areas of Regions Proportional to 1990 GDP (mer)



World Economic Map

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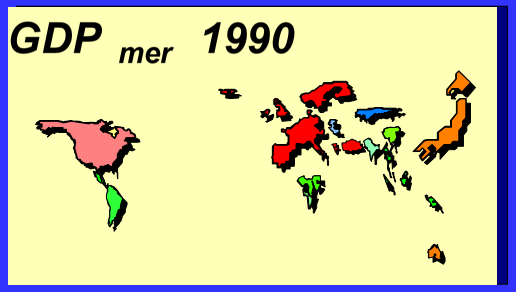

Area of Regions Proportional to 1990 GDP_{mer}

World Economic Map

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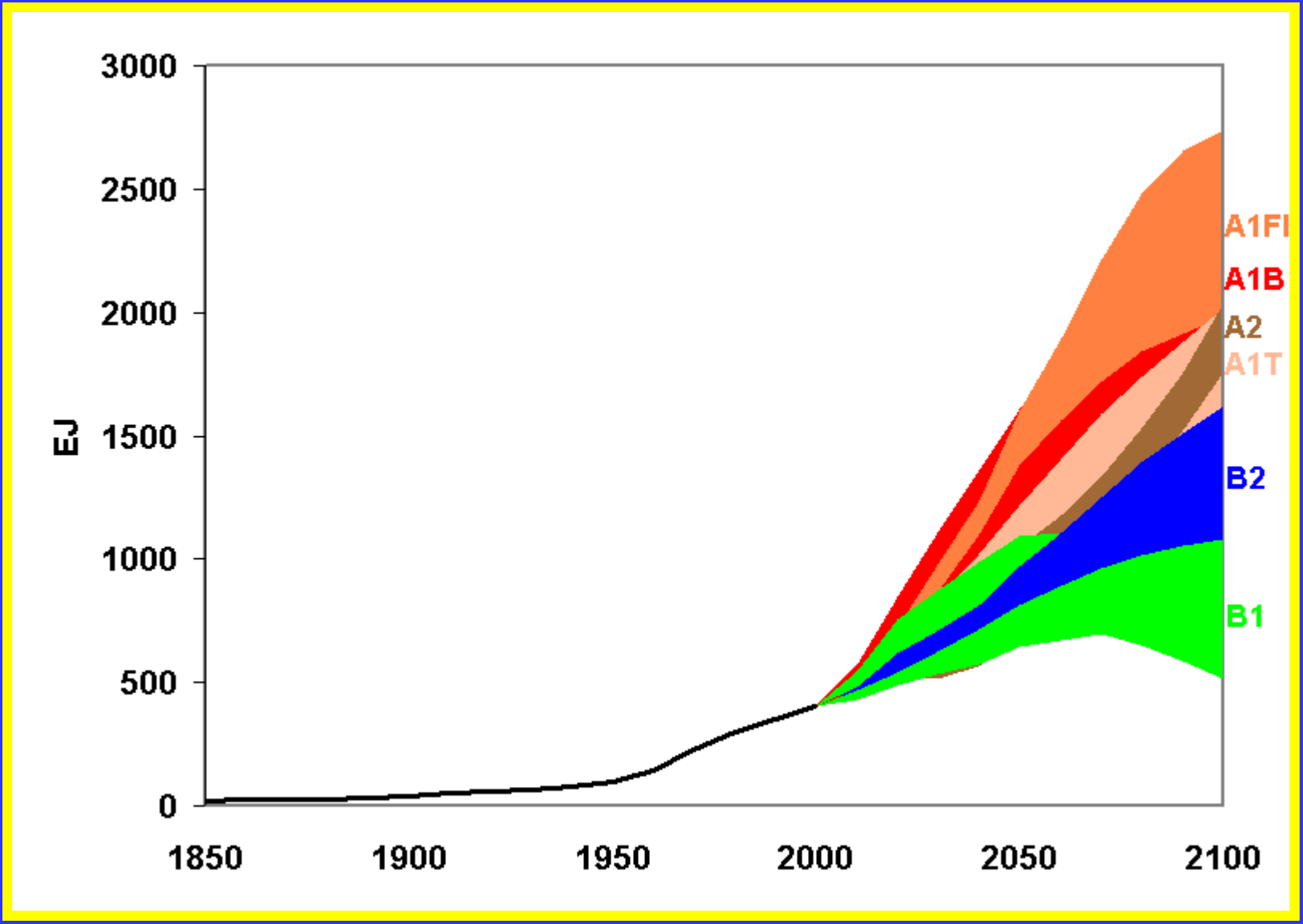
Global Primary Energy Scenarios



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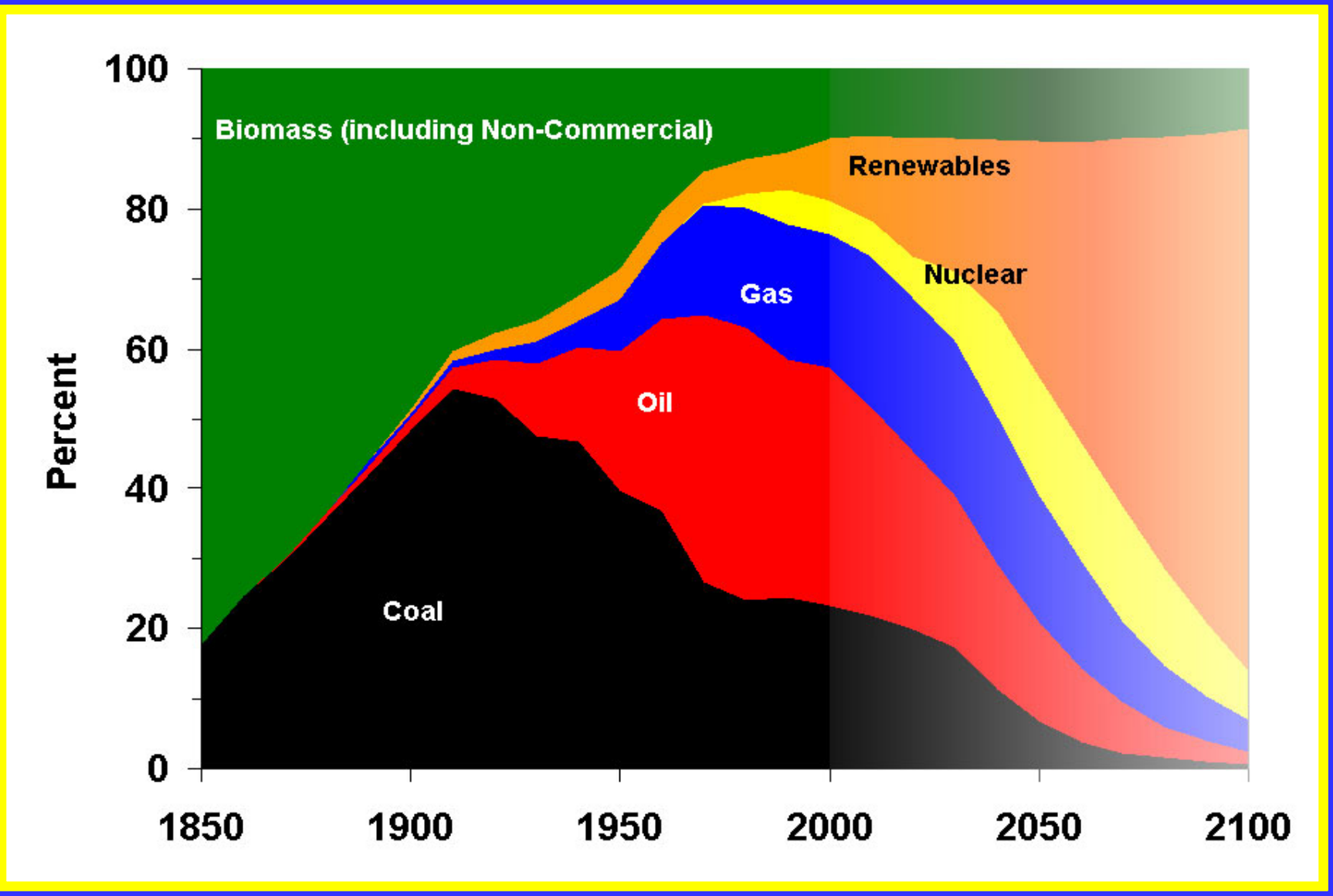
Evolution of Global Primary Energy



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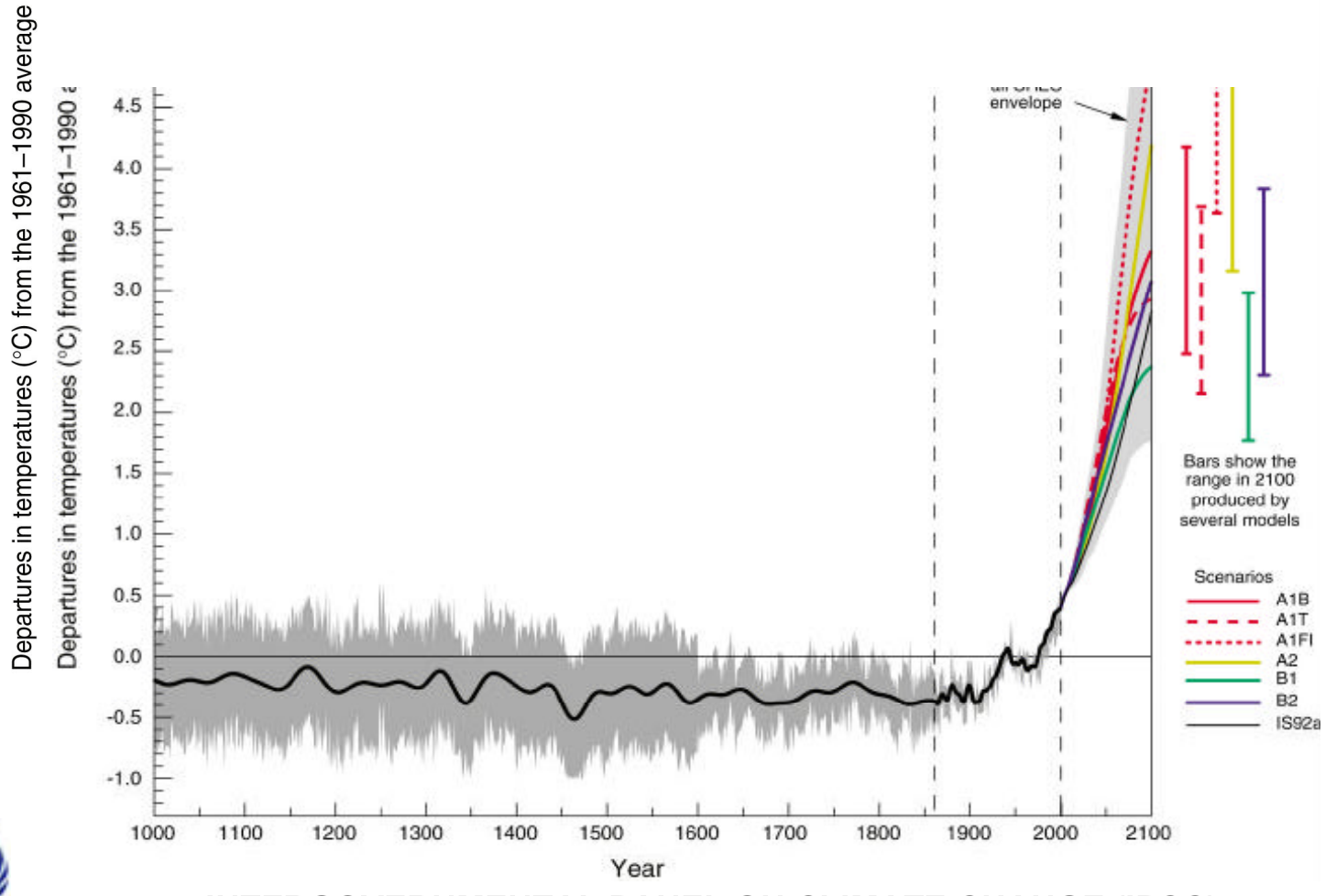
Global Mean Temperature Change



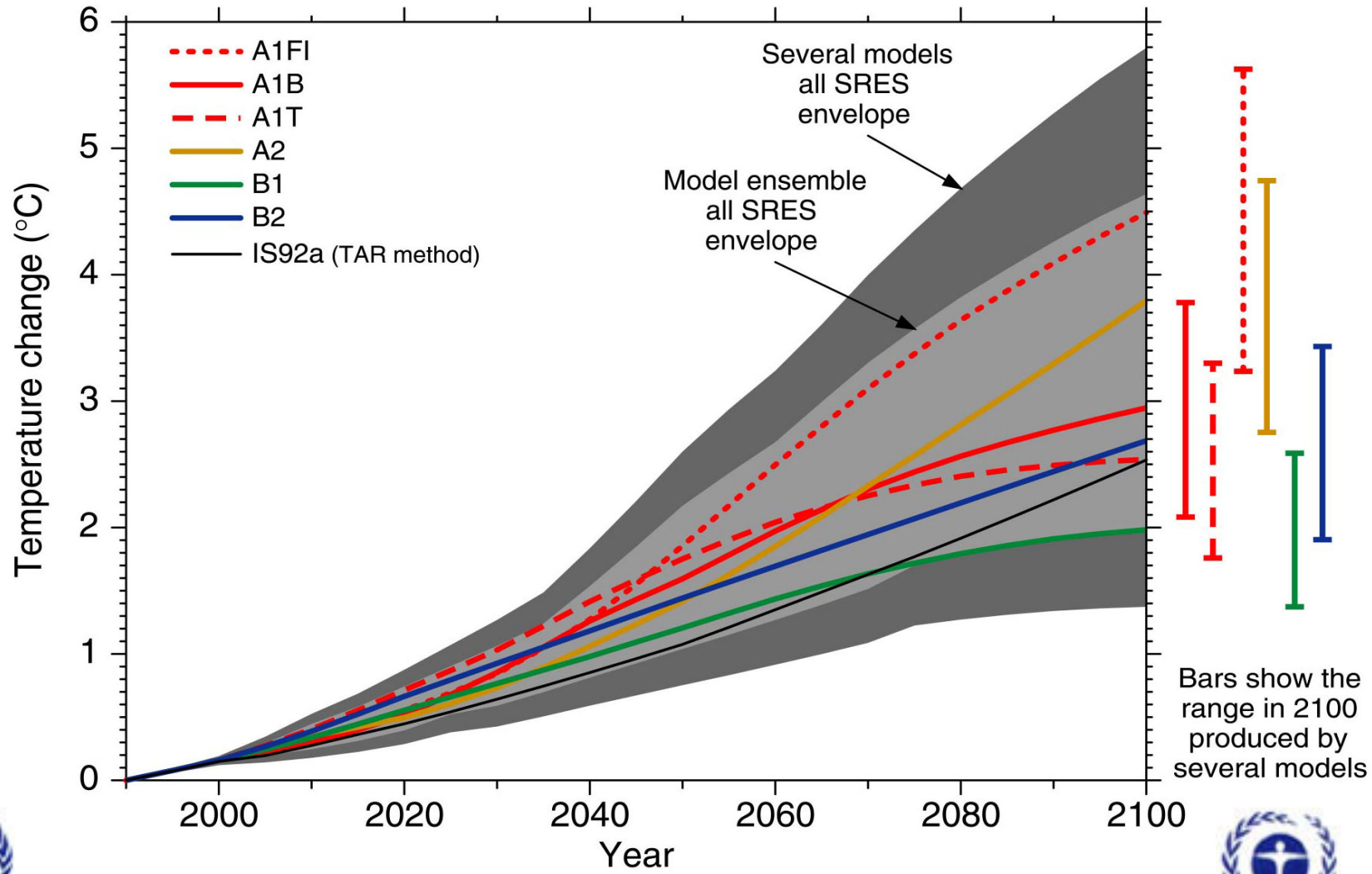
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

WMO

UNEP

Global Mean Temperature Change

Six illustrative SRES scenarios, full range



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

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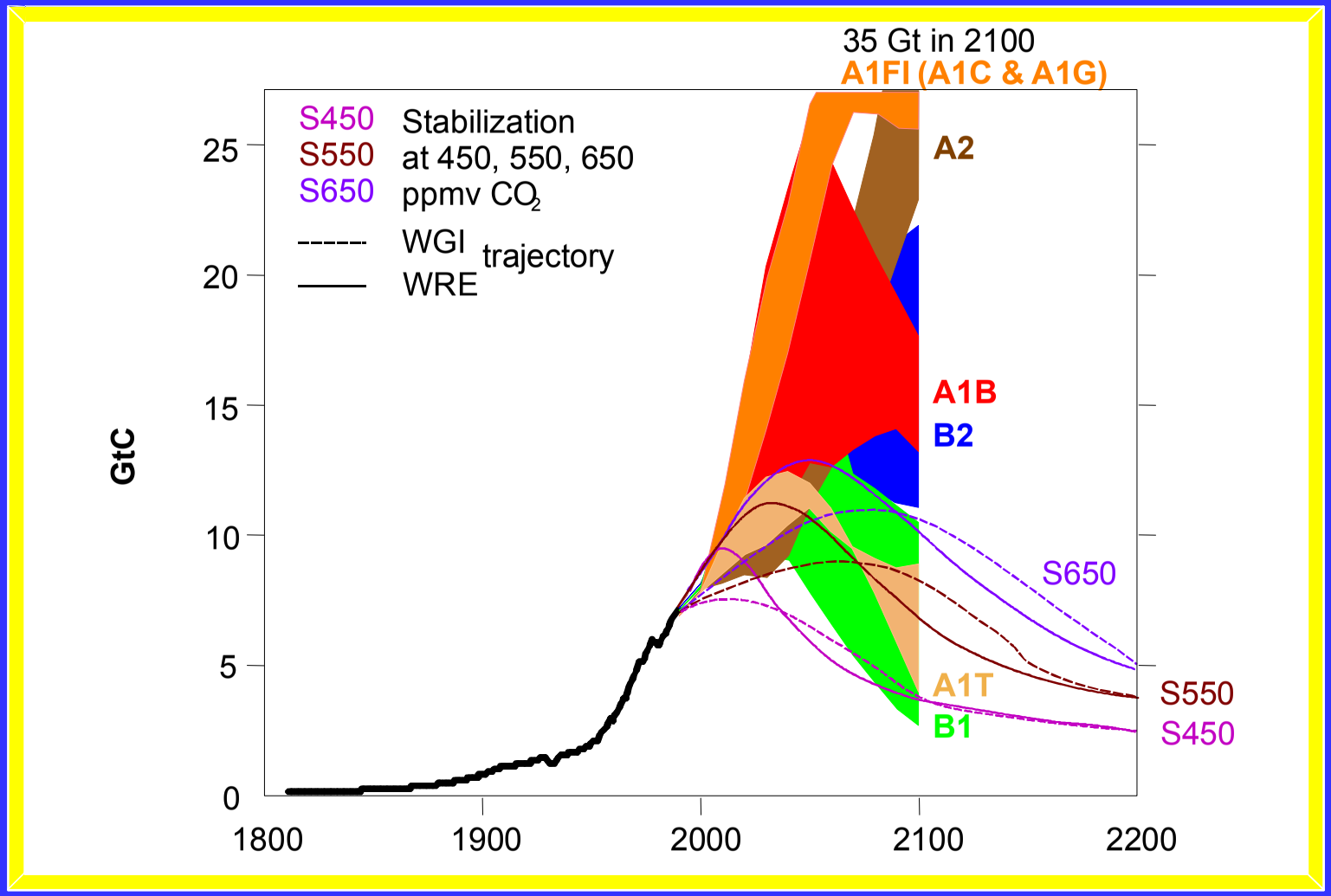
Carbon Emissions: Scenarios and Stabilization Profiles



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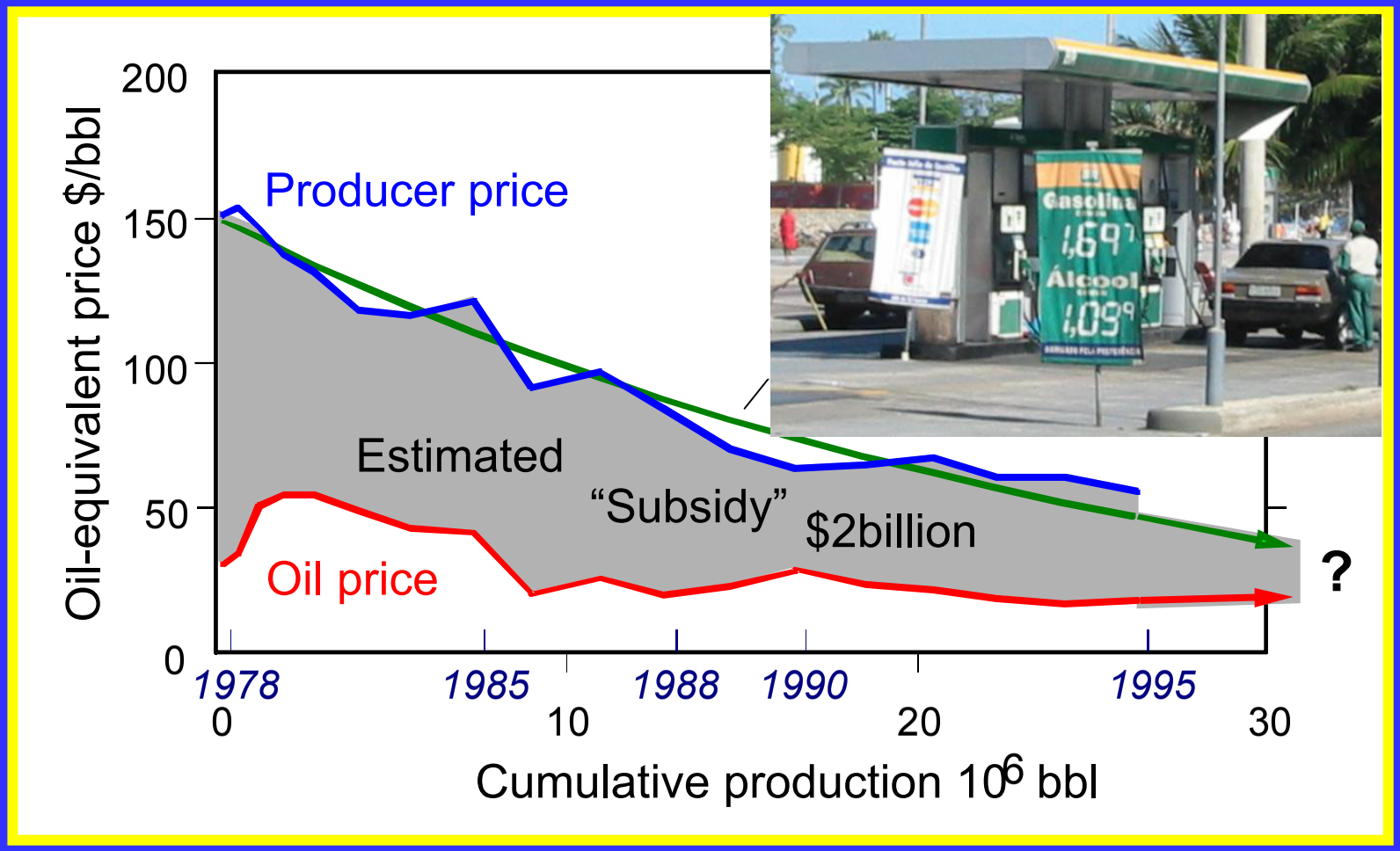
Technical Options for a more Sustainable Future

- **Improved Energy Efficiency** - especially at the point of end-use in buildings, electric appliances, vehicles, and production processes.
- **More Renewable Energy**: such as biomass, wind, solar, hydro, and geothermal
- **Advanced Energy Technologies**:
  - next generation fossil fuel and carbon sequestration technologies
  - nuclear technologies, if the issues can be resolved.

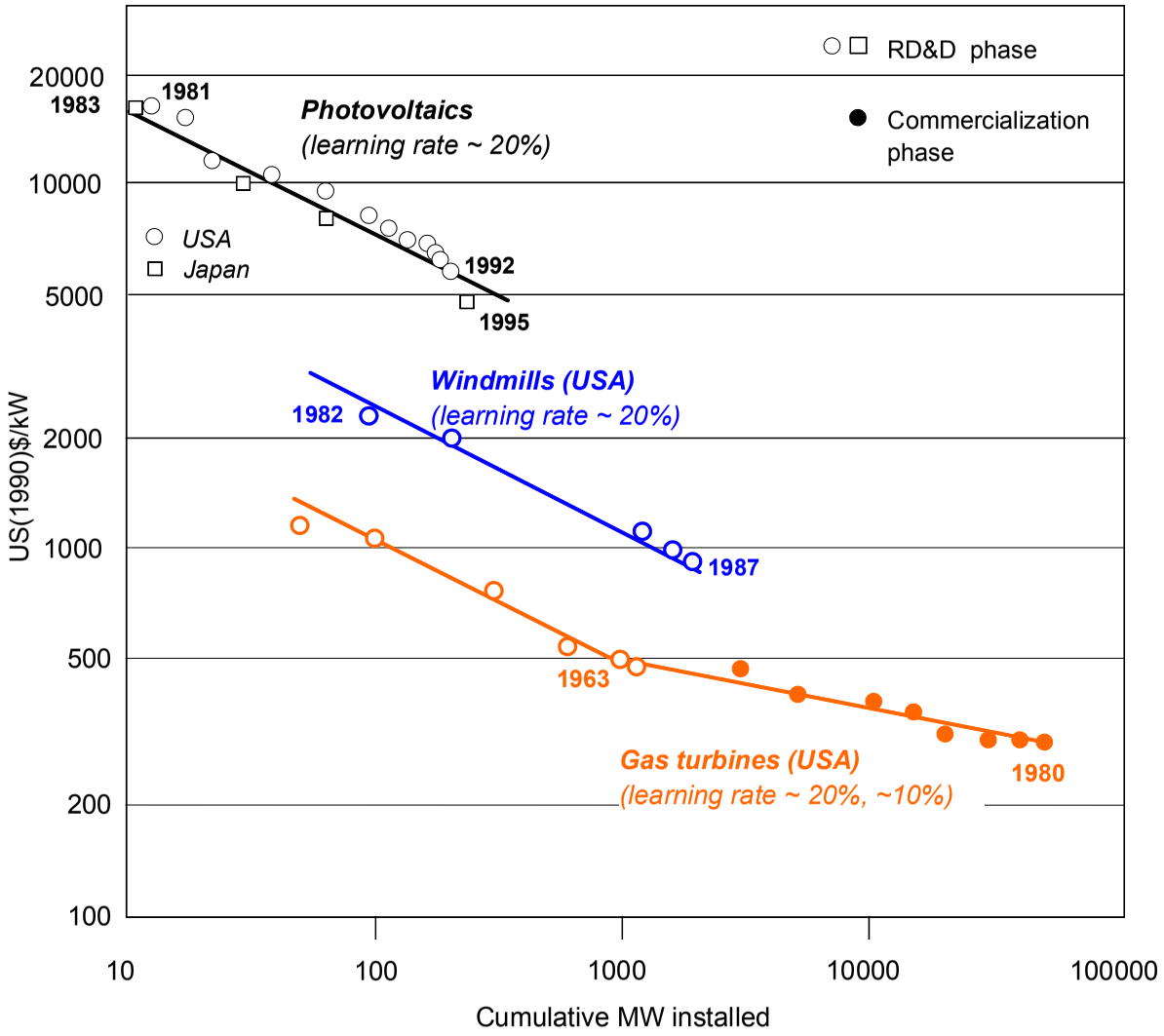
The Innovation Chain

- Research and development
- Demonstration projects
- Early deployment (cost buy-down)
- Widespread diffusion

Brazil – Ethanol Learning Curve



Learning Curves



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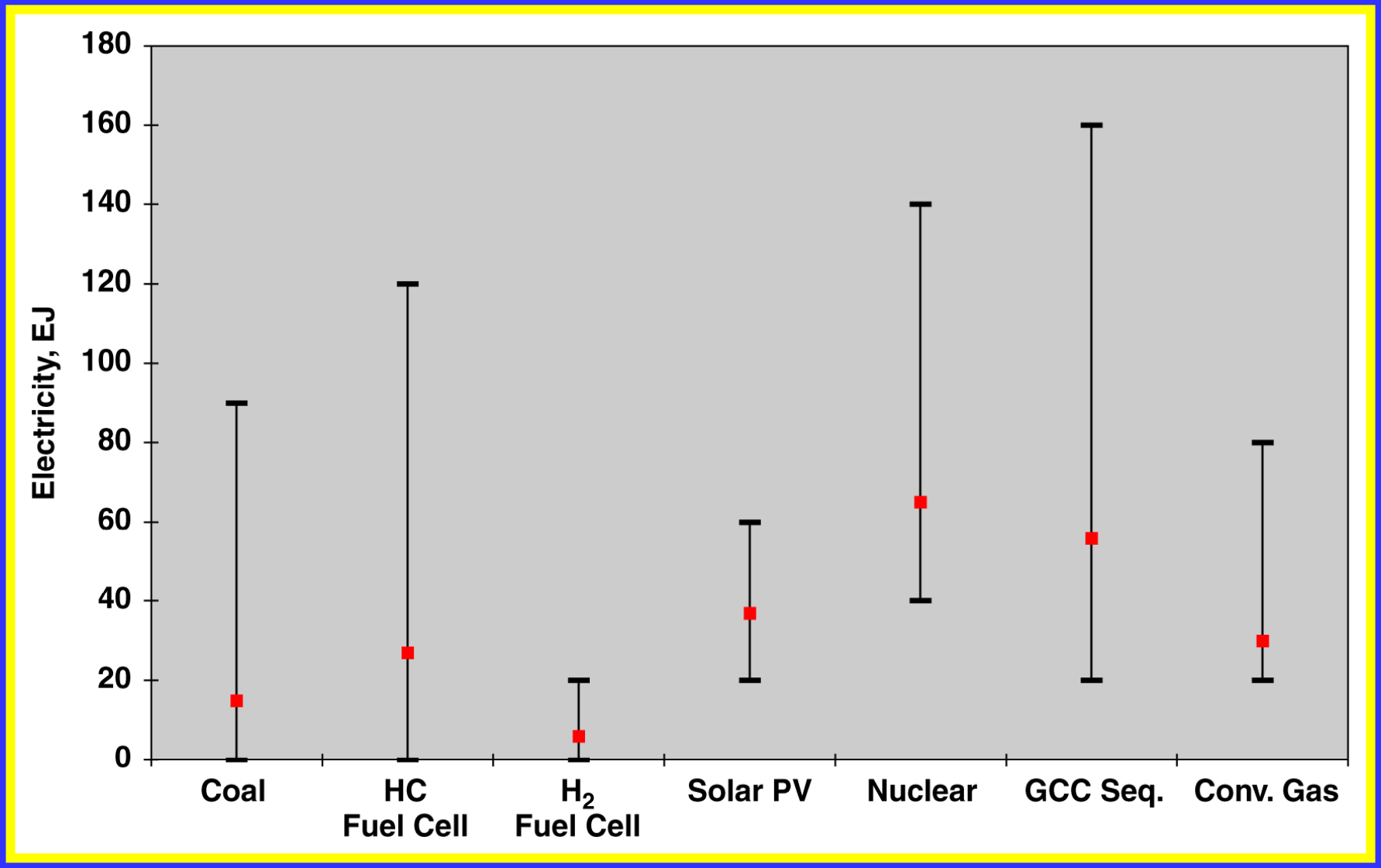
Power Generation in 2050



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Investments in Energy Supply

Issue: Mobilization of capital for energy supply investments

- Investment in energy supply projected at $300-500 billion per year for the next 20 years, depending on path chosen
- Less than 10% of total overall investments

TIME FOR A CHANGE

- Typical diffusion time constraints for replacing 80% of energy capital stock are 20 to > 50 years
- Premature replacement of capital by new technologies is too costly
- Start experimentation and technological learning now to prepare for future capital replacement

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