

# Nuclear Energy Outlook

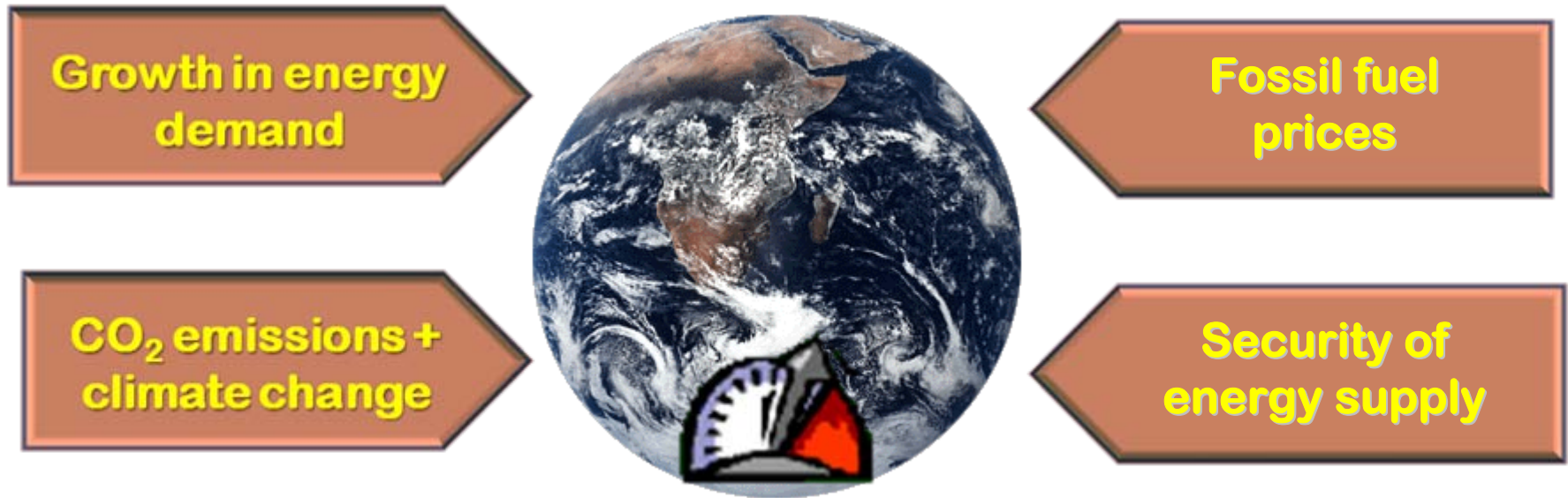
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OECD NEA: Nuclear Energy Outlook '08  
IAEA International Ministerial Conference on Nuclear Energy in the 21<sup>st</sup> Century  
Beijing, China, 21 April 2009

# **A lasting tribute to NEA's 50 years**

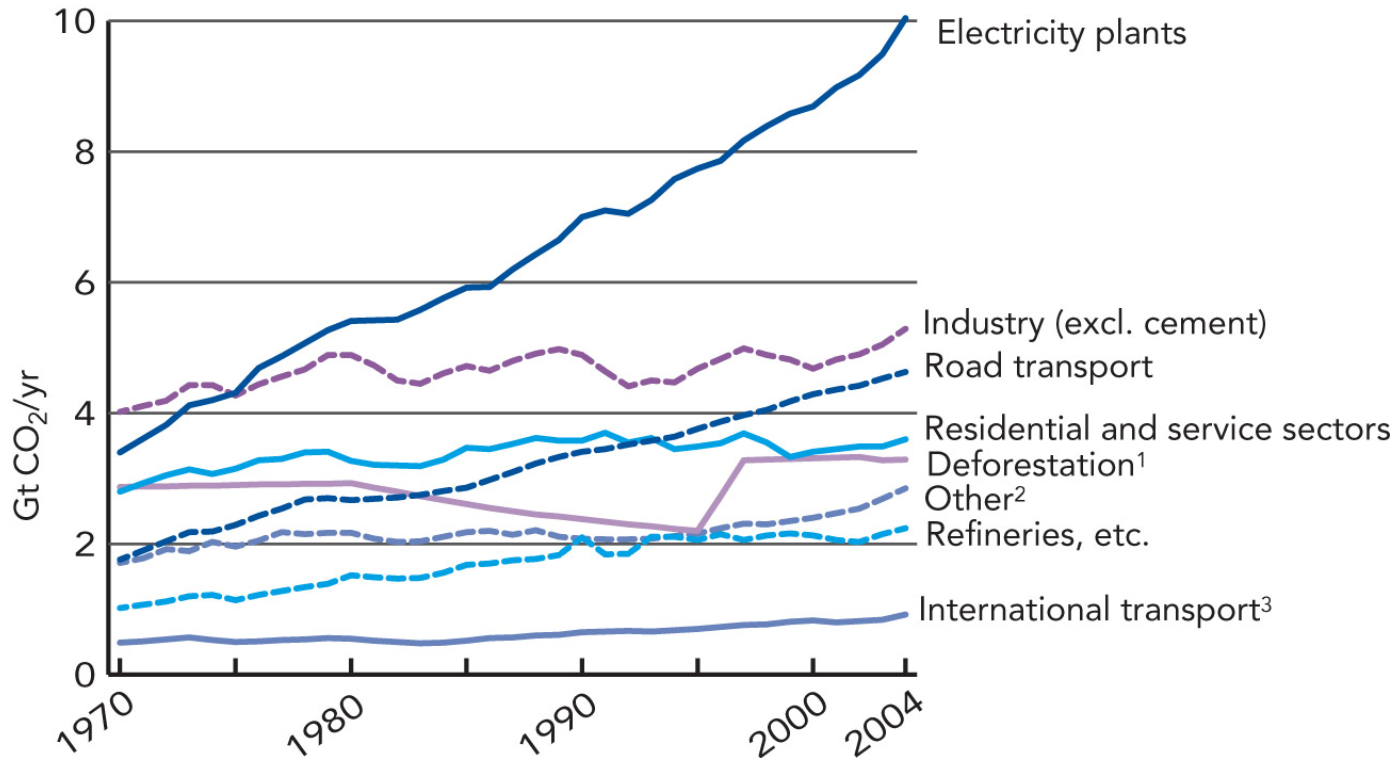
- **First ever NEA outlook**
- **Responding to renewed interest in nuclear energy**
- **Intention to inform the debate**

# Why the renewed interest in nuclear energy?



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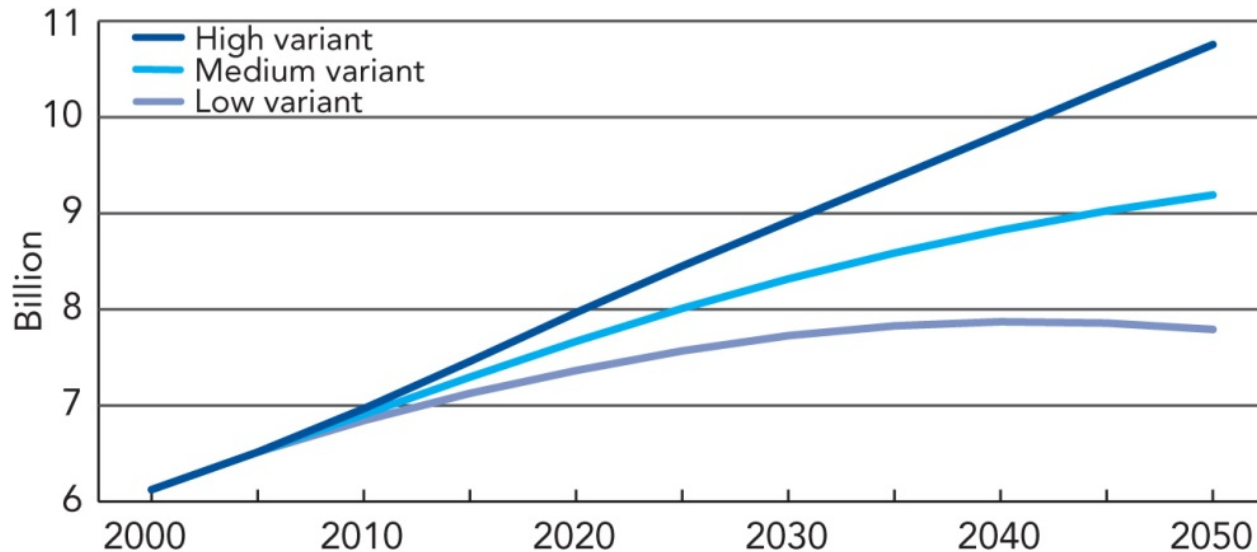
Figure 4.6: Sources of global anthropogenic CO<sub>2</sub> emissions



# Business as usual to 2050

Population up by 50%...

Figure 3.1: UN projections of world population

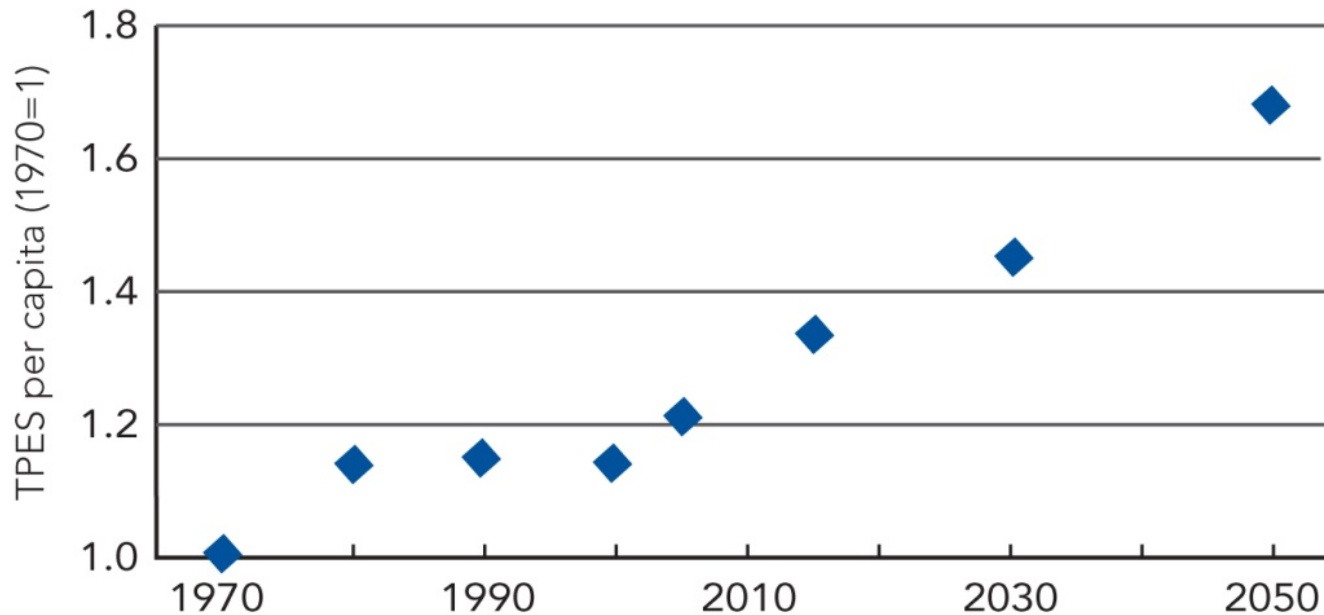


Source: UNPD (2006).

# Business as usual to 2050

Energy demand up by 100%...

Figure 3.2: Increase in TPES per capita

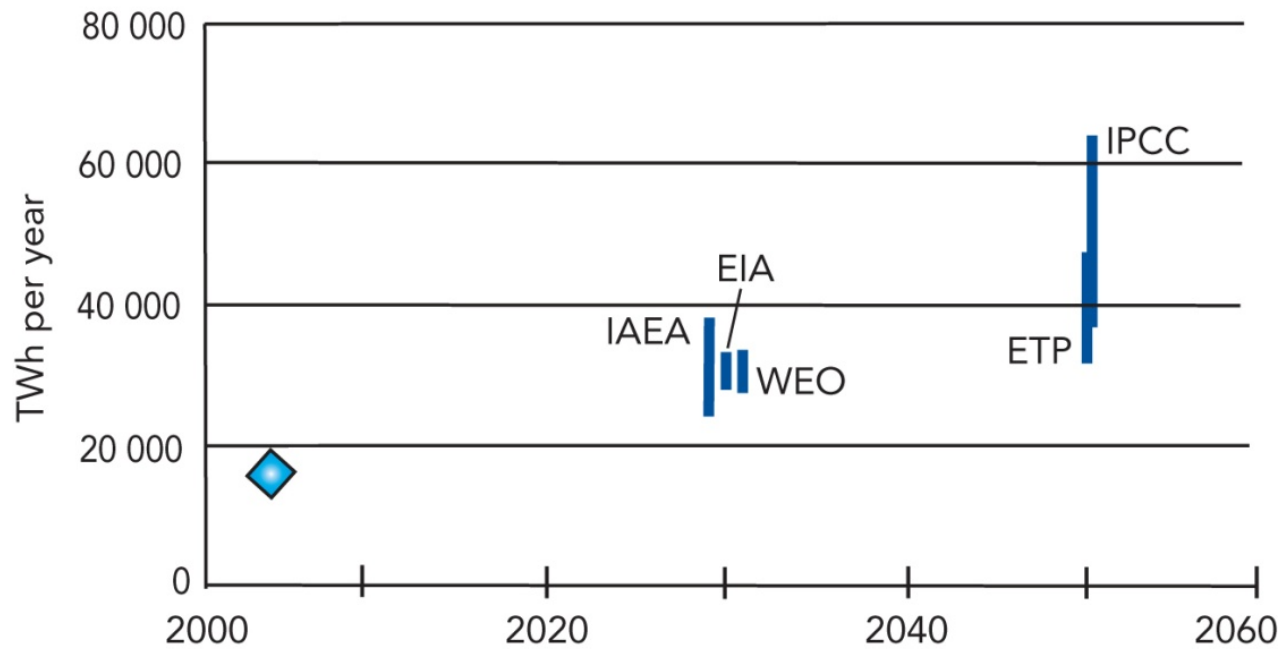


Sources: adapted from IEA data (2006a, 2006b).

# Business as usual to 2050

## Electricity demand up by 150%...

Figure 3.5: Projected increase in electricity demand worldwide



Note: The vertical bars at 2030 and 2050 have been separated for ease of reading.

# Business as usual 2050

Population up by 50%...

Energy demand up by 100%...

Electricity demand up by 150%...

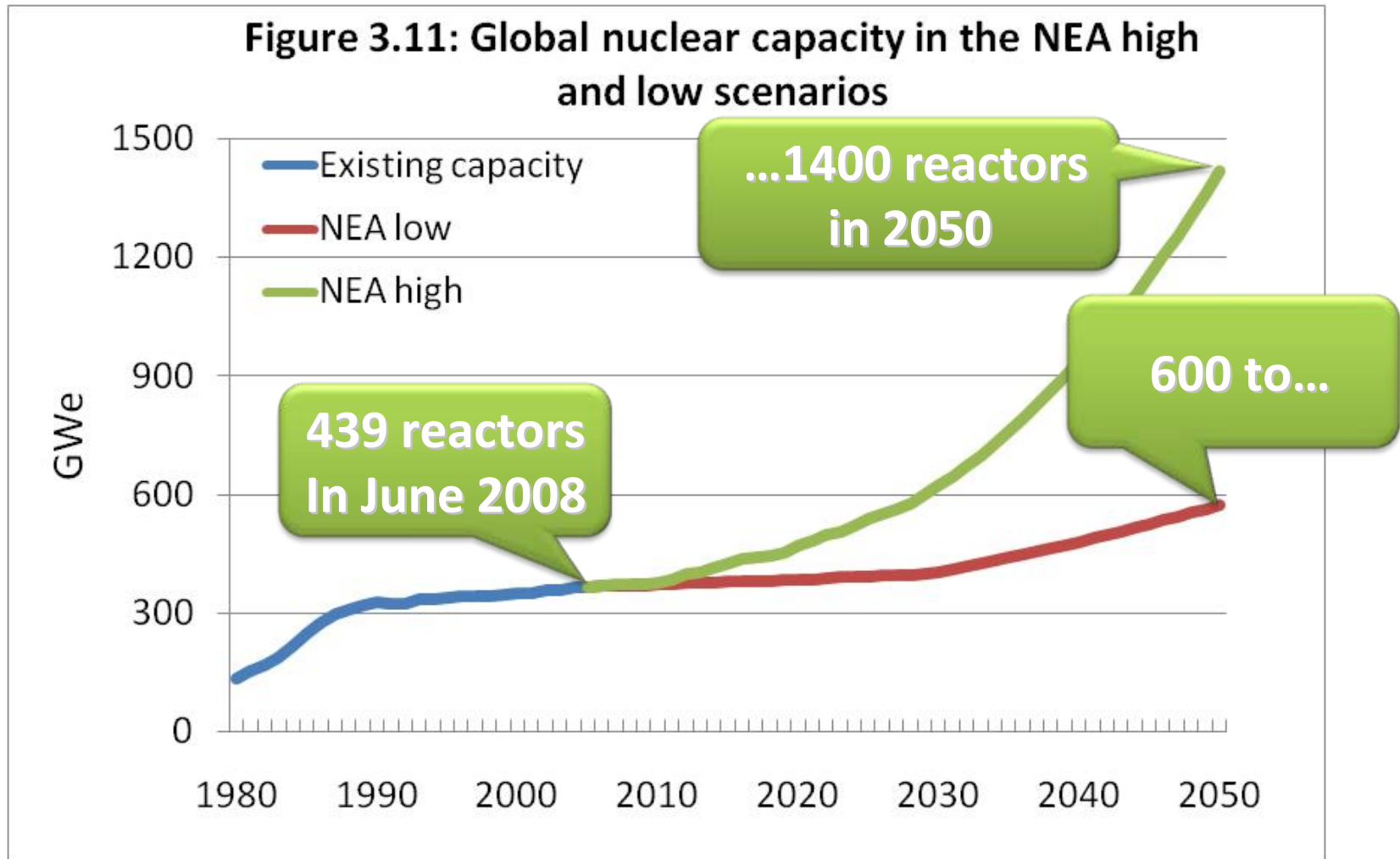


**CO<sub>2</sub> emissions per unit of energy consumption must be reduced by a factor of 4**

**Nuclear could make a significant contribution**



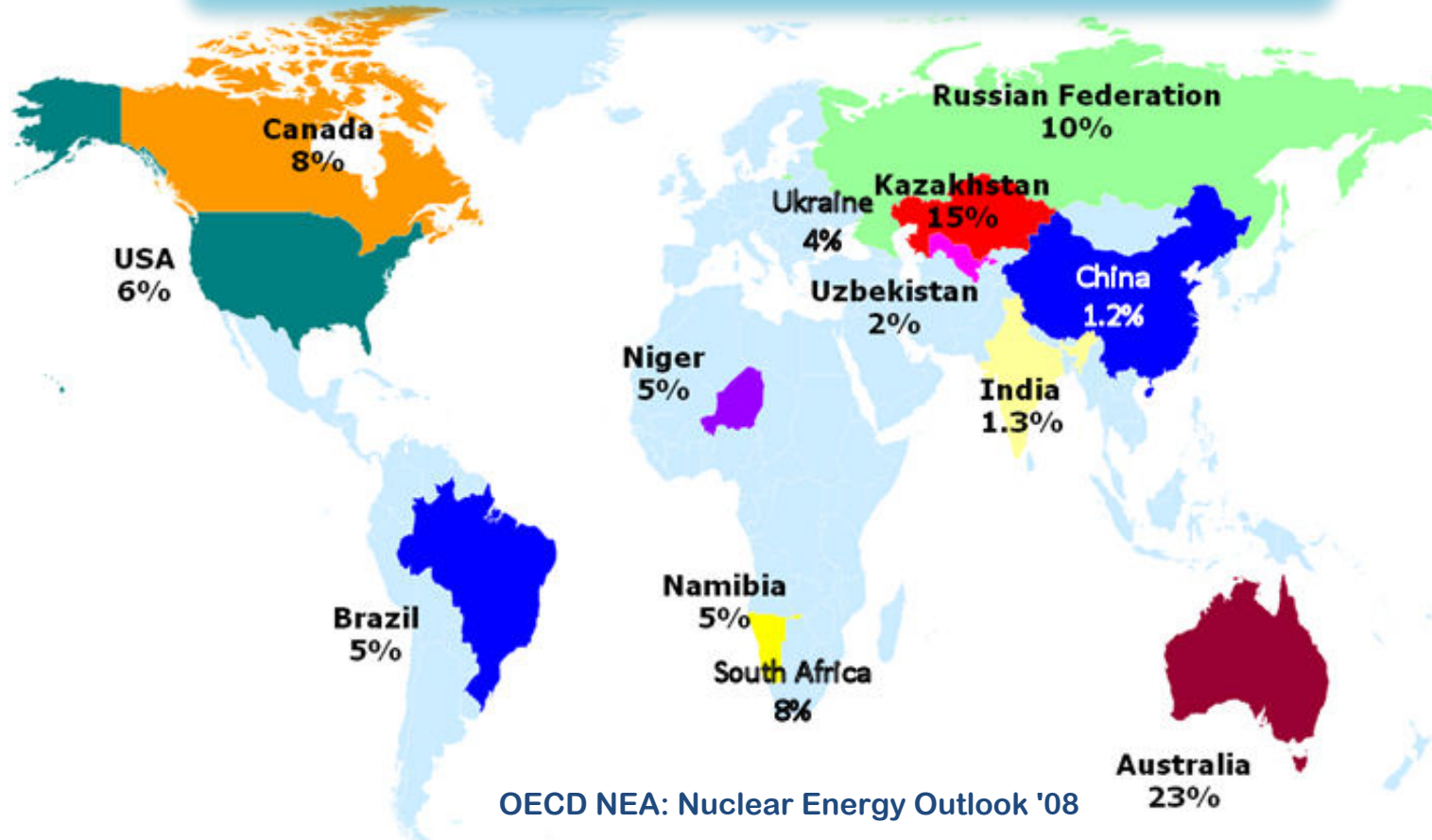
# Nuclear energy's potential role



**Nuclear could expand by a factor of nearly 4**

# Potential benefits of nuclear power

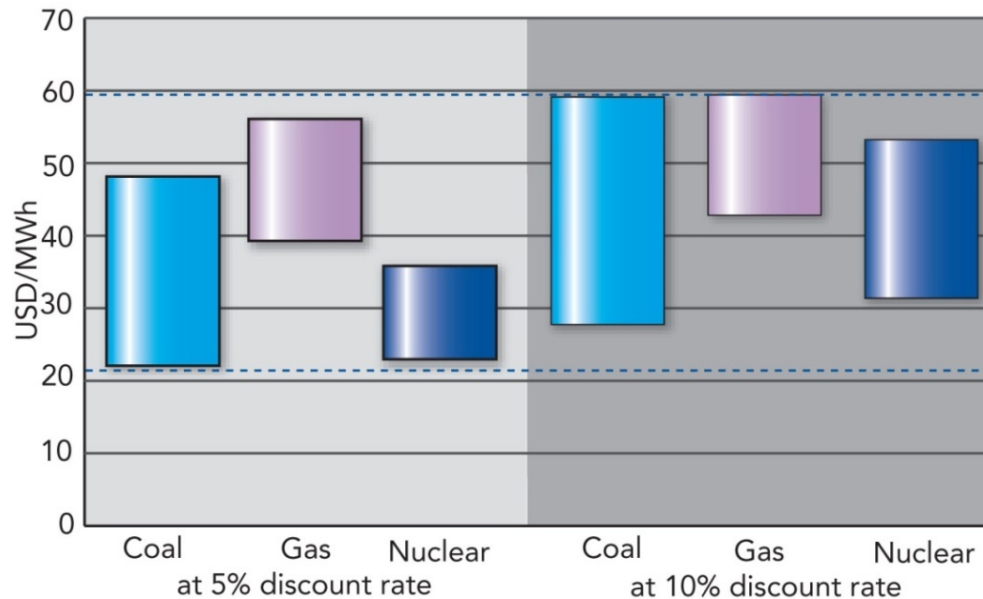
Diverse, politically stable sources of plentiful uranium



# Potential benefits of nuclear power

Cost competitive and very insensitive to price of uranium

Figure 6.8: Range of levelised costs for nuclear, coal and gas power plants at 5% and 10% discount rates (USD/MWh)



# Managing current and future challenges

**Unsafe?**

**Actually, safer than base load alternatives**

**Radwaste?**

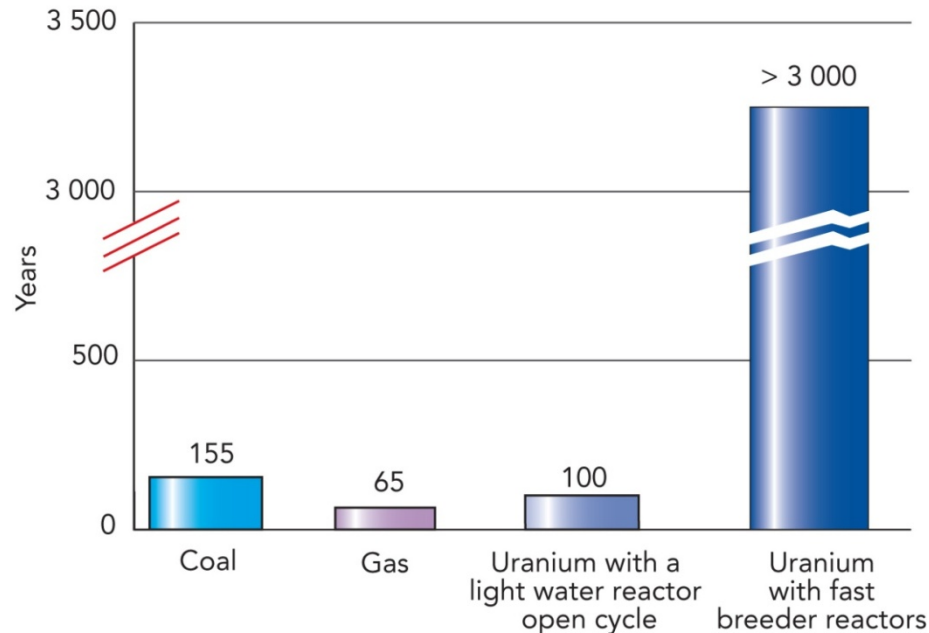
**Actually, most disposable by 2050**

**Proliferation?**

**NPT largely successful, improved regime under discussion**

# 1400 reactors in 2050?

Figure 6.11: Lifetime of energy resources  
(years of present annual consumption rates\*)



\* Uranium resource lifetimes have been calculated using estimated consumption at present nuclear electricity generation rate.

**Vast resources of virtually  
CO<sub>2</sub>-free energy**

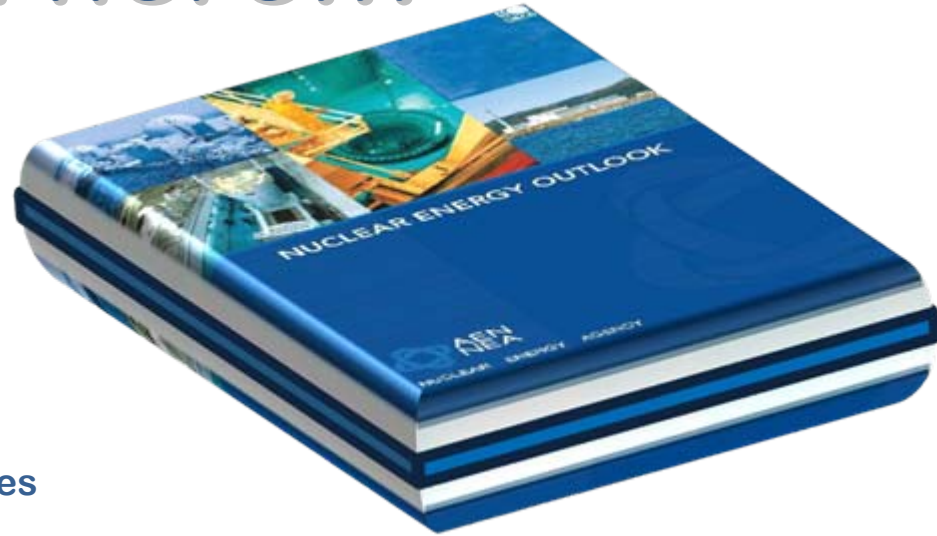
# But!...

## **Governments have clear responsibilities:**

- ensure maintenance of the skill base
- maintain continued effective safety regulation
- foster progress facilities for waste disposal
- maintain and reinforce international non-proliferation arrangements
- provide the stability (policy, regulatory, fiscal) investors require

**to enable nuclear energy's role in future sustainable energy mixes**

# The facts are all here...



- Chapter 1. Current Status
- Chapter 2. Programmes and Government Policies
- Chapter 3. Projections to 2050
- Chapter 4. Environmental Impacts of Energy Use and Power Production
- Chapter 5. Uranium Resources and Security of Supply
- Chapter 6. Providing Electricity at Stable and Affordable Costs
- Chapter 7. Nuclear Safety and Regulation
- Chapter 8. Radioactive Waste Management and Decommissioning
- Chapter 9. Non-proliferation and Security
- Chapter 10. Legal Frameworks
- Chapter 11. Infrastructure: Industrial, Manpower and R&D Capability
- Chapter 12. Stakeholder Engagement
- Chapter 13. Advanced Reactors
- Chapter 14. Advanced Fuel Cycles