A Long-Term View of Uranium Supply

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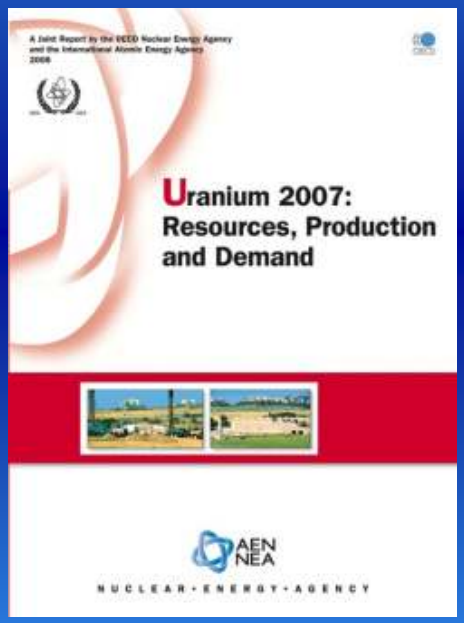
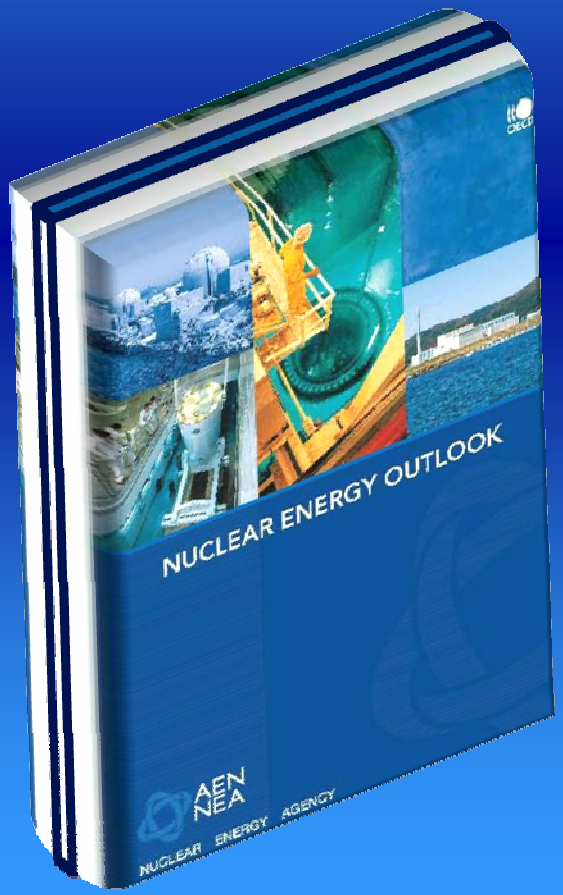
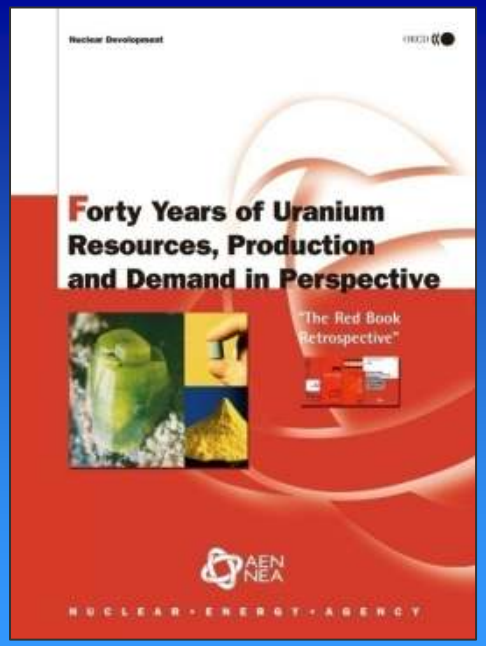
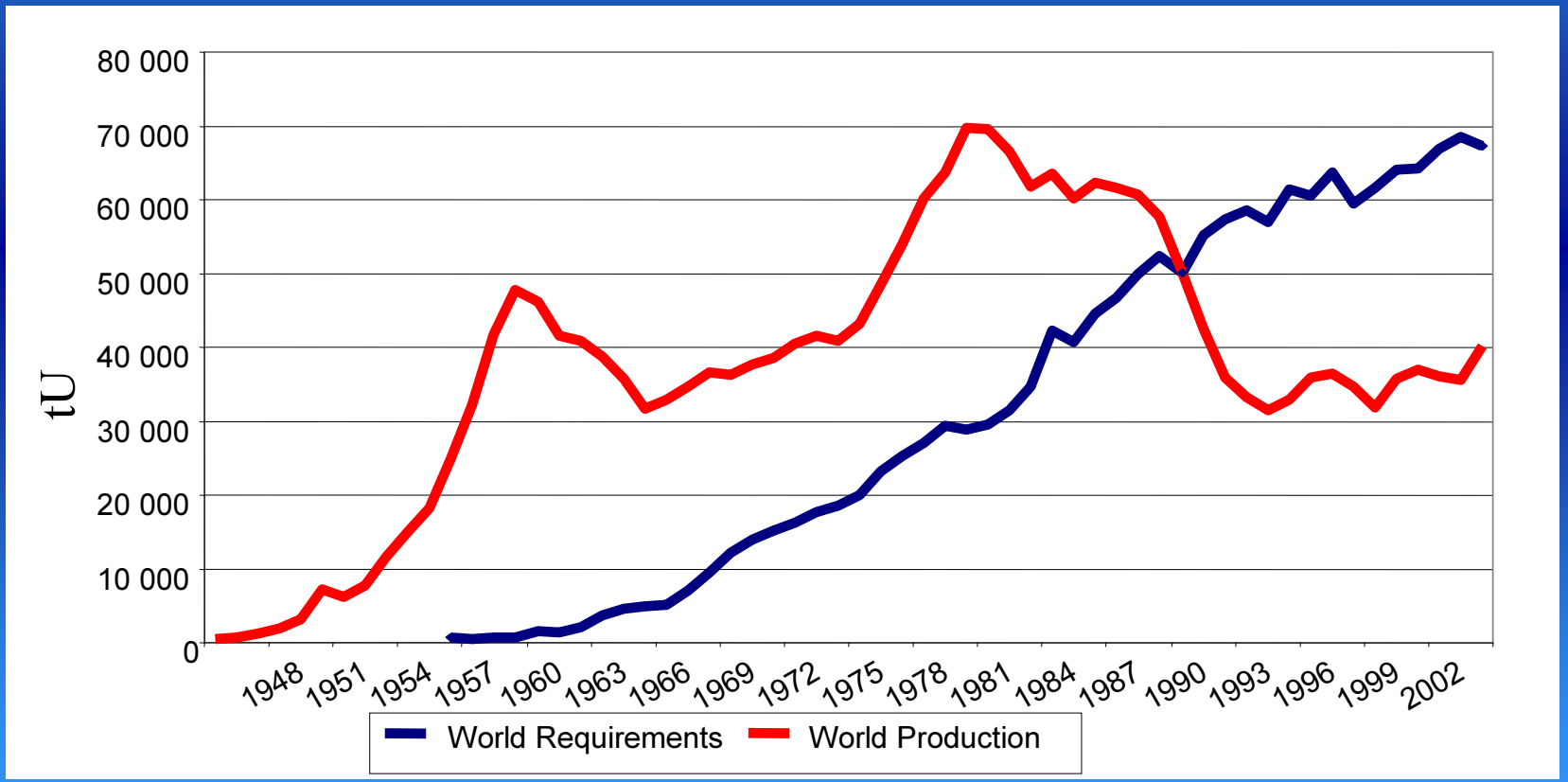
Presentation based principally on three publications produced by the OECD Nuclear Energy Agency (in the case of the Red Book, in co-operation with the International Atomic Energy Agency)







Production (Supply) / Requirements (Demand)



NEA Nuclear Energy Outlook (October 2008)

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

Background

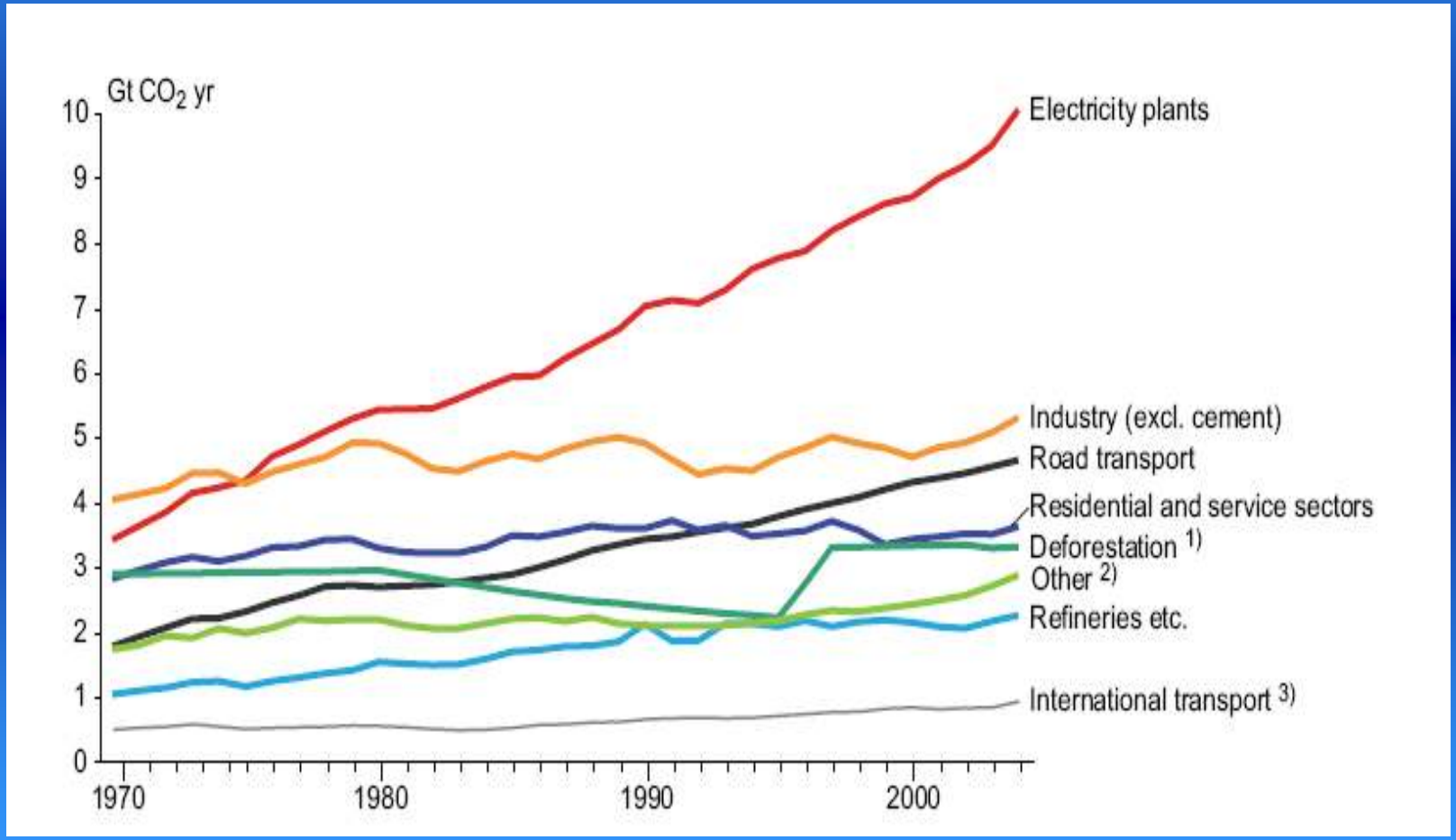
- NEO looks at the increasing world demand for energy and at some of the environmental and energy security issues that this raises.
- NEO assesses the likely global demand for electricity out to 2050, considering the range of potential contributions from nuclear power and comparing this with the projections of others.
- NEO also discusses the possible construction rate for new nuclear plants, to determine if the world could build them fast enough to impact significantly the environmental and security concerns.

Indicators affecting CO_2 emissions

The EU goal: 50% reduction in CO_2 emissions by 2050:

- The UN projects that the global population will grow by a factor of almost 1.5 to 2050.
- If world GDP per capita continues to grow by 1.8% per year it will have increased by a factor 2.3 by 2050.
- If energy intensity continues to fall by 1.2% per year it will have decreased a factor 1.7 by 2050.
- If the above projections hold true, the carbon intensity of the world energy system must be reduced by a factor four to achieve a 50% reduction in CO_2 emissions by 2050.

Sources of Global CO_2 emissions



The NEA Scenarios

Low scenario:

- No entirely new plants are built in the next two decades, capacity though maintained.

Between 2030-2050

- Carbon capture and storage proves to be successful.
- Renewables prove successful.
- Experience of new nuclear technologies is poor.
- Political and public acceptance of nuclear power is low.

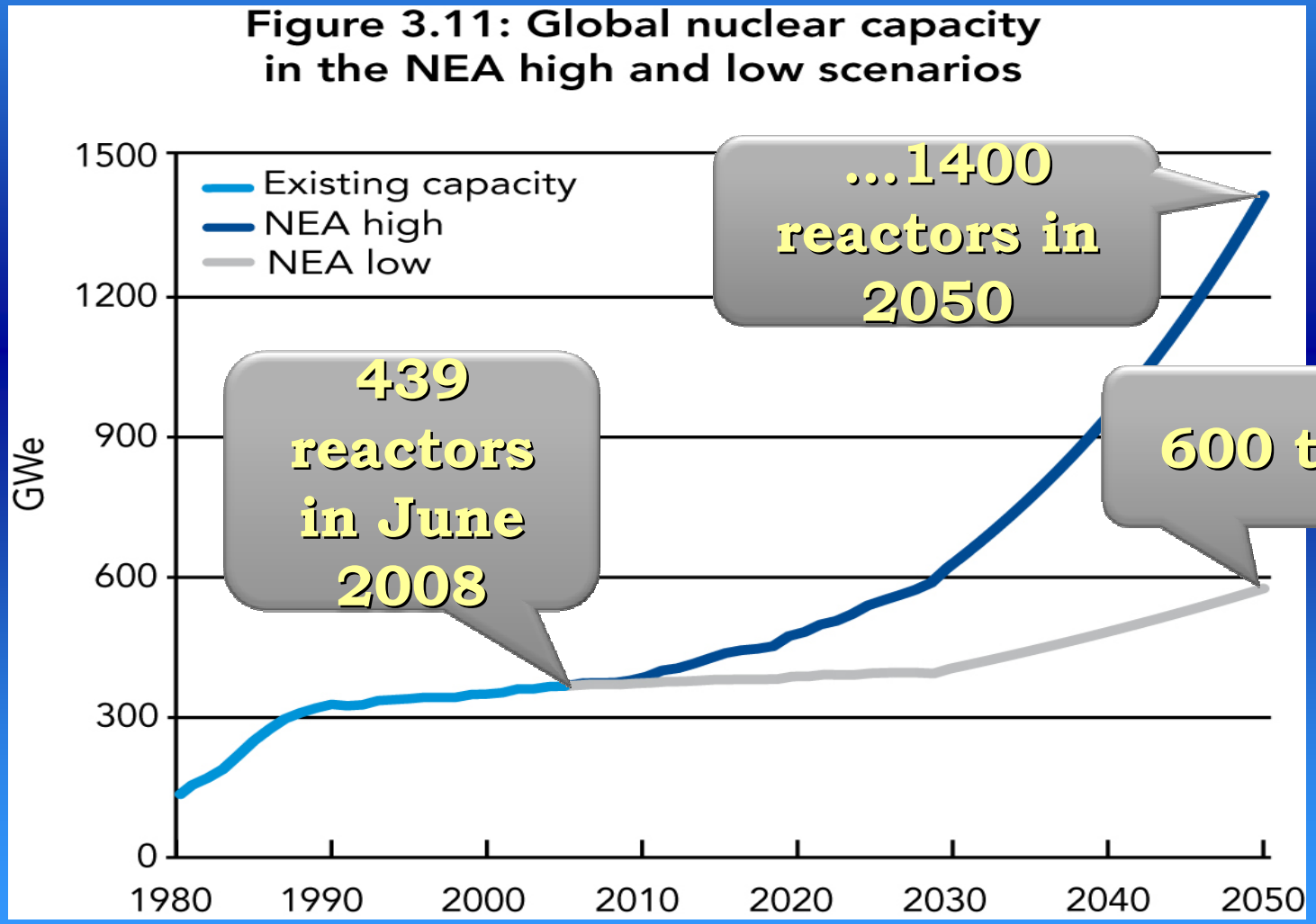
High Scenario:

- Current national plans and governmental statements are implemented

Between 2030-2050

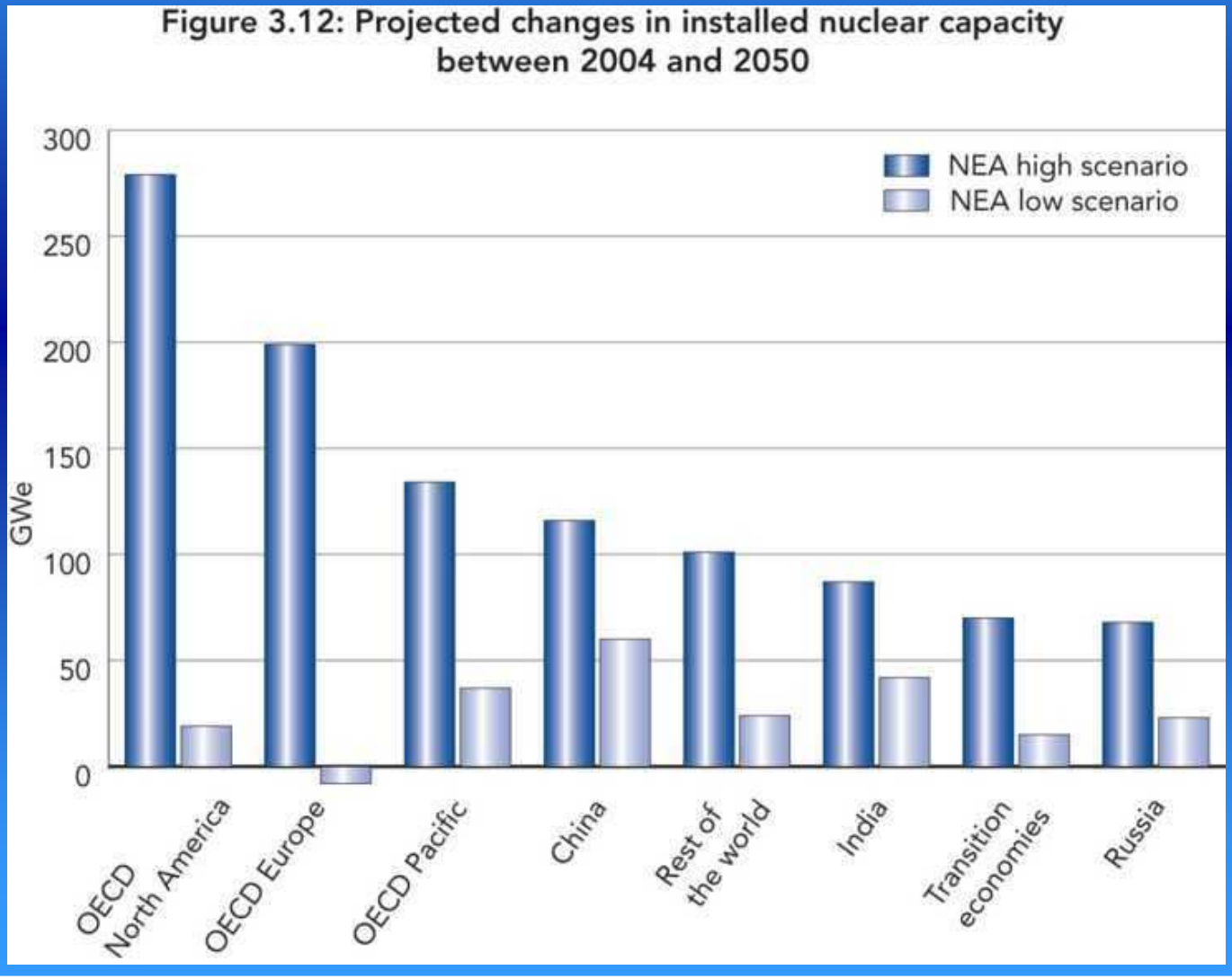
- Carbon capture and storage proves not to be very successful
- Renewables prove not to be very successful
- Good experience of new nuclear technologies
- Public concerns on climate change and security of supply increases
- High public acceptance for nuclear
- Carbon trading schemes largely utilised and successful

Part I: Nuclear Power's Current Status and Projected Trend
Chapter 3: Projections to 2050

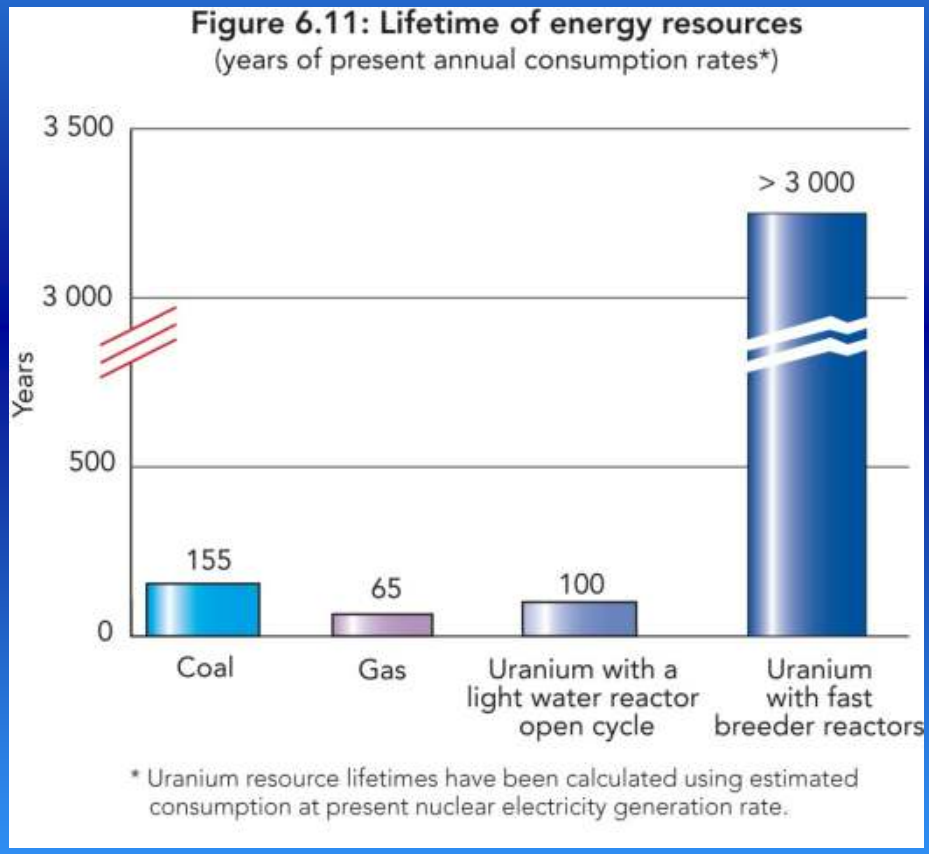


Part I: Nuclear Power's Current Status and Projected Trend
Chapter 3: Projections to 2050

Figure 3.12: Projected changes in installed nuclear capacity between 2004 and 2050

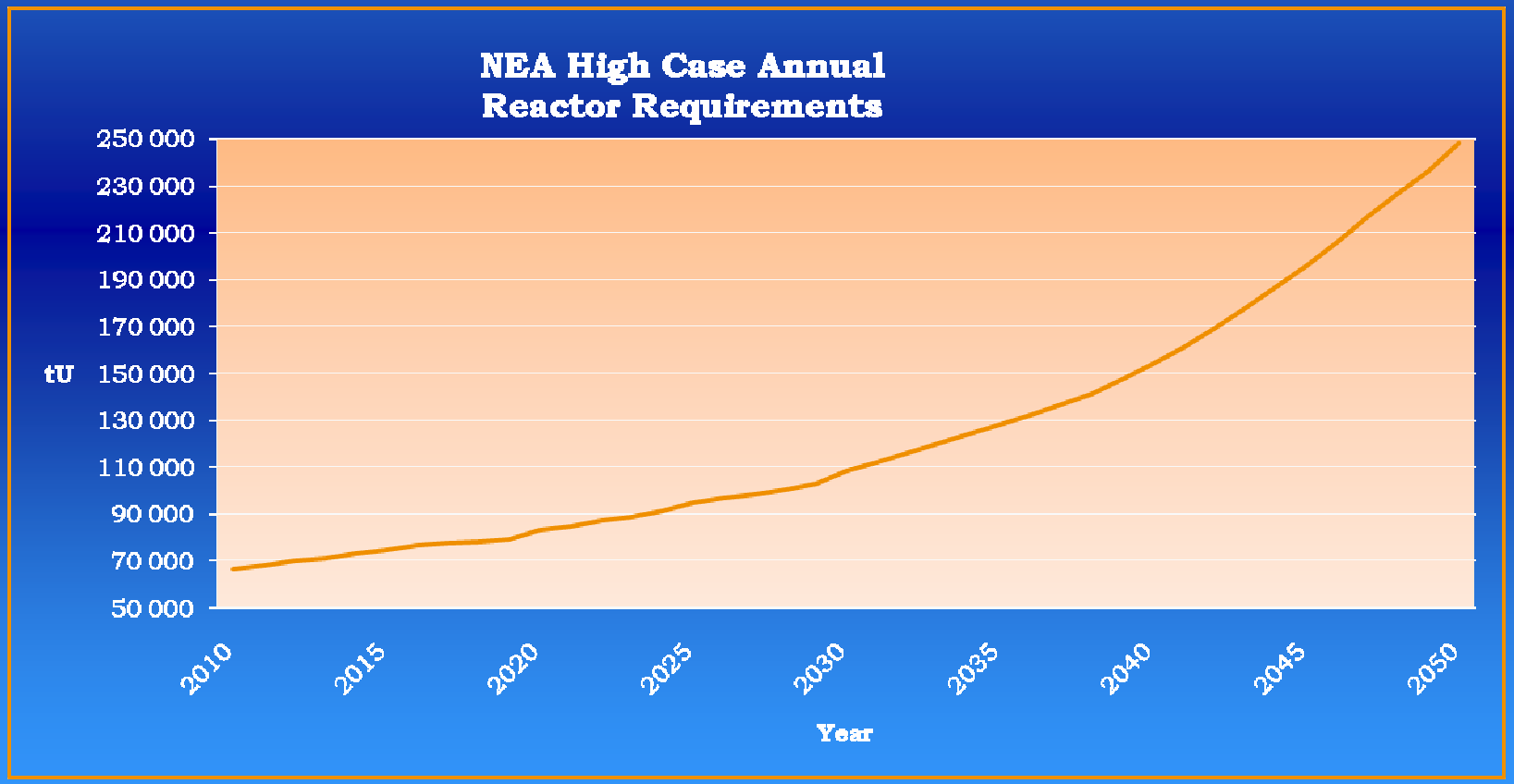


1 400 reactors in 2050?



Vast resources of virtually CO_2-free energy

Resources are available and more will be discovered with appropriate market signals; but production must increase SIGNIFICANTLY



Limitations on Increasing Production

- Political constraints
- Public acceptance
- Labor and infrastructure requirements
- Regulatory issues
- Government initiatives
- Market uncertainties

Political Constraints & Public Acceptance

- Perceptions based on past practices – separate present practices from past
  - ✓ continue implementing and communicating best practices at currently operating sites
  - ✓ encourage tours of operations by all stakeholders
  - ✓ arrange independent, third-party evaluations of operations in remote areas and make results available to all stakeholders

Political Constraints & Public Acceptance (2)

- Improving Perceptions
  - ✓ accelerate efforts to contribute to studies on nuclear LCA - energy costs and GHG emissions from all types of mining operations (in particular, low-grade OP and ISL)
  - ✓ accelerate efforts to remediate remaining legacy sites

Labor & Infrastructure Requirements

- Over 2 decades since last phase of intense mine development – skilled labor lacking
  - ✓continue training efforts, particularly for local inhabitants
- Development of resources in remote regions needs infrastructure
  - ✓ Governments benefitting from tax and employment arising from U mines should be willing to consider development with industry

Regulatory Issues

- Approval times growing in length in some jurisdictions
- Requirements unnecessarily complicated by regulatory layers in some jurisdictions
  - ✓accelerate harmonization processes, without compromising health, safety and environmental protection
- Development of regulations in countries with little experience in U mining crucial

Government Initiatives

- Non-Proliferation
  - down blending HEU to LEU fuel
  - multilateral fuel cycle initiatives
- Secondary supplies
  - release of government inventories
  - U tails re-enrichment

✓Continue to work with industry to minimize market impact of new initiatives

Market Uncertainties

- Will nuclear build proceed at projected growth rates?
- When will CO_2 emissions costs be a component of energy investment decisions?
- What is the current market price? Is the market currently providing adequate signals, given the long development time required for uranium mines in most jurisdictions?
- Politics

Conclusions

- Future bright for the industry, but must continue to operate to the highest standards of safety and environmental protection
- Openness and transparency key – industry must continue to demonstrate that it is modern and has goals that are equally important to maximizing production
- Clear market prices