NEA Uranium Activities

Reliable supply

Safe and environmentally responsible production

Robert Vance

OECD-NEA Nuclear Development Division

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Outline

OECD-NEA uranium activities

Electricity Demand / Markets

Uranium Demand / Markets

Conclusions

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OECD-NEA uranium activities
"Red Book"

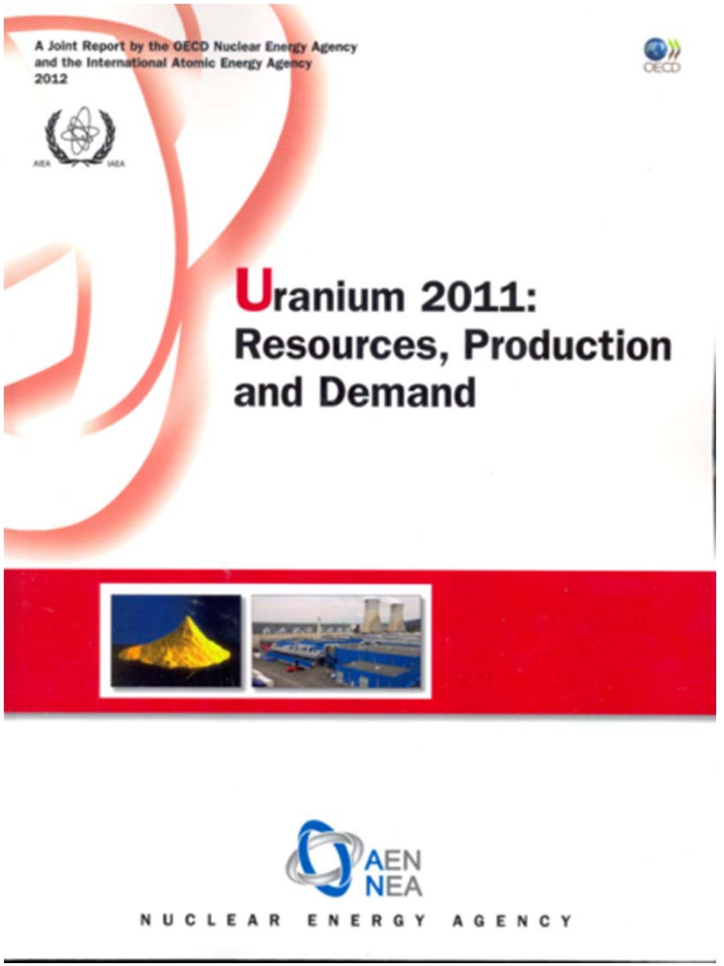
Need recognized early in development of commercial nuclear power

Widely consulted source for global resource information and more

Longstanding OECD/NEA and IAEA cooperation - published every 2 years

Relies principally on input from country representatives nominated by governments to the Uranium Group

Continued support from OECD-NEA Nuclear Development Committee



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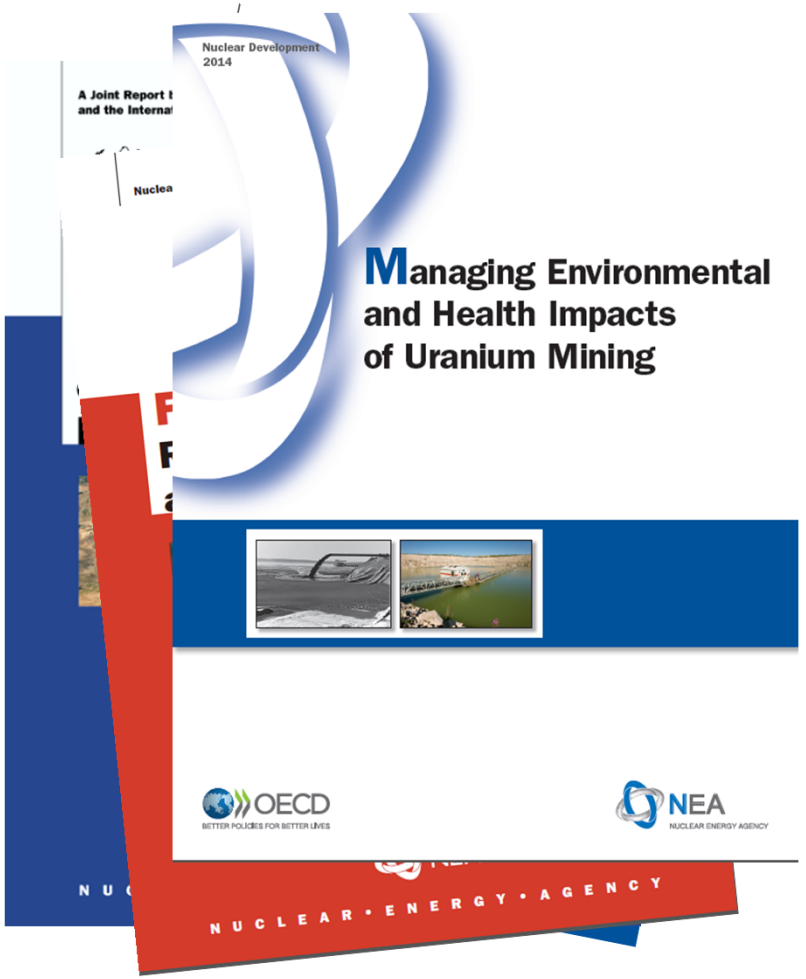
OECD-NEA uranium activities publications

- In addition to Red Book:
  - 1999: Environmental Activities in Uranium Mining and Milling
  - 2002: Environmental Remediation of World Uranium Production Facilities
  - 2006: Red Book Retrospective
  - 2014: Managing Environmental and Health Impacts of Uranium Mining



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Managing Environmental and Health Impacts of Uranium Mining

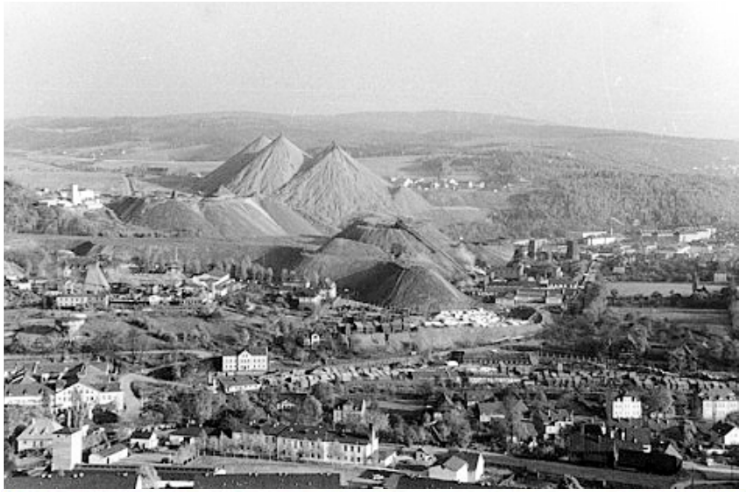
Plain language for public consultation

History of uranium mining and significant changes that have been undertaken to manage impacts

Case studies comparing / contrasting practices and outcomes of historic and current leading practice uranium mining

Guidance to policy and regulatory framework needed to effectively manage uranium mining

Available free of charge
www.oecd-nea.org



Aerial view of Ranger Mine and Plant

URAM Symposium; 23-27 June 2014

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Electricity Demand / Markets

Access to electricity key to economic development

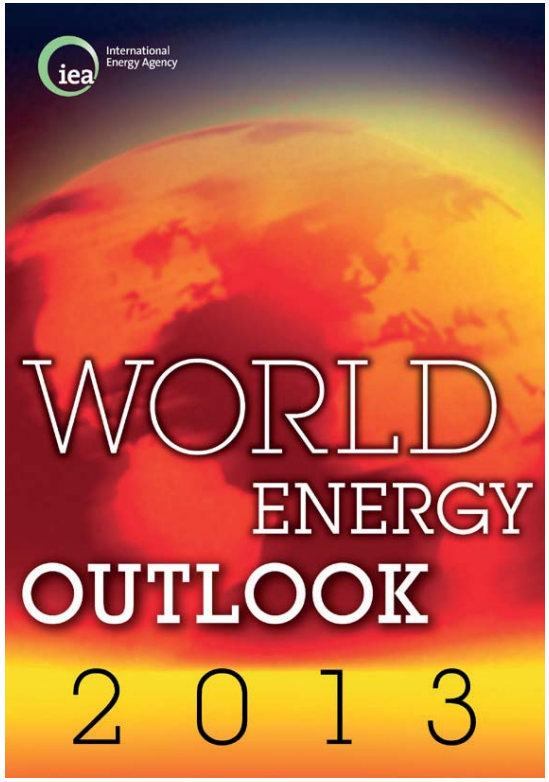
Demand for electricity projected to grow to 2035 more rapidly than any other final form of energy

Led by non-OECD: China (36%), India (13%), Southeast Asia (8%), Latin America (6%) and Middle East (6%)

Global installed capacity to grow by 70% - $17 trillion investment

Nuclear power expected to grow but share remains about 12% due to growth of other generating technologies

Rate of nuclear power policy driven



2014 Nuclear Energy Outlook feature section on nuclear power

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Electricity Demand / Markets

Liberalized	⟷	Regulated
Competition between generators		Limited competition
Prices vary with market conditions		Prices set for long term
Market structure - policy		Central planning
Generally in developed countries		Generally in developing countries
Demand declining		Demand increasing
Generating fleet aging		Generating fleet young
Nuclear faces tough competition		Nuclear power growth projected

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Projected Growth in Nuclear Generation

Principally in developing countries – led by China and India

Significant economic growth, urbanization, demand for electricity; clean air a high priority

Nuclear power attractive, but significant investment costs challenging

For China and India, investment not barrier – Rosatom BOO model
(Turkey, Bangladesh, Belarus…Jordan, Armenia?)

- loans for investment
- training
- fuel supply
- spent fuel management

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Implications for uranium demand

China and India

Strategies to secure fuel supply - inventories

Reprocessing, fast reactors (eventually breeders), thorium

Russian Federation

Fuel supply to support successful international marketing (BOO) and domestic growth in nuclear generating capacity - inventories

Reprocessing, fast reactors (eventually breeders), thorium

Excess enrichment capacity

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Uranium Demand / Market

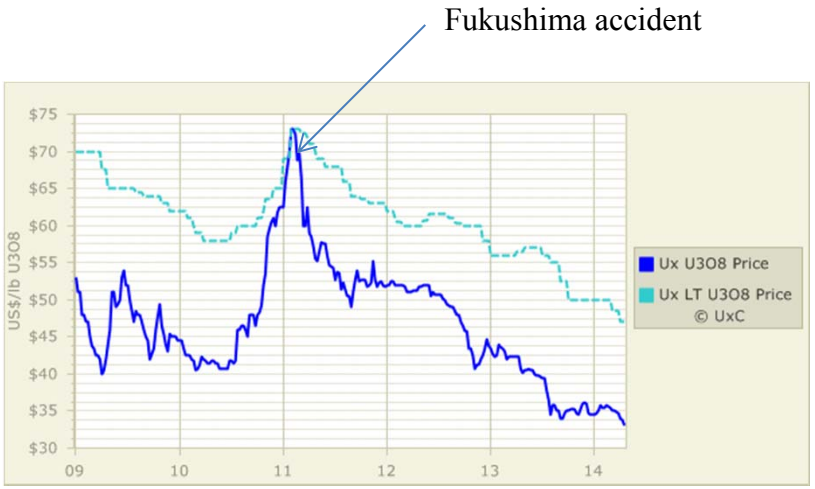
Price decline since Fukushima accident

Nuclear development policies little changed

U demand projected to increase, mainly in developing world, led by China and India

Uranium miners delaying development plans, reducing output

Will additional demand meet projections?



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Secondary Supplies

Already mined uranium

Commercial and government inventories (HEU), depleted uranium tails (DU), used (spent) nuclear fuel (MOX, Repu)

Significant sources of potential supply

Beyond recently completed HEU downblend agreement, not extensively utilized today, but..?

- excess centrifuge capacity – DU
- Laser enrichment
- reprocessing technology, capacity
- HEU

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Market indicators to monitor

Japan: re-starts

China: construction (near and long term); reprocessing, thorium, FR;
reactor exports; U sourcing, investments

Russian Federation – BOO signings, non-domestic and domestic sourcing; DU, reprocessing, HEU, FR

Liberalized markets – reforms to reward low CO2 generation, SoS
EU – UK…Czech Republic, Poland
US – EPA proposed limits (coal, natural gas)
Market reform (Kewaunee, Vermont Yankee…)

DU re-enrichment; laser enrichment

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Conclusions

Shift in axis of nuclear power development (and uranium mining) away from OECD countries (83% of world nuclear generating capacity)

Nuclear capacity increase will create additional uranium demand, but countries with the largest and growing demand may meet all requirements using traditional market means

Market reforms needed in liberalized markets to maintain or increase nuclear generation share

Opportunities remain for producers, but may need to adjust expectations to these new circumstances

Secondary supply not done yet

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