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The Role of Nuclear Energy in Sustainable Development: Entry Pathways

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UNECE Energy Week 2020 Session:

The role of nuclear energy resources in sustainable development

24 September 2020

Application of UNFC to Nuclear Fuel Resources

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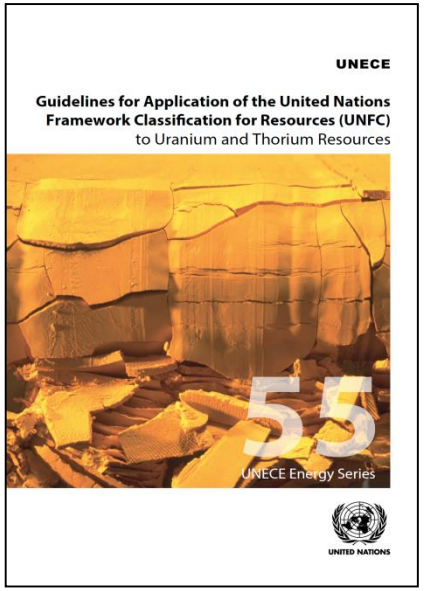
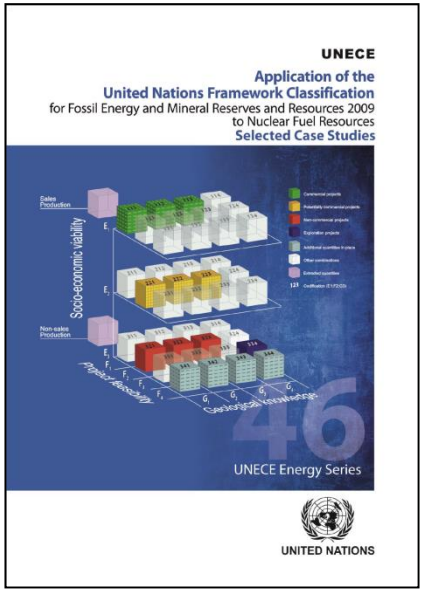
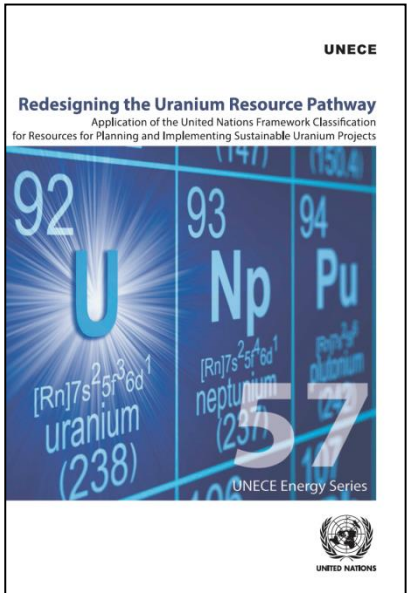
- Application of the United Nations Framework Classification (UNFC) for Fossil Energy and Mineral Reserves and Resources 2009 to Nuclear Fuel Resources – 2015
- Guidelines for Application of UNFC to Uranium and Thorium Resources – 2017
- Redesigning the Uranium Resource Pathway - Application of the UNFC – 2019







The Role of Nuclear Energy in Sustainable Development: Entry Pathways

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- Show how the utilisation of local/regional uranium resources can enhance the sustainability of nuclear power
- Support policy formulation in countries interested in nuclear energy, including developing countries
- Define locally relevant pathways to support sustainable development and climate change mitigation

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WORLD NUCLEAR ASSOCIATION

IAEA International Atomic Energy Agency

NEA NUCLEAR ENERGY AGENCY

Nuclear energy and Sustainable Development

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- Nuclear Technology contributions to the Sustainable Development Goals

- Nuclear energy in the future sustainable energy mix
  - In the advanced economies as a group, nuclear power is the largest low-carbon source of electricity,

    - IPCC's 1.5C report middle-of-the-road scenario shows nuclear increasing to six times current level.

Nuclear Development Considerations

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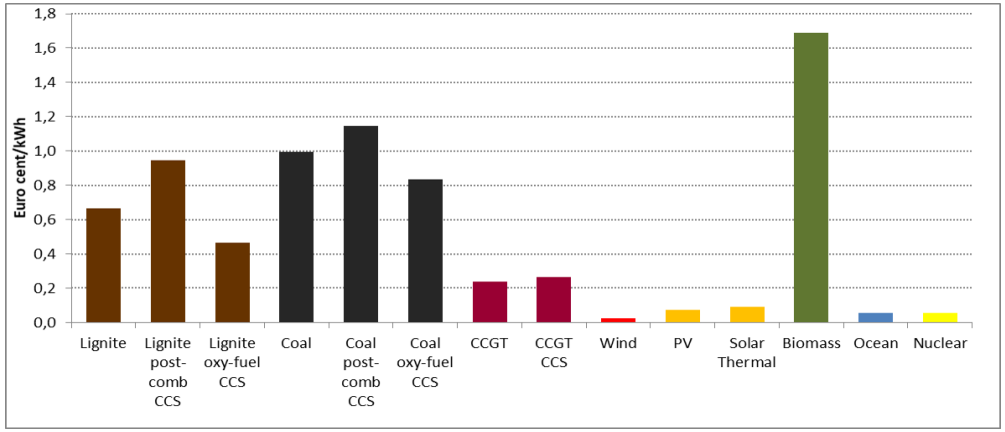
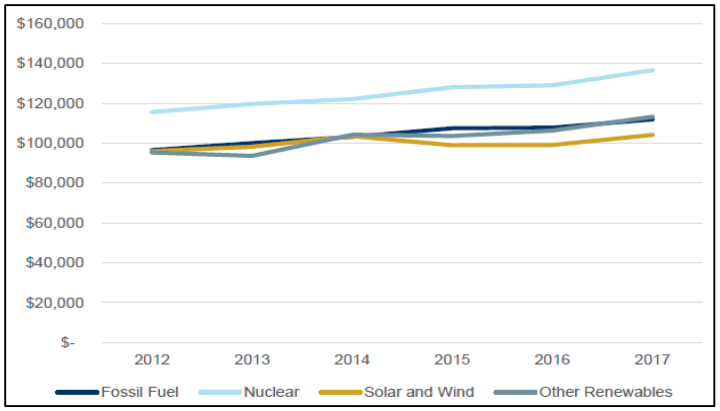
- Energy system evaluation and planning
- Socioeconomic development factors
- Environmental factors
- Establishing the legal and regulatory framework
- Economics and project financing

IAEA Milestones approach



Health effects, measured by their external costs
Source: NEEDS (2009), New Energy Externalities Developments for Sustainability,



Average salary of a US energy worker
Source: Oxford Economics

National and Regional considerations – the nuclear fuel cycle

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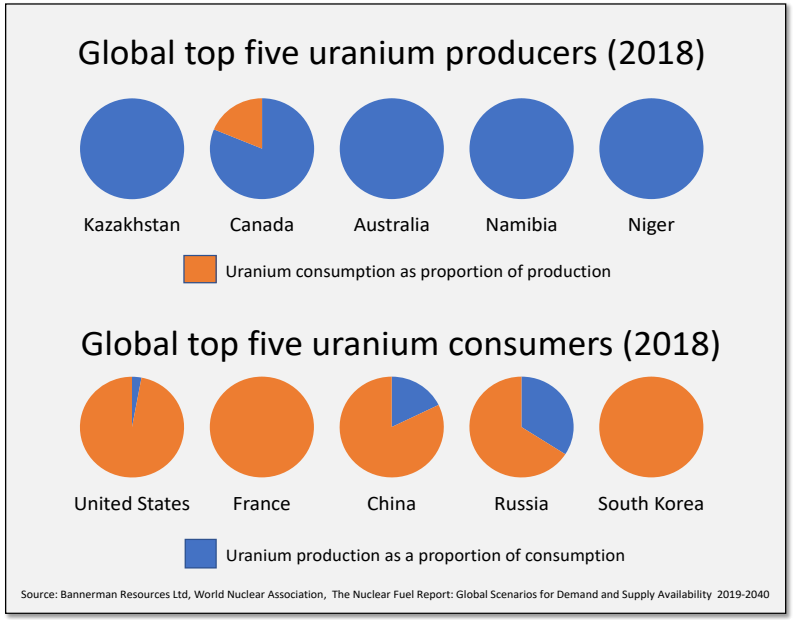
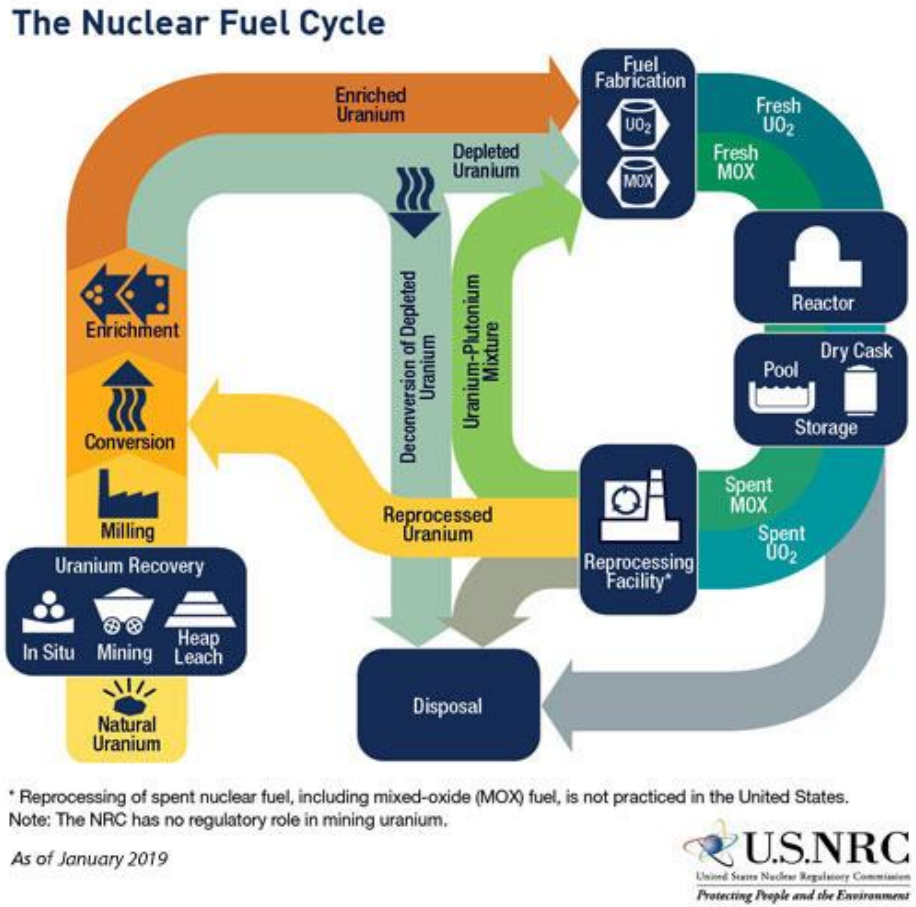
- Utilising local uranium resources
- Developing the nuclear fuel cycle
- Sustainable management of radioactive materials and waste
- Focus on decommissioning
- Disposal of high level waste



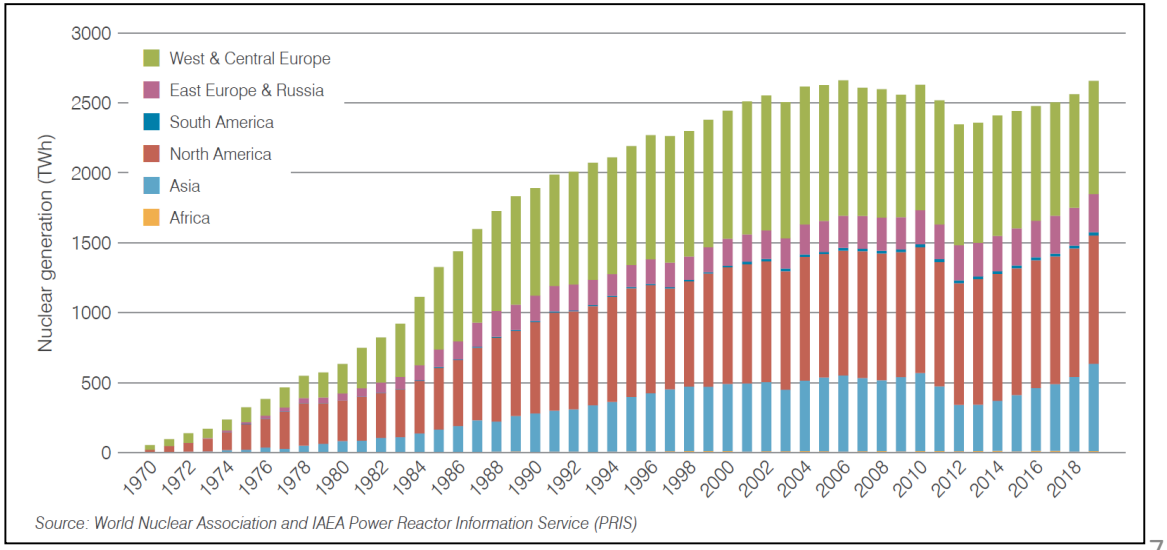
The global distribution of uranium production and consumption



Nuclear Technology Options – Current large reactors

The nuclear power plants operating across the world are based on proven technology, which has evolved and matured over the past 40 years. These reactors are available in capacities from about 600MWe to 1700MWe.

Tianwan nuclear power plant units 1-6



Nuclear electricity production

Nuclear Technology Options – Small modular reactors

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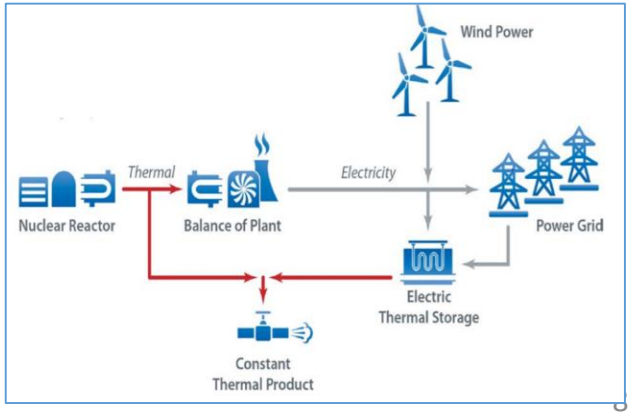
SMRs and floating nuclear power plants for small grids or remote communities

High temperature gas reactors for industrial heat

Hydrogen production

Integrated nuclear-renewable energy systems



Nuclear Energy Entry Pathways

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Nuclear energy supports the realization of a number of national policy goals, including; affordable and clean energy provision, mitigating climate change, enhancing energy resilience, development of industry and infrastructure.

Policies that support nuclear energy

- A roadmap to sustainable development
- A plan for transitioning to a low-carbon economy
- Electricity market design
- Policies for improving energy security and resilience
- Integrated industrial development

The four units of the Barakah nuclear power plant in UAE

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Thank you

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Director Harmony Programme

World Nuclear Association

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