



# The Role of Nuclear Energy in Sustainable Development: Entry Pathways

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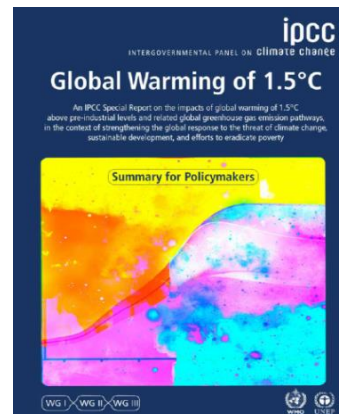
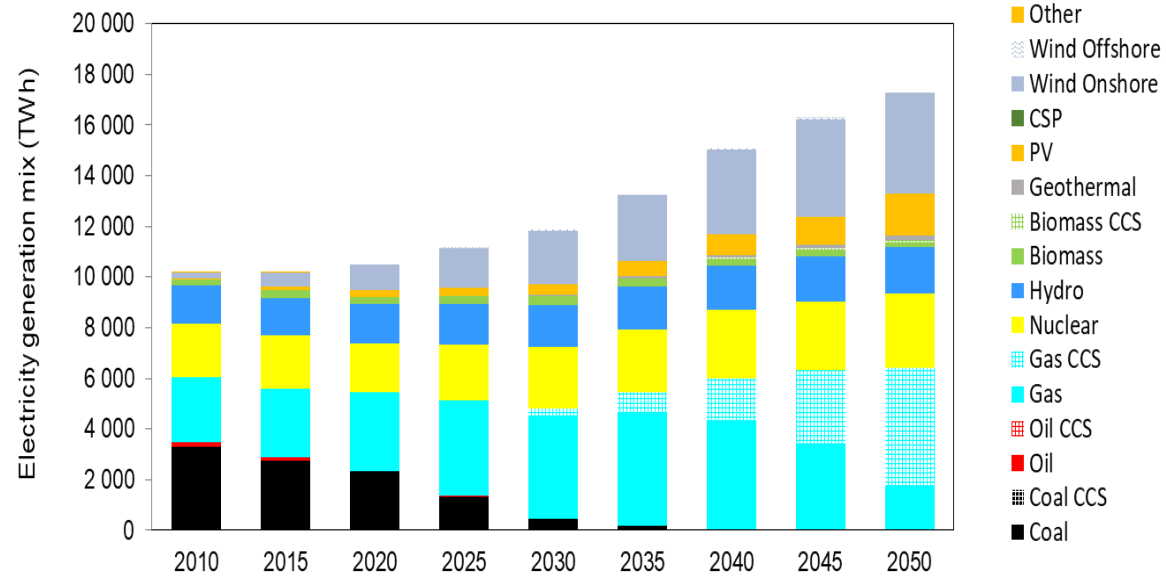
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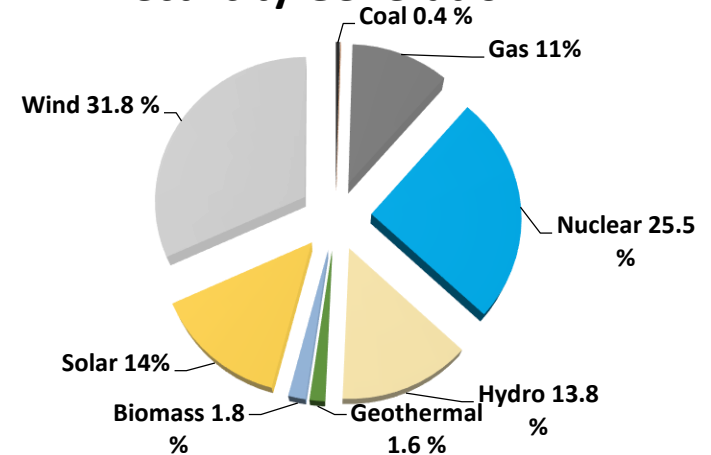


# Nuclear important part of future clean energy mix

- Pathways to Sustainable Energy project show nuclear energy increase by 38% representing 17% of electricity generation in the P2C scenario in 2050.
- IPCC's 1.5C report P3 middle-of-the-road scenario nuclear increases to six times current level. Nuclear generate 25% of electricity in 2050



## Electricity Generation



# The Role of Nuclear Energy in Sustainable Development: Entry Pathways

## ENERGY



- Support policy formulation in interested nuclear newcomer countries to define locally relevant pathways for the introduction of nuclear energy to support sustainable development
- Show how the utilisation of a local/regional uranium resources can support the sustainable development of nuclear power
- Complement the report - Redesigning the Uranium Resource Pathway - Application of the United Nations Framework Classification for Resources (UNFC)





1. Introduction
  2. Sustainable Development and Nuclear Energy
  3. Nuclear Development Considerations
    - Energy system evaluation and planning
    - Regulatory and legal
    - Socioeconomic development
    - Economic and financing
    - Environment
  4. Local resources and United Nations Resource Management System
  5. Nuclear Technology Options
  6. Nuclear Energy Entry Pathways
  7. Conclusions
- Appendices- Case studies

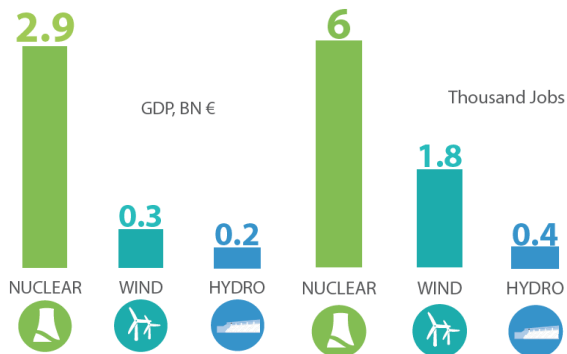


### Sustainable Development and Nuclear Energy

- Resource/ Economic
- Environmental
- Social

EU council decided not to exclude nuclear projects from sustainable “green” finance.

In 2030 one GW in EU of installed capacity would generate



### Fast reactors and fusion for extended fuel utilization

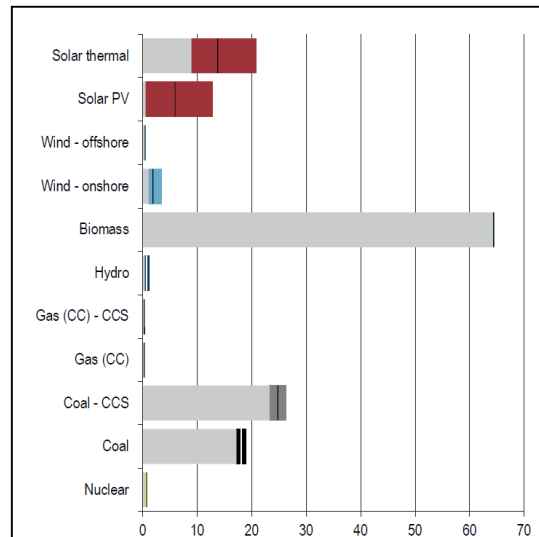


Fig. 9. Life cycle land occupation (m<sup>2</sup>-year/MW-h) required for the production of electricity.<sup>9, 11</sup> Coloured ranges show regional low, average and high estimates, which can also vary considerably from site to site.

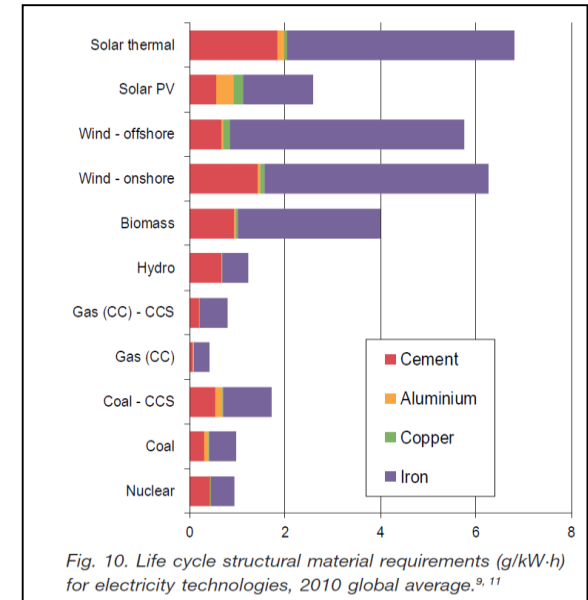


Fig. 10. Life cycle structural material requirements (g/kW-h) for electricity technologies, 2010 global average.<sup>9, 11</sup>

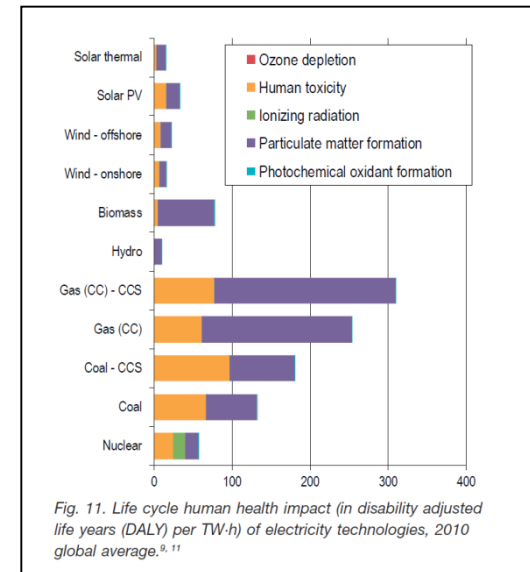


Fig. 11. Life cycle human health impact (in disability adjusted life years (DALY) per TW-h) of electricity technologies, 2010 global average.<sup>9, 11</sup>



## Nuclear Technology Options

- Current large reactor technologies
- Small modular reactors (SMR)
- Nuclear-renewable Hybrid energy systems

SMRs and floating nuclear power plants for local or remote communities



Clean Hydrogen



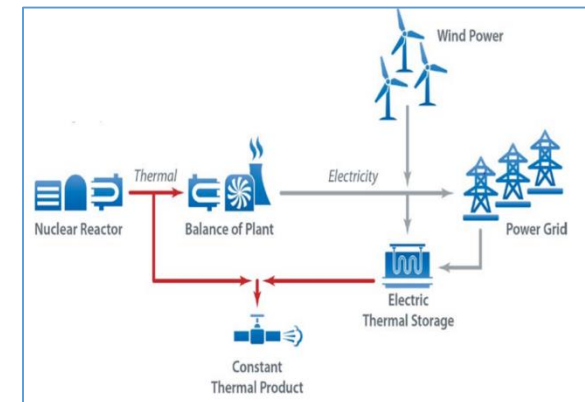
Hydrogen plant powered by low-carbon, low-cost electricity from nuclear power station



High temperature gas reactors for industrial heat



Nuclear-renewable hybrid energy systems





# Thank you!

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