



Empresa de Pesquisa Energética

# Small Modular Reactor (SMR) in the Brazilian Energy Planning

## ABDAN Webinar

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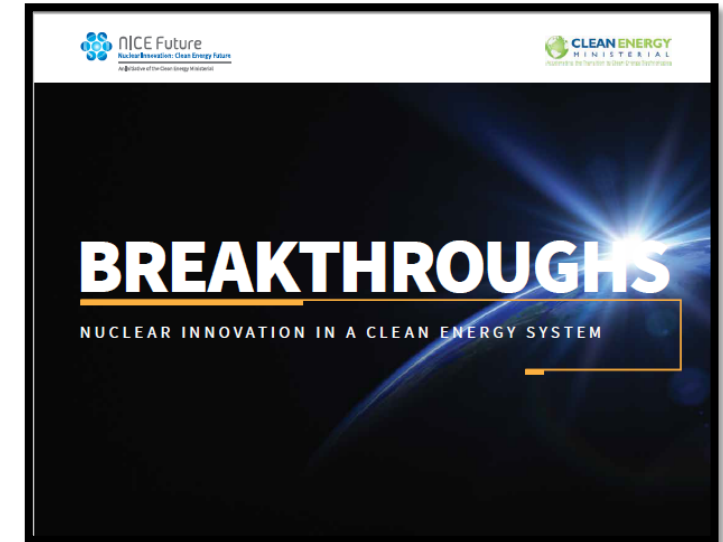
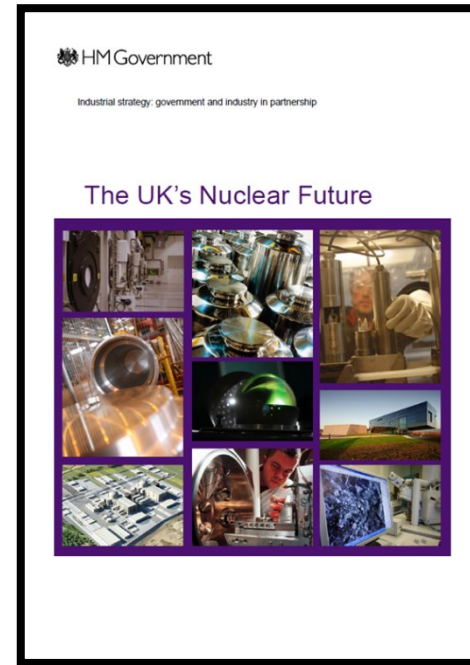
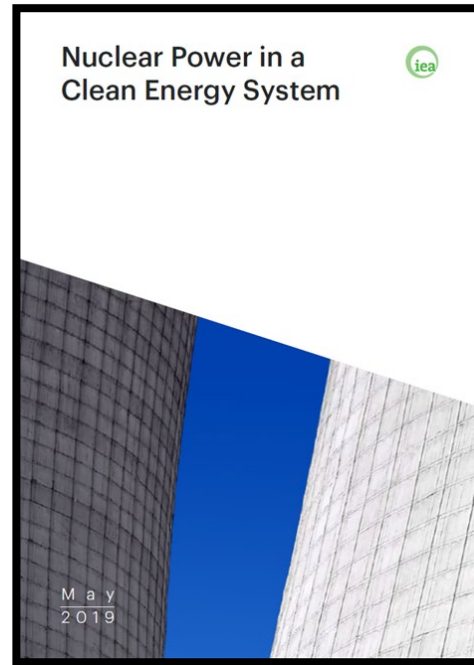
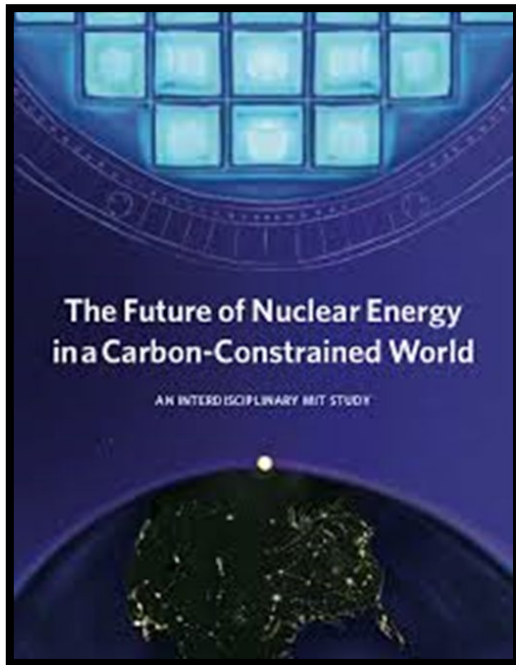
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# Nuclear energy will play a role in the energy transition



Energy security, system reliability, decarbonization and technological spillovers



# Nuclear energy is in the Brazilian Energy Planning



## Energy Plans, Legislations & Resolutions

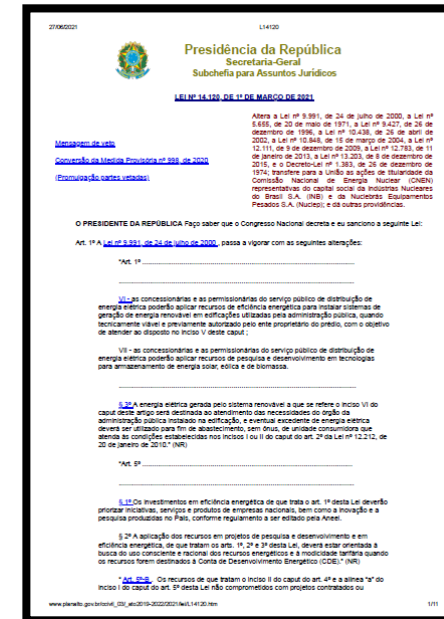
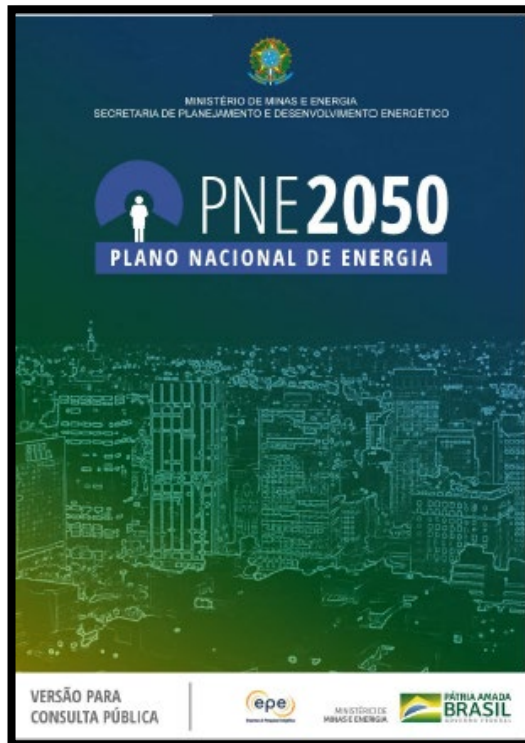
### PNE 2050 Nuclear Energy

#### Main challenges:

Communication; improvements on institutional, legal and regulatory arrangements; implementing the National Nuclear Policy; Security & Safety; useful life and decommissioning of facilities; knowledge on related minerals resources.

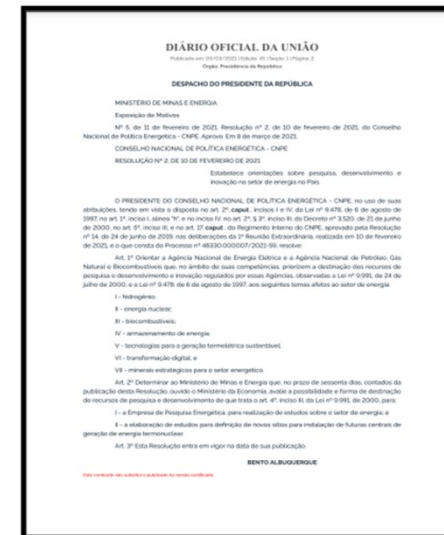
#### Recommendations:

To enhance communications with Brazilian society; To improve regulation framework; To estimate benefits related to spillovers and economies of scope; To standardize projects to get scale and learning economies; To seek synergies in public policies; To assure good housekeeping of waste and used fuel; To improve culture on security and safety; To guarantee fuel supply; To evaluate implications of expanding useful life.



**Law # 14,120/2021**

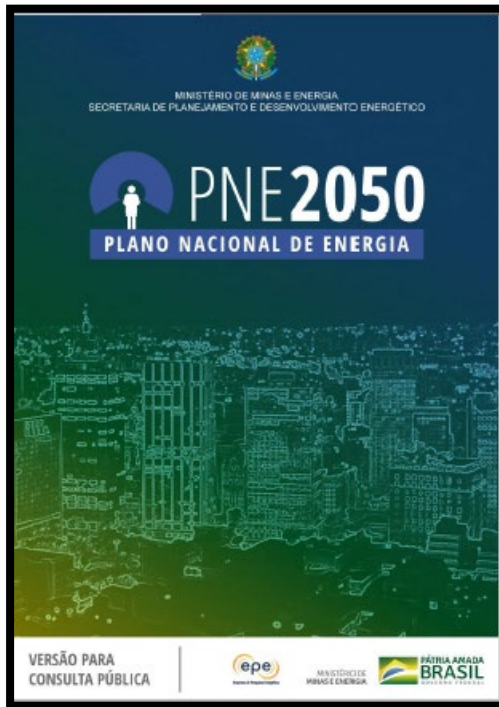
Establish competences to CNPE regarding authorization of Angra III; electricity price must be approved by CNPE based on a study carried out by BNDES for Eletronuclear, considering feasibility, financial conditions and affordability to consumers (EPE will be heard); Stocks from INP and Nuclep will be transferred to Union, etc.



**CNPE Resolution nº 2, Feb, 10, 2021**

Guidelines for energy R&DI public & public oriented funds to allocate resources in priority areas, which includes **nuclear energy**.

## SMR brings new opportunities to nuclear industry



### PNE 2050 Nuclear Energy

In Brazil, the technological option was for pressurized water reactors (PWR), the most adopted technology in the world, with more than 60% of the plants in operation. This option will be maintained for Angra III and for new power plant projects that are eventually defined throughout the 2020s. **After 2030, new projects may be based on PWR, SMR and fourth-generation reactor technologies, if the latter reach technological maturity and competitiveness.**



IAEA Coordinated Research Project – CRP  
“Economic Assessment of the Potential for Small Modular Reactors on a National Level”

### Opportunities:

Standardization, simplicity, security & safety, construction time & cost reduction, flexibility of supply, etc.

### Challenges:

Technological uncertainties, many reactor concepts being proposed (70+), quite diverse range of technological alternatives, comparisons, etc.

## Making the Case for Nuclear Power: Why Stakeholder Involvement Matters



*Embarking on a nuclear power programme requires years of preparatory work and long term national commitment throughout the development, construction, operation and, ultimately, decommissioning, of nuclear facilities. To advance a strong case for nuclear power and to gain sustained public acceptance, it is essential to engage all stakeholders at every stage of the planning process and during the life cycle of nuclear facilities.*

- ✓ Nuclear role in energy transition
  - ✓ Energy security, system reliability, decarbonization and technological spillovers
- ✓ Energy plans, legislations and CNPE resolutions are dealing with challenges for nuclear in Brazil
- ✓ SMR brings new opportunities to nuclear industry
  - ✓ Standardization, simplicity, security & safety, construction time & cost reduction, flexibility of supply, etc.
- ✓ Possibility of coupling to other markets (industrial, **hydrogen**, etc.)
- ✓ Engagement and communication



Eletronuclear plans to purify the hydrogen gas (96% concentration) produced in Angra I & II (potential 150-300 kg of H<sub>2</sub>/day, raising to 500 kg/day with Angra III in the future)



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Thank you