Country and type of organization

IBAMA (1)
- Environment Ministry
- Environmental Licensing

ELETROBRAS

CNEN (2)
- Ministry of Mines and Energy
- Nuclear Safety Licensing

INB (3)
- Ministry of Science and Technology
- Nuclear Fuel

Eletronuclear

IBAMA: The Brazilian Environmental Protection Agency
CNEN: National Commission of Nuclear Energy
INB: Brazilian Nuclear Industries
Brazilian Licensing Processes of NPP

➢ Environmental License

- EIA: Environmental Impact Assessment
  - PL: Preliminary License

- RIMA: Report about the Impacts to the Environment
  - IL: Installation License

- Official Public Hearings

- RCEA: Report about the Compliance to the Environmental Requirements
  - OL: Operation License

➢ Nuclear License

- LR: Local Report
  - LL: Local License

- PSAR: Preliminary Safety Analysis Report
  - CL: Construction License

- FSAR: Final Safety Analysis Report
  - OL: Operation License
Radioactive Waste Deposit Costs

Art. 16. The holder of the authorization for a nuclear waste generating facility operation shall bear the full costs of site selection, design, construction, installation, licensing, administration, operation and physical security of the initial deposits.

Art. 17. CNEN will bear the costs related to site selection, design, construction, installation, licensing, administration, operation and physical security of intermediate and final deposits.

Single paragraph. CNEN may enter into agreements or arrangements with third parties for mutual cooperation that affect the total or partial implementation of treatments or caput, thus not being exempt from its responsibility.

Art. 18. The intermediate and final deposit of radioactive waste will have its costs compensated to CNEN by the depositors, according to the table approved by the CNEN Deliberative Commission, effective from the first business day following the publication in the Official Diary of the Union.
Goal

Art. 1 The purpose of the Brazilian Nuclear Policy is to guide nuclear and radioactive planning, actions and activities in the Country, in compliance with national sovereignty, with a view to development, the protection of human health and the environment.

Art. 3 Are Principles of Brazilian Nuclear Policy:

I - use of nuclear technology for peaceful purposes, as established in the Constitution;
II - respect for conventions, agreements and agreements of which the actions of the Federative Republic of Brazil are signed;
III - nuclear safety, radioprotection and physical protection;
IV - the domain of nuclear fuel cycle technology; and
V - the use of nuclear technology as a tool for national development and the welfare of society.

Radioactive waste and spent nuclear fuel

Art. 14. Used nuclear fuel will be stored in an appropriate place for future use of reusable material.
Art. 1 This Decree provides for the Development Committee of the Brazilian Nuclear Program.

Art. 2. The Development Committee of the Brazilian Nuclear Program is an advisory body to the President of the Republic aimed at establishing guidelines and goals for the development of the Brazilian Nuclear Program and overseeing its implementation.

Art. 4 The Development Committee of the Brazilian Nuclear Program is composed of the following Ministers of State:

I - Head of the Institutional Security Office of the Presidency of the Republic, who will coordinate it;
II - Chief of Staff of the Presidency of the Republic;
III - Defense;
IV - Foreign Relations;
V - Economy;
VI - Agriculture, Livestock and Supply;
VII - Education;
VIII - Health;
IX - Mines and Energy;
X - Science, Technology, Innovations and Communications; e
XI - Environment.
Brazilian Nuclear Sector Regulatory Area

RESOLUTION No. 15, SEPTEMBER 27, 2019

Article 1. Create a technical group with the purpose of streamlining the regulatory area for the development of the Brazilian nuclear sector.

Art. 2 The technical group will be composed by representatives, holders and alternates, of the following organs:

I - Ministry of Mines and Energy;
II - Ministry of Science, Technology, Innovations and Communications;
III - Ministry of the Environment;
IV - Institutional Security Office of the Presidency of the Republic;
V - Navy Technology Center in São Paulo;
VI - Special Secretariat of the IRS;
VII - National Commission of Nuclear Energy;
VIII - Eletrobras - Eletronuclear;
IX - Nuclear Industries of Brazil;
X - Institute of Energy and Nuclear Research;
XI - Nuclear Technology Development Center;
XII - Brazilian Institute of Environment and Renewable Natural Resources;
XIII - National Health Surveillance Agency;
XIV - National Agency of Supplementary Health;
XV - National Mining Agency; and
XVI - Naval Agency for Nuclear Safety and Quality
Almirante Álvaro Alberto Nuclear Center
CNAAA

ANGRA 1 PWR
Power: 640 MW
Technology: Westinghouse
Operation start: Jan. 1985

ANGRA 2 PWR
Power: 1,350 MW
Technology: KWU/Siemens
Operation start: Jan. 2001

ANGRA 3 PWR
Power: 1,405 MW
Technology: KWU/Siemens-Framatome
Civil works reached ~67%.

RADIOACTIVE WASTE STORAGE CENTER

500kV Switchyard

Waste Monit. Building – New Civil works – 95%

UAS (ISFSI) – 2020
Illustrative picture
Overview of the Strategy for Spent Fuel Management in our Country

Independent Spent Fuel Storage Installation (ISFSI)

UAS (UNIDADE DE ARMAZENAMENTO COMPLEMENTAR A SECO)
Spent Fuel Management

<table>
<thead>
<tr>
<th>Plants</th>
<th>Storage Capacity (cels)</th>
<th>Cels being used</th>
<th>SFA inside the core</th>
<th>End of capacity forecast</th>
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<tr>
<td>Angra 1</td>
<td>1.252</td>
<td>978</td>
<td>121</td>
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<tr>
<td>Angra 2</td>
<td>1.084</td>
<td>756</td>
<td>193</td>
<td>Jul/21</td>
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✓ ISFSI to be constructed until 2020
   – UAS (Unidade de Armazenamento a seco)
✓ Under construction

Figura – Transfering route from Angra 1 and Angra 2 for UAS (Eletronuclear, 2016)
UAS – ISFSI – Dry SF Storage

✓ VERTICAL or Horizontal – BID to choose

✓ Short Schedule

✓ Worldwide implemented (+90 plants)

✓ More than 2300 implemented

✓ CNEN resolution 199 Jul/2016 >> Certified solution following NRC licencing
  - RG 3.62 (Std Format and Content for the SAR for Onsite Storage of SFS Casks)
  - NUREG 1567 (Std Review Plan for SF Dry Storage Facilities)
  - CFR 72 – Licensing Req for the ISSF and HLW

✓ Expandable – 15 >> 72 >> +2 x 90

✓ HOLTEC INTERNATIONAL – BID Winner – TurnKey

➢ 33 NPPs >> 706 Canisters, >> 36.336 SFAs
UAS – ISFSI – 1\textsuperscript{st} phase

✓ ~ 5 operation cycles of Units 1 e 2:

- Angra 1: 222 SFAs - 6 Overpacks
- Angra 2: 288 SFAs - 9 Overpacks

Total: 510 SFAs - 15 Storage Overpacks
# UAS Dry Storage Summary Schedule

**Status:** 31/12/17

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<td>Angra 2 SF transfer</td>
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</table>

**Nota:** Cronograma Executivo Geral - rev. 1

- **Planned**
- **Planned updated**
- **Executed**

~11 months of margin until completion of SFP capacity
Thank you!

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