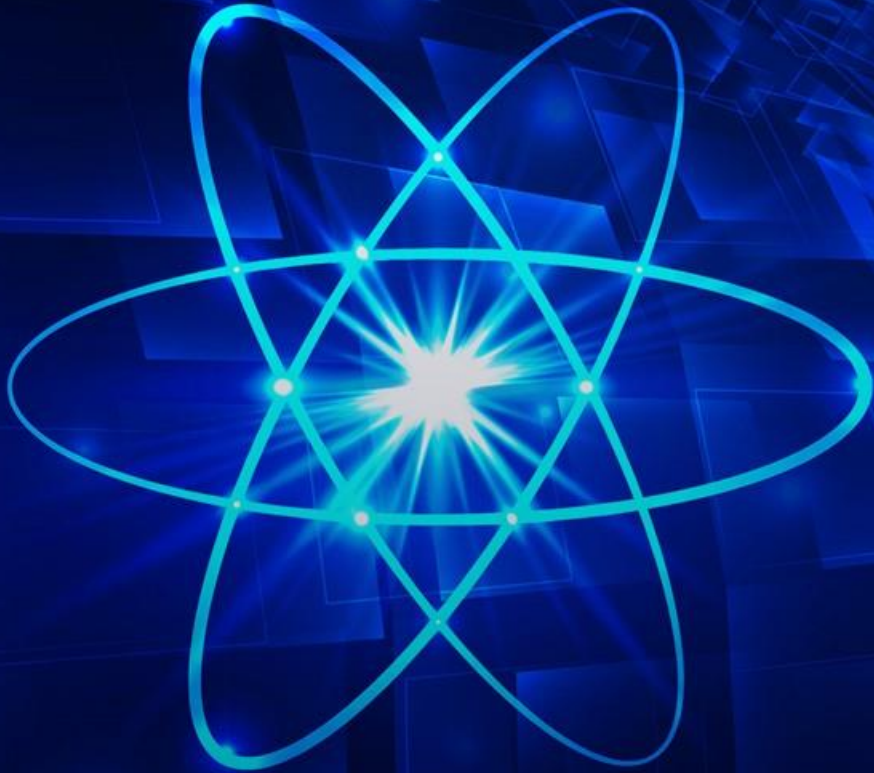


Comissão Nacional de Energia Nuclear



INAC 2024

**Initiatives to build a harmonized
regulatory framework for new
technologies in Brazil**

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Diretoria de Radioproteção e
Segurança Nuclear



MINISTÉRIO DA
CIÊNCIA, TECNOLOGIA
E INOVAÇÃO





CNEN'S MISSION

The commitment to ensure the safe and peaceful use of nuclear energy, develop and make available nuclear and related technologies, aiming the welfare of the population.





Our Mandate

Regulate the use of nuclear energy and materials to protect health, safety, security and the environment.

Implement Brazilians international commitments on the peaceful use of nuclear energy.

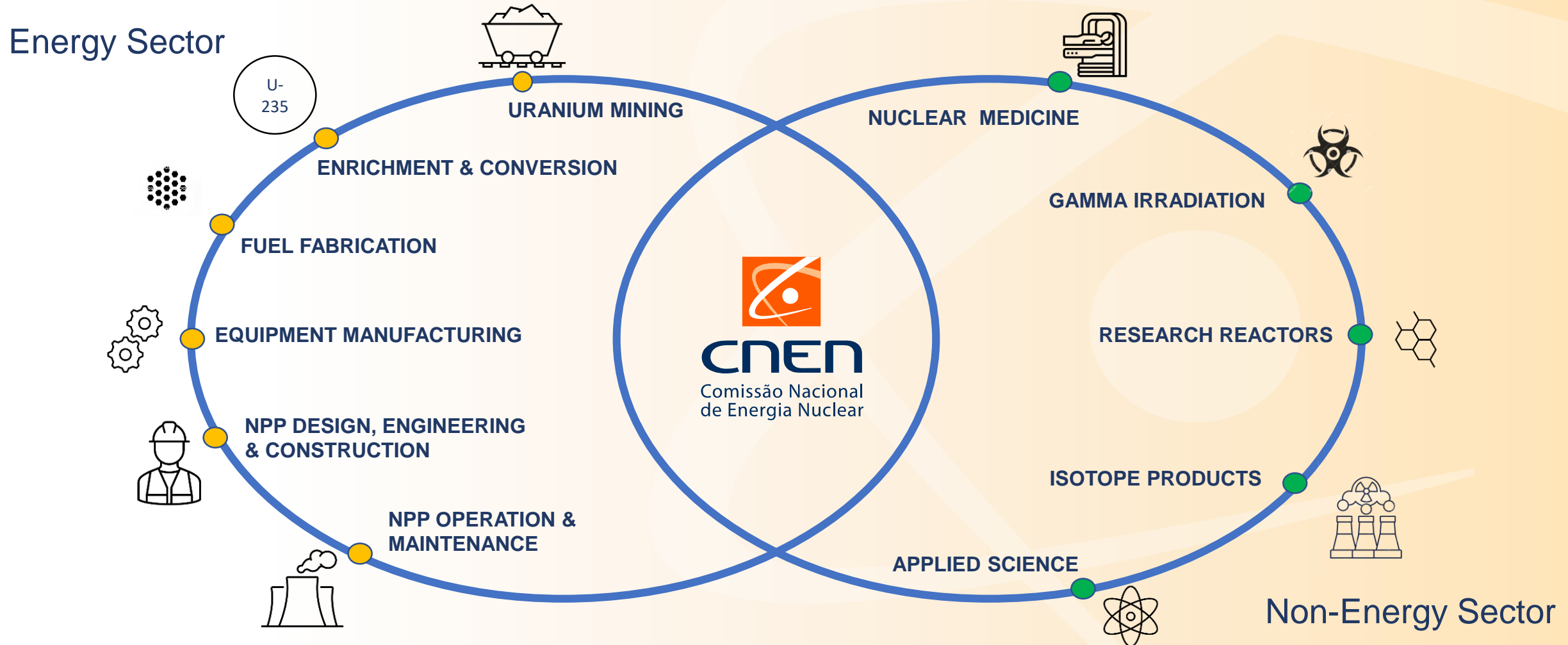
Disseminate objective scientific, technical and regulatory information to the public.

OVER 62 YEARS OF REGULATORY EXPERIENCE





THE CNEN REGULATES ALL NUCLEAR FACILITIES AND ACTIVITIES IN BRAZIL





The Brazilian Nuclear Power Industry Program

Mining & Processing



Conversion



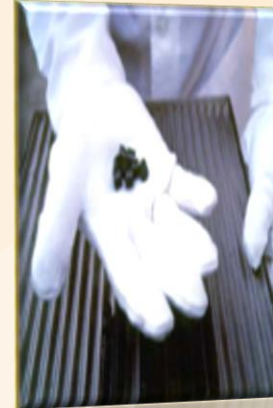
Enrichment



UO₂ powder



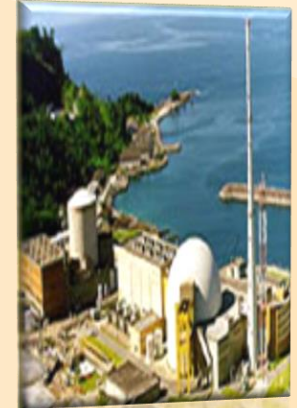
Pellets



Fuel Elements



Power Generation



A synergic mix of

- Large uranium reserves
- Fuel cycle technology
- PWR technology
- Non-proliferation



CNEN Responsibilities: Focus is on Safety

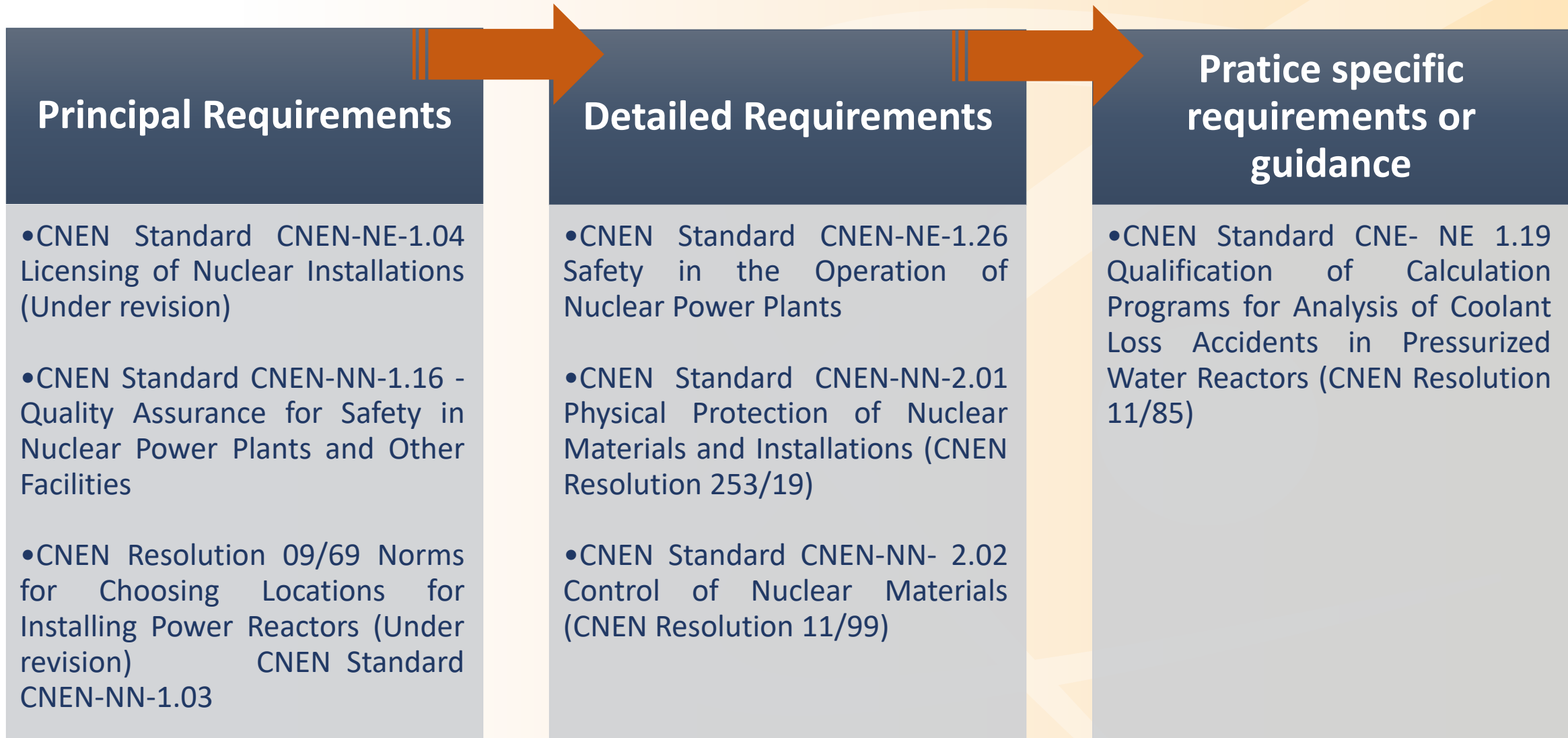
- Set safety requirements, inform licensees, verify compliance
- Base regulatory action on the level of risk — graded approach
- Ensure society that the licensee's responsibilities are properly fulfilled
- Make independent, objective and risk-informed decisions

Licensee (Regulated Party) Responsibilities

- Primary responsibility for safety
- Manage regulated activities in a manner that protects health, safety, security and the environment, respecting Brazil's national standards and international agreements (consistent with the license application)



Hierarchical Regulatory Structure – ex. of CNEN Standards





The Licensing Process Conducted by CNEN

Licensing Process (Lei n.º 6.189, de 16 de dezembro de 1974, com as alterações introduzidas pelo Decreto- Lei n.º 2.464, de 31 de agosto de 1988 e pela Lei n.º 7.781, de 27 de junho de 1989.)

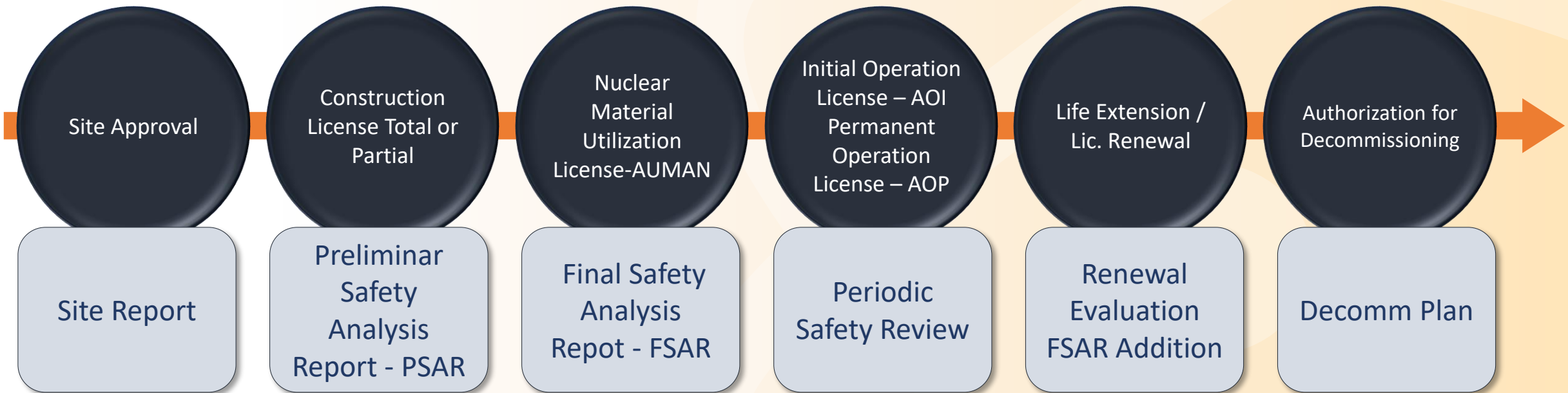
Article 7º The construction and operation of nuclear installations will be subject to license, authorization and supervision by CNEN, in the form and conditions established in this Law and its Regulations.

§ 1st - The license for the construction and authorization for the operation of nuclear installations will be conditioned on:

- I – proof of suitability and technical and financial capacity of the person responsible;
- II – fulfillment of the safety and radiological protection requirements established in standards issued by CNEN;
- III – adaptation to new emerging conditions, essential for the safety of the installation and the prevention of the risk of accidents arising from its operation;
- IV – satisfaction of other legal and regulatory requirements



The Licensing Process Conducted by CNEN





Regulatory Decision-Making

Decisions made by the Commission take into consideration:

- Regulatory requirements
- Analyses and recommendations from CNEN staff, based on their assessment of both licensee and stakeholder submissions to the Commission
- Best available information, arising from regulatory research or credible research by third parties
- Public input, through the hearing process

Understanding risks and mitigating those risks play a significant role in the decision-making process

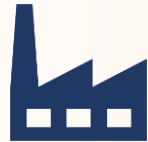


SMR Road Map

Understanding
Technology



Regulatory
Framework



Industrial Codes
and Standards



Utility
Requirements



Operation
Preparation



Human Resource



Supply Chain



Business
Case



Safeguards



Security



Current Challenges



- Large number of innovative designs (first of kind)
- Unproven technology
 - Comprehensive analyses, simulations, including code validation and testing needed to close knowledge gaps
 - New design philosophy
 - New materials
 - New safety systems strategies
- Lack of operational experience
- Regulatory processes need to be adapted, as appropriate
 - Rules and Regulation
 - Safety Requirements and Guides

Maintaining regulatory excellence requires that regulators evolve with the technology



Rethink the licensing process and the regulatory framework



SMRs bring to the reactor licensing process challenges associated with **outsourcing activities, a modular design approach, strong decentralization of design activities, and off-site safety analyses, construction and commissioning.**

Considering these assumptions, the participation of Reactor Coordination technicians in international discussions has two set of objectives. **One set of short-term goals and another set of long-term goals.**



Initiatives Toward a Licensing Process for SMR's in Brazil

• The short-term goal

- The main objective in the short term is to build technical competence to discuss a new licensing model that contemplates the new practice and that converses with the global model of a regulatory review framework.
- The construction of technical competence improves CNEN's ability to provide subsidies to other government instances that make up the Brazilian Nuclear Program.



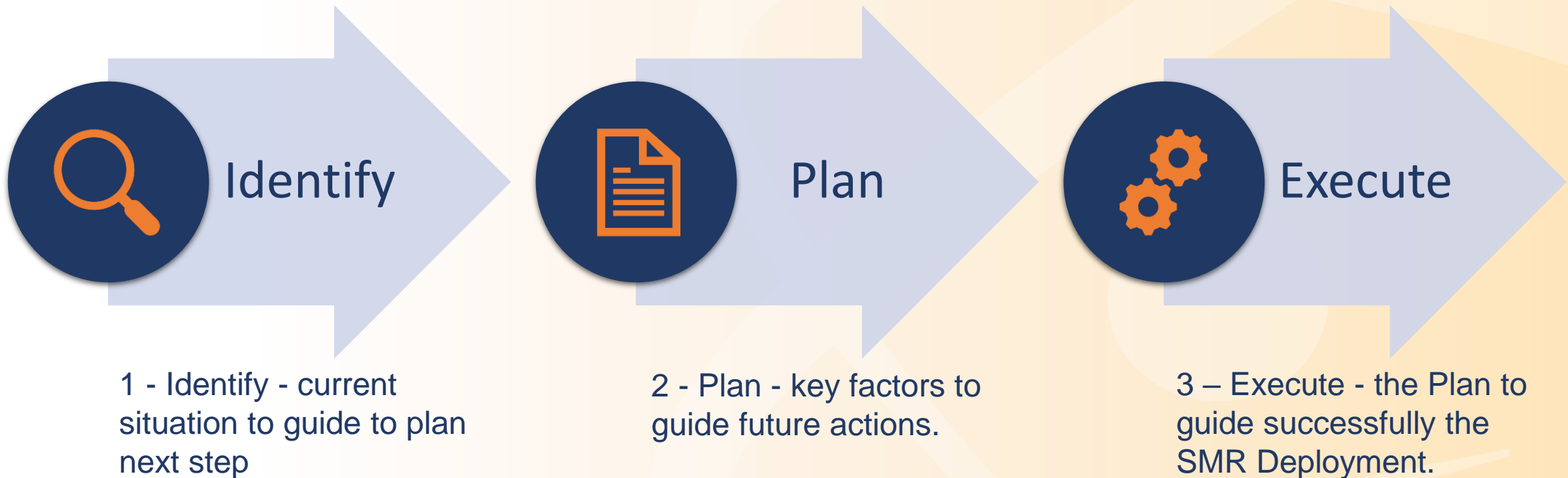
• The long-term goal

- Developing harmonized regulatory approaches between national regulatory bodies
- A harmonized review outcome while preserving national sovereignty
- A new licensing model that contemplates the new practice and that converses with 3S approach.
- Ensure necessary competence to take ownership of the leveraged review and perform due diligence.
- Ensuring processes are less resource-intensive than reviewing “from scratch”





Initiatives Toward a Licensing Process for SMR's in Brazil





Brazilian Regulatory Body strategies to accelerate SMR deployment

1 - Identify - current situation to guide successfully the SMR Deployment

- The legal and regulatory infrastructure for the licensing process need to be reconsidered in the context of the users', licensee's and the regulators approach.

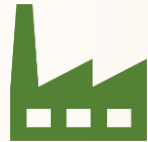


Actions in the Context of key elements to deployment

Understanding
Technology



Regulatory
Framework



Industrial Codes
and Standards



Utility
Requirements



Operation
Preparation



Human Resource



Supply Chain



Business
Case



Safeguards



Security

Must be based on firm technical understanding and competent workforce to manage safety, performance, economics and innovation.



knowledge trail to build Competence

- TM on Safety Assessment in the Design of Nuclear Power Plants
- Nuclear Harmonisation and Standardisation Initiative
- TM on Generic User Requirements and Criteria of SMR Technologies for Near Term Deployment
- EW on Regulatory Challenges in Small Modular Reactors

2022



- IW on Education, Training Tools and Knowledge Transfer for SMRs
- Harmonisation and Standardisation Initiative
- Safety and Licensing
- Support of Developing, and Enhancing the Safety Infrastructure
- IW on Safety, Security and Safeguards by Design
- IW on Safety Analysis for Small Modular Reactors

2023



- ITC on Safety aspects of small Modular Reactors (SMRs)
- W Safety of Fuel Manufacturing for Advanced Reactors
- IW on the development of Taxonomy for Small Modular Reactors (SMRs) and Micro-reactors (MRs)
- NHSI Regulators WG
- International Conference on Small Modular Reactors and their Applications

2024





Exchange of Information through National Cooperation

- National cooperation between DRS and DPD through a Focus Group to encourage the exchange of information and expand technical discussions.
 - Nuclear scientific and technological research
 - Development of nuclear applications
 - Specialized training for the Nuclear Sector
- The Research and Development Board participates in the international SMR forums sponsored by the IAEA with the aim of becoming familiar with the evolution of SMR technologies proposed by the different designing countries, seeking to identify the possible uses of these reactors both for future electrical generation, as well as supporting the operation of large industrial and mining companies throughout the country.





Lessons learned from the actions of other regulators

- Some states expressly take on the task of modernizing their regimes and consider establishing a new licensing process for Advanced Nuclear Reactors.
 - USA – The NRC is currently working on a new part 53 licensing process to establish a “Risk Informed, Technology-inclusive Regulatory Framework for Advanced Reactors”.¹
 - Canada: has stated that its nuclear regulatory framework is technology neutral all reactor facilities will be classified as Class 1A.²
 - UK The ONR is working to develop and strengthen its regulatory capacities for “Advanced nuclear Technologies”.³

1 - <https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/rulemaking-and-guidance/part-53.html>

2 - <https://nuclear.safety.gc.ca/eng/acts-and-regulations/consultation/coment/d-16-04/index.cfm#sec2>

3 - <https://www.onr.org.uk/our-work/what-we-regulate/new-reactors/advanced-nuclear-technologies-ants/>



Engagement with Regulators internationally

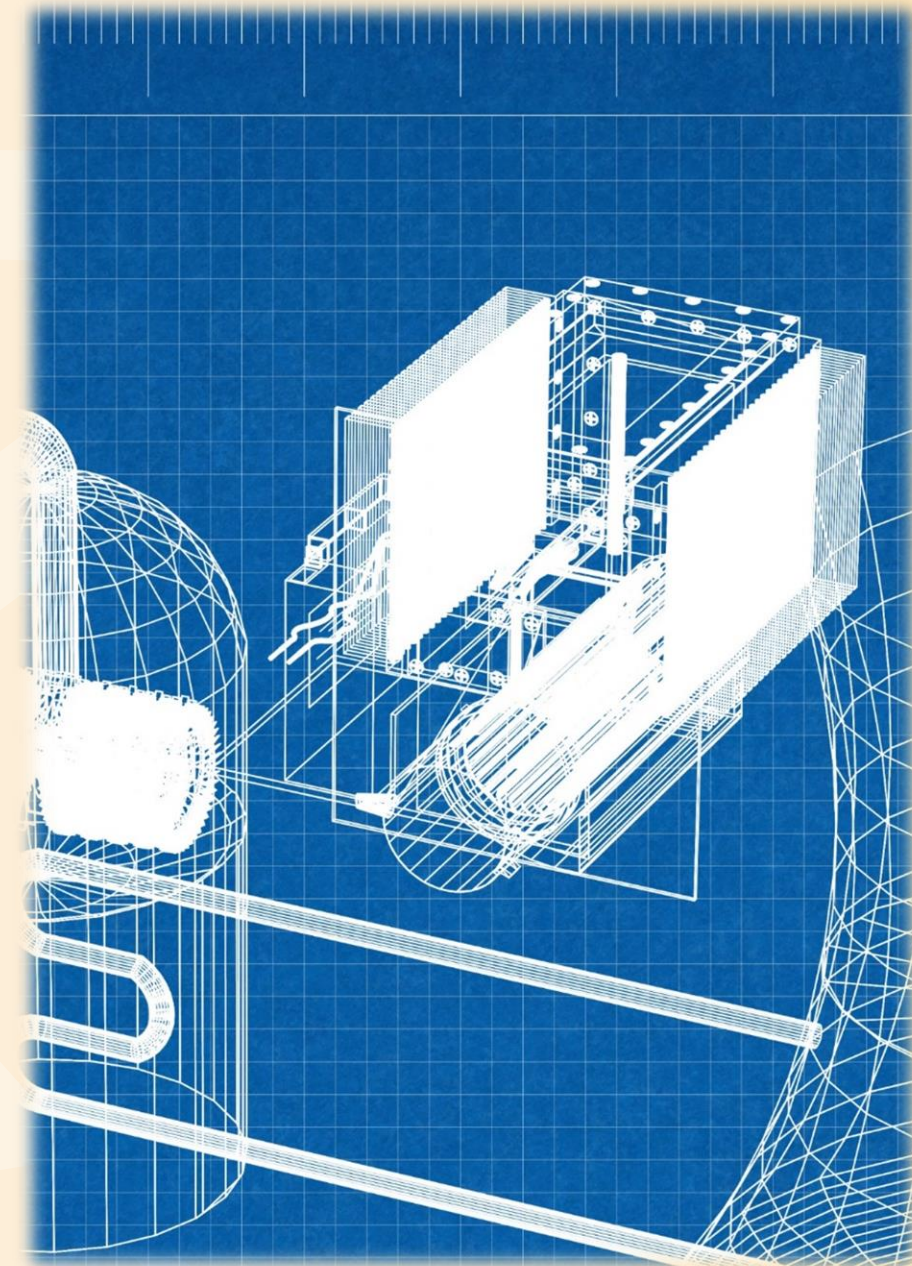
- CNEN high level management is part **Nuclear Harmonization and Standardization Initiative**
 - 2nd phase of NHSI Regulatory Track WG1
 - 2nd phase of NHSI Regulatory Track WG2
 - 2nd phase of NHSI Regulatory Track WG3
- Technical Cooperation with Argentina CNEN / ARN (in progress)
- Technical Cooperation USA CNEN / NRC (Mutual understanding of the convenience desirability of cooperation)





Why is anticipating discussions important?

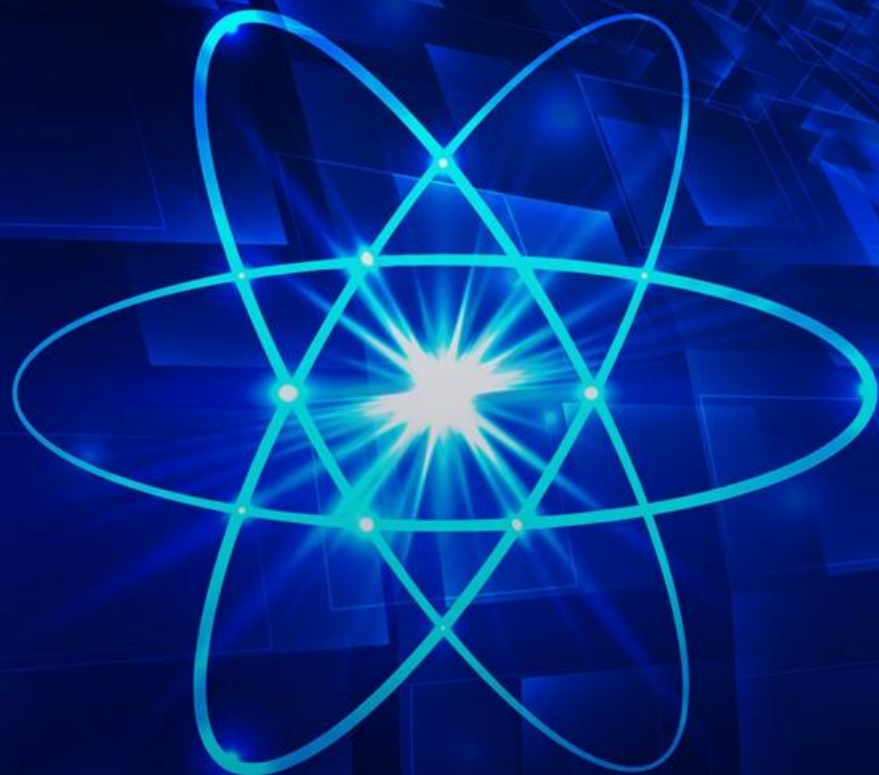
- The nuclear power sector has adopted a strong focus on safety. Often this focus on safety has resulted in conservative decision-making and a risk-adverse culture
- Nuclear legal and regulatory regimes need to evolve to simultaneously maintain responsible nuclear and radiation safety regulation while facilitating advantageous technological innovation
- The history of the deployment of large reactors demonstrates that regulatory frameworks and licensing processes have an impact on commercialization costs, project schedules and budgets.
- For SMRs, they have the potential to be particularly impactful where primary drivers of project economics are linked to standardised designs and multi-unit deployment.



Comissão Nacional
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Obrigada!

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