

Reconstruction of Legal Politics on Radioactive Waste Management in the Framework of Strengthening Sustainable Development

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Abstract:

Indonesia is committed to achieving the Sustainable Development Goals (SDGs) targets and this has been manifested in various legal politics, including in the establishment of legislations and regulations. Since the SDGs have complex goals that do not only focus on economic growth, but also ensure environmental preservation, social welfare, and peace. In addition, as one of the countries considered pioneers in the implementation of the SDGs, Indonesia has become a reference for countries at the Asia-Pacific region as well as at the international level. On the other hand, the problem of radioactive waste management in Indonesia still has problems in achieving optimum solutions. The strengthening of legislations and regulations related to radioactive waste and spent fuel has been implemented, but on the other side, it is still necessary to decide legal politics for radioactive waste management. However, at the same time there is legal politics in the establishment of national policies as outlined in the omnibus law (Law No. 11 of 2020 on Job Creation). The purpose of establishing an omnibus law is to overcome all forms of regulatory constraints currently being experienced by Indonesia so that regulations shall be simplified, amended, or revoked in number. This is important, considering that regulations that have multiple interpretations can have an impact on Indonesia's weak competitiveness in the global arena. There are special provisions in the Job Creation Law changing legal politics in the management of radioactive waste in Indonesia, namely the issues of authority and institutions. Previously, Law No. 10 of 1997 gave BATAN (Indonesian National Nuclear Energy Agency, the promoting agency of nuclear energy) centralized responsibility for managing radioactive waste. By Law No. 11 of 2020 on Job Creation, BATAN had no authority for high and longterm radioactive waste repository. However, on the other side, there is no document that normatively and specifically develops a national policy in setting up a strategy for radioactive waste and spent fuel. The approach used is normative juridical research or normative legal research which is research aimed at finding and formulating legal arguments through an analysis of the subject matter. The main problem of this can be found in the conclusion that there should be regulatory tools and the compliance with the international standards that have become best practices and common practices related to the principles of good regulation. In addition, there is unclear boundaries of institutional authority, including coordination mechanisms. This solution requires reforming elements related to policy formulation as well as legislations and regulations so that the establishment processes will be able to produce higher quality and more proportional legislations and regulations. It is necessary to carry out various establishment of policies for the short, medium, and long term, especially in structuring strategies for the management of radioactive waste and spent fuel.

1. OVERVIEW OF INDONESIA'S SDGs STATUS

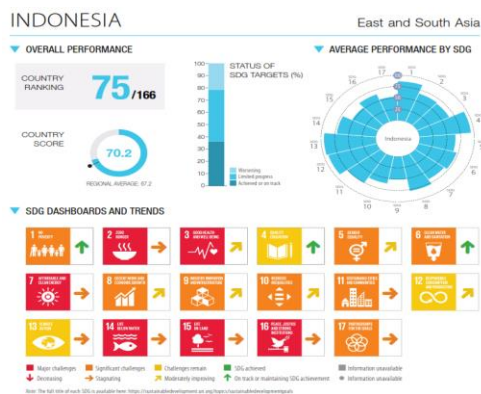
Indonesia is one of the Member States of the United Nations that has played an active role in the establishment of the Sustainable Development Goals as set out in the document Transforming Our World: The 2030 agenda for sustainable development. To implement this, the SDGs National Roadmap is formulated as a plan document that contains a phased strategic policy in achieving the SDGs from 2017 to 2030, which is in line with the national development goals. In order to meet the Government's commitment to achieving the Sustainable Development Goals, it is necessary to accelerate the implementation of the National Long-term Development Plan and the National Medium-Term Development Plan. The SDGs National Action Plan is contained in a document containing the programmes and activities of the five-year work plan for the implementation of various activities that directly and indirectly support the achievement of SDGs in line with national targets [1]. SDGs aims to maintain the sustainable improvement of the economic well-being of the people, the sustainability of the social life of the community, the maintenance of the quality of the living environment and the development of an inclusive and implemented system of governance capable of fine-tuning the improvement in quality of life from one generation to the next. Indonesia's progress in the implementation of the SDGs as listed in the Table.1 below.

Tabel.1. Indonesia's progress in the implementation of the SDGs

YEAR	COUNTRY RANKING	COUNTRY SCORE
2016	98	54,38
2017	100	62,90
2018	99	62,80
2019	102	64,20
2020	97	66,30
2021	97	66,30
2022	82	69,16
2023	75	70,20

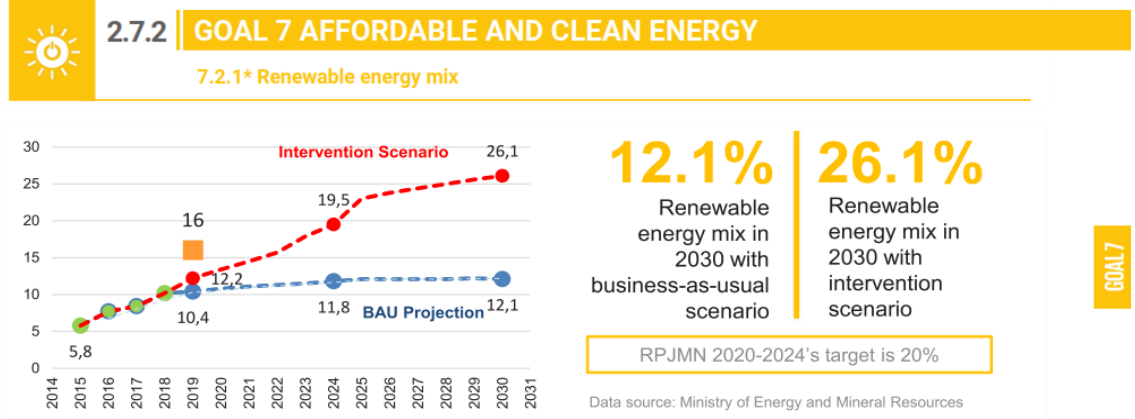
By 2023, Indonesia was ranked 75th out of 166 United Nations countries and also had a score of 70.2 as shown in the Table.2 below.[2]

Tabel.2. Indonesia was ranked in 2023



The policy on the use of nuclear energy has also been covered in Objective 7: Affordable and Clean Energy. The nuclear energy policy is constructed in the policy in the renewable energy mix as described in the Table.3 below [3].

Tabel.3. Renewable Energy Mix



As a consideration, the policy is based on the following national needs:

Per capita electricity consumption is one indicator of a country’s development as it is proportional to the level of economic activities. Indonesia’s per capita electricity consumption has increased steadily in recent years along with the improvement of electrification ratio. Tabel.4 as per capita electricity consumption

Tabel.4. Per Capita Electricity Consumption

Electric power consumption per capita		
Year	Baseline	Intervention
2015	785 kWh/kapita	785 kWh/kapita
2019	996 kWh/kapita	1,200 kWh/kapita
2024	1,371 kWh/kapita	2,283 kWh/kapita
2030	2,035 kWh/kapita	3,201 kWh/kapita

- Increasing electric power consumptions means there should more demand and also better access to electric power in the future. Majority of regions that have yet electrified are
- located in remote areas that are not covered by State Electricity Company (PLN). Nevertheless, it is also important to increase economic activities in these remote areas as these activities create more demand for electricity.
- On the supply side, providing more equitable access to electricity should be the focus of policy direction as inequality in electricity access still persist in several

regions, for example, electrification ratio in East Nusa Tenggara still a challenge behind at 61.90% while most provinces' electrification ratios are more than 85%.

In the period 2020-2024, the Indonesian government has planned to utilize nuclear energy and implement it by 2025-2030, as listed in Table.5 and Table.6 below.[4]

Tabel.5. Utilization of Nuclear Energy in the Periode 2020-2024

POLICY AND STATEGY FOR 2020 - 2024	
POLICY	Reviewing the utilization of nuclear power plants
STRATEGY	<ul style="list-style-type: none"> • Conducting research on nuclear power plants development which takes account economic and safety factors, • Designing a roadmap for nuclear power plants implementation as the last option of national energy development priorities, • Preparing the regulatory and institutional needs of nuclear power plants implementation, • Preparing to master nuclear power plants technology

Tabel.6. implementation of Nuclear Energy in the Periode 2025-2030

POLICY AND STATEGY FOR 2025 - 2030	
POLICY	Developing nuclear power plants utilization
STRATEGY	<ul style="list-style-type: none"> • Increasing the national capacity in the field of nuclear power use safety, • Preparing pre-feasibility academic studies as a basis to make a decision on the planning of nuclear power plant development, • Preparation of nuclear power plants development.

The utilization of nuclear energy as a nuclear power plant should also be considered with regard to the management of its radioactive waste. Indonesia actually has experience in operating the three (3) research reactors located in Bandung, Yogyakarta, and Serpong besides it also has a radioactive waste management facility. However, in its development the implementation of the utilization of research reactors and the facility of the management of radioactive wastes raises issues related to the activities and facilities of one is legacy waste. In addition, radioactive waste is also generated from activities and facilities of medic, industrial and research. In addition, the radioactive waste disposal facility will no longer be able to store radioactive wastes by 2027.

2. LEGAL FRAMEWORK OF SDGs AND RADIOACTIVE WASTE MANAGEMENT

Indonesia is committed to achieving the Sustainable Development Goals (SDGs) targets and this has been manifested in various legal politics, including in the establishment of legislations and regulations. To implement the Transforming Our World: The 2030 Agenda for Sustainable Development, The Government of Indonesia has set out into Presidential Regulation (PR), namely:

- a. PR No. 59 of 2017 on the Implementation of the Achievement of the Sustainable Development Goals;

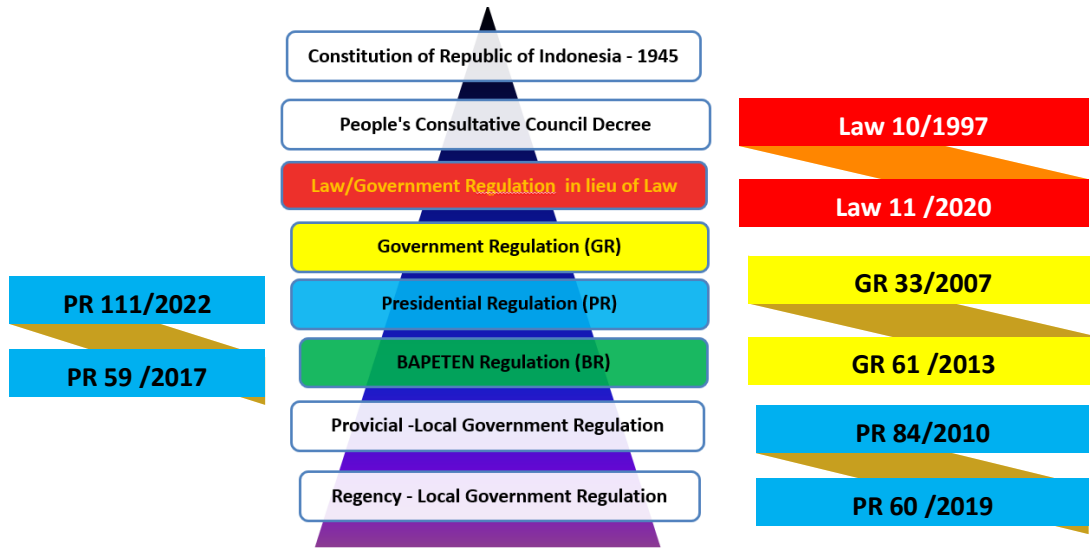
b. PR No. 111 of 2022 on the Implementaion of the Achieving of the of Sustainable Development Goals;

Since the SDGs have complex goals that do not only focus on economic growth, but also ensure environmental preservation, social welfare, and peace. In addition, as one of the countries considered pioneers in the implementation of the SDGs, Indonesia has become a reference for countries at the Asia-Pacific region as well as at the international level. On the other hand, the problem of radioactive waste management in Indonesia still has problems in achieving optimum solutions. The strengthening of legislations and regulations related to radioactive waste and spent fuel has been implemented, but on the other side, it is still necessary to decide legal politics for radioactive waste management. However, at the same time there is legal politics in the establishment of national policies as outlined in the omnibus law (Law No. 11 of 2020 on Job Creation). The purpose of establishing an omnibus law is to overcome all forms of regulatory constraints currently being experienced by Indonesia so that regulations shall be simplified, amended, or revoked in number [5]. This is important, considering that regulations that have multiple interpretations can have an impact on Indonesia's weak competitiveness in the global arena. There are special provisions in the Job Creation Law changing legal politics in the management of radioactive waste in Indonesia, namely the issues of authority and institutions. Previously, Law No. 10 of 1997 gave BATAN (Indonesian National Nuclear Energy Agency, the promoting agency of nuclear energy) centralized responsibility for managing radioactive waste. By Law No. 11 of 2020 on Job Creation, BATAN had no authority for high and longterm radioactive waste repository. The Central Government has taken over the mentioned authority. BATAN has already been merged and as part of National Innovation and Research Agency (BRIN) [6].

The management of radioactive waste management also regulated by Government Regulation (GR) No. 33 of 2007 on The Radiation Safety of the Ionizing Radiation and Security of the Radioactive Source as well as the GR No. 61 of 2013 on the Management of Radioactive Waste. GR No. 61 of 2013 has significant relation with PR No.84 of 2010 on Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Nuclear energy utilization must prioritize safety to prevent radiation hazards to workers, public, and the environment [7]. National policies and strategies on nuclear safety and radiation are necessary for all stakeholders. In view of this, the Indonesian government has established PR No. 60 of 2019 on the National Policy and Strategy for Nuclear and Radiation Safety. The hierarchy of legislation and regulation for nuclear energy especially for radioactive waste describes as Fig.1:

Fig.1. the Hierarchy of Legislation and Regulation for Nuclear Energy



However, on the other side, there is no document that normatively and specifically develops implementation of national policy and strategy for radioactive waste and spent fuel [8]. PR 60 of 2019 mentioned about national policy concept for the management of radioactive waste as mentioned Tabel.7. Until 2023 there is no mentioned formal document established by BATAN (now BRIN) to implement of the PR 60 of 2019. BAPETEN as Regulatory Body on the progress to revise GR No. 61 of 2013 to harmonize with international standard dan science and technology especially for management of radioactive waste and nuclear spent fuel, including the safety of the temporary storage and longterm storage for the nuclear spent fuel.

Tabel.7. National Policy and Strategy in the PR 60 of 2019

POLICY : Enhanced intersectoral coordination related to nuclear and radiation safety

STRATEGY : Improving the effectiveness of nuclear and radiation safety supervision through regulation, licensing, and inspection

PROGRAM PLAN	PRINCIPAL SECTOR	SUBSECTORS	PERIODES AND OUTPUTS		
			2020-2024	2025-2029	2030-2035
Developing a national policy concept for the management of radioactive waste	Promoting Body (BATAN)	Ministries of Research, Technology and Higher Education, Ministry of Industry, Ministers of Environment and Forestry, Ministries of Energy and Mineral Resources, Ministries for Health, and BAPETEN	Availibility of the concept of a national policy on the management of radioactive waste		
Formulation of legislations and regulations on the safety of the temporary storage and long term storage for the nuclear spent fuel	Regulatory Body (BAPETEN)	Ministries of Research, Technology and Higher Education, Ministry of Industry, Ministers of Environment and Forestry, Ministries of Energy and Mineral Resources, Ministries for Health, and BAPETEN			Availibility of the legislations and regulations on the safety of the temporary storage and long term storage for the nuclear spent fuel

3. CHALLENGES AND OBSTACLES

As mentioned before by Law No. 11 of 2020 on Job Creation, BATAN had no authority for high and longterm radioactive waste repository. The Central Government has taken over the mentioned authority. BATAN has already been merged and as part of National Innovation and Research Agency (BRIN). The issue of synergy in the performance of the duties and function of the ministry and/or agency should be achieved.

To achieve the main objective of the nuclear safety is to prevent radiation hazards to workers, public, and the environment. However, PR 60 of 2019 needs to be reconsidered as for the arrangement and above all need to have an action plan in its implementation. Currently, the issues that can be identified are:

- a. the legacy wastes in some BRIN (ex BATAN) facilities;
- b. the radioactive sources caused by a bankrupt business;
- c. the radioactive sources used in the radiotherapy facility;
- d. the implementation of the clearance in the health and industrial facilities;
- e. the integration of the radioactive waste data information system;
- f. the transport of nuclear spent fuel to the radioactive waste management facility;
- g. the radioactive waste storage facility for decommissioning activities;
- h. the coordination among the parties concerned in carrying out the orphan source;
- i. the waste management of the cessation of activities;
- j. the information system for the management of nuclear spent fuel;
- k. the funding assistance for repatriation for nuclear spent fuel;
- l. the temporary storage for nuclear spent fuel outside the nuclear reactor site.

The main problem that should be regulatory tools and the compliance with the international standards that have become best practices and common practices related to the principles of good regulation. In addition, there is unclear boundaries of institutional authority, including coordination mechanisms.

4. LEGAL POLICY APPROACH

Article 32 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, requires Contracting Parties to address the following issues in their national reports to the review meetings of the Convention [9]:

- Spent fuel management policy;
- Spent fuel management practices;
- Radioactive waste management policy;
- Radioactive waste management practices;
- Criteria used to define and categorize radioactive waste.

According to IAEA Nuclear Energy Series No. NW-G-1.1, a policy for spent fuel and radioactive waste management should include a set of goals or requirements to ensure the safe and efficient management of spent fuel and radioactive waste in the country [10].

A typical policy should include the following elements:

- a. defined safety and security objectives,
- b. arrangements for providing resources for spent fuel and radioactive waste management,
- c. identification of the main approaches for the management of the national spent fuel and radioactive waste categories,
- d. policy on export/import of radioactive waste, and
- e. provisions for public information and participation.

Policies and strategies may need to be updated because of new national circumstances (legislative changes, plans for new nuclear facilities), new international agreements and/or experience obtained with the original policy and strategy.

Policies and strategies requires availability of effective enforcement of the regulations and also consideration of the networking between regulatory body, radioactive waste management institution and other relevant institutions by take into account:

1. to assure the safety and security purposes in the management of radioactive waste
2. to minimize the radioactive waste management by:
 - reuse and recycle
 - improving the effectiveness of clearance mechanisms to determine radioactive waste can be exempted from regulatory supervision
3. availability of storage location
4. management of nuclear spent fuel can be done by re-processing, directly deemed as waste or returned to the supplier country

The policy and strategy are being offered to be discussed taking into account the situation and condition of Indonesia with regard to harmonization of international conventions and standards as mention Tabel.8. These policy and strategy are based on field of duty held by ministry and/or agency.

Tabel.8. Policy and Strategy Based on Field of Duty

POLICY	1. Development of the infrastructure for the management of radioactive waste waste and nuclear spent fuel	2. Increase the coordination of the management of radioactive waste and nuclear spent fuels
STRATEGY	1.1. Increased availability and optimization of resources and supplies	2.1. Increased regulatory effectiveness
	1.2. Information system development	2.2. Synergy in the performance of the duties and functions of the Ministry/Agency

Therefore another option that policy and strategy are based on business process held by ministry and/or agency as mention Tabel.9

Tabel.9. Policy and Strategy Based on Business Process

POLICY	legislation and regulations
	coordination among regulatory body and related ministry/agency, radioactive waste management organization, and waste producers
	waste reduction programmes
	waste management systems
	availability of waste processing technologies
	public communications
	competent human resources
	guarantee of financial availability

STRATEGY	conditions of inventory of radioactive waste and nuclear spent fuel
	classification of waste
	characteristics of waste
	current regulatory regime
	resource availability
	current waste management facilities
	waste management strategies from other countries
	expectations of other parties

5. CONCLUSION

Accomplishing SDGs is also accomplishing the Indonesia's development agenda. The roadmap of SDGs Indonesia is an important vehicle for Indonesia's SDGs stakeholders in reaching the same goals and missions, with clear targets and directions. The interlinkages of SDGs targets and indicators presented in the roadmap shall be the basis for policymakers and stakeholders to put their intervention priorities.

There should be regulatory tools and the compliance with the international standards that have become best practices and common practices related to the principles of good regulation. There should be clear boundaries of institutional authority, including coordination mechanisms. There are two (2) approaches as option to deliver policy and strategy namely based on field of duty or based on business process.

Reference

- [1] Presidential Regulation No. 59 of 2017 on the Implementation of the Achievement of the Sustainable Development Goals
- [2] <https://dashboards.sdgindex.org/profiles/indonesia>
- [3] Roadmap of SDGs Indonesia: A Highlight, Ministry of National Development Planning/ National Development Planning Agency, 2017
- [4] Roadmap of SDGs Indonesia: A Highlight, Ministry of National Development Planning/ National Development Planning Agency, 2017
- [5] Law No. 11 of 2020 on Job Creation
- [6] Presidential Regulation No. 78 of 2021 on National Innovation and Research Agency (BRIN)

- [7] Law No. 10 of 1997 on Nuclear Energy
- [8] Presidential Regulation No. 60 of 2019 on the National Policy and Strategy for Nuclear and Radiation Safety
- [9] Presidential Regulation No.84 of 2010 on Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- [10] IAEA Nuclear Energy Series No. NW-G-1.1: Policies And Strategies For Radioactive Management