Integration of renewable energy policies between central and regional governments

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Abstract. Renewable Energy will play a more critical role in meeting future energy needs. Therefore, it is necessary to have policies and strategies at the national and regional levels so that the development of renewable energy can increase and develop. Unfortunately, Indonesia does not have a specific policy that covers the development of renewable energy until now. This study aims to see the integration of central and regional policies by targeting the renewable energy mix as a connecting link. This research was conducted using the document analysis method. The study results indicate that the national level's legal instruments and policies for renewable Energy are inadequate. The instrument is still fragmented into several policies with a minimal portion and legal standing that is not strong enough. We propose the need for policies at the national level that specifically regulate renewable Energy and prepare derivative regulations for the law to have an integrated policy. In addition, local governments must also integrate their regional regulations with existing policy instruments at the national level. Good integration of national and regional policies is expected to accelerate renewable energy development in Indonesia, and the targets are not just ambitions written on paper.

1. Introduction
Energy transition has become one of the current strategic issues both domestically and internationally [1,2,3,4,5,6]. The goal is none other than ensuring the sustainability of development in the future [7,8,9,10,11]. The current development still relies on fossil energy which has limitations. Indonesia, in this regard, is one of the countries that has been relatively late in promoting the energy transition. Indonesia’s energy demand in 2025 is predicted to be three times higher than in 2010 [12]. In fact, with the limited fossil energy sources owned by Indonesia and the high energy growth target, must accelerate the energy transition immediately. However, the heavy dependence on fossil energy makes the transition very difficult and complex [13], especially if there is no clear and binding instrument to encourage the transition.

In 2014 through Government Regulation 79/2014, Indonesia revised its renewable energy mix target to 23% in 2025 and 31% in 2050 from the base of 6% in 2014 [14]. However, eight years after that, in 2020, Indonesia’s energy mix has only reached 11.31% [15], or less than half the target for 2025. Several
problems in renewable energy development have been identified due to the lack of existing regulations in accelerating renewable energy development. Development of Renewable Energy, such as: not yet maximally implementing price policies, unclear renewable energy subsidies on the buyer's side (off-takers), regulations that have not been able to attract investment, no incentives for renewable energy utilization, lack of availability of financing instruments by investment needs, process complicated and time-consuming licensing and land and spatial planning issues [16]. In terms of acceptance in the community, which also often gets obstacles [17,18,19,20]. Therefore, this article aims to see the integration of existing policies in Indonesia's central and local governments in accelerating renewable energy development with connecting lines as the target of the renewable energy mix.

2. Methodology
This study was conducted by analyzing documents on policies at the central and regional levels regarding the development and utilization of renewable energy in Indonesia. The policies at the central level that we mean in this paper refer to Article 7 (1) of Law No. 12/2011 concerning the Establishment of Legislations which consist of Laws/Government Regulations in Lie of Laws, Government Regulations, and President Regulations. Whereas what is meant by Regional Regulations are Provincial Regulations.

So that our reference in this research is policy documents at the central level, including Law 30/2007, Law 30/2009, Law 21/2014, Government Regulation 14/2012, Government Regulation 23/2014, Presidential Regulation 4/2016, Presidential Regulation 14/2017, Presidential Regulation 22/2017, meanwhile, policies at the regional level are provincial regulations governing the General Plan for Regional Energy. There are 20 local regulatory documents from 20 provinces that we analyze in this article. These 20 provinces are provinces that have ratified regional regulations regarding their general regional energy plans. The twenty provinces are: Central Java, West Java, West Nusa Tenggara, North Kalimantan, East Java, Lampung, Bengkulu, Central Sulawesi, Gorontalo, East Nusa Tenggara, East Kalimantan, Jambi, Aceh, Bangka Belitung Islands, West Sumatra, Yogyakarta, South Sumatra, Bali, and West Sulawesi. Meanwhile, the other 14 provinces still do not have these regional regulations.

3. Results and Discussion

3.1. Indonesia's renewable energy development policy
Indonesia's national energy policy is an energy management policy that refers to the principles of justice, sustainability, and environmental insight to create independence and national energy security. Although the objective of the national energy policy implicitly refers to renewable Energy, Indonesia has not had a policy that regulates renewable Energy at the level of law (the third hierarchy in Indonesian legislation after the 1945 Constitution and Decree of the People's Consultative Assembly).

We do not want to rush to conclusions in this article. However, from a policy law perspective, the absence of a law explicitly regulating renewable energy development means that renewable Energy is not strategic to regulate, plan, implement, and implement. Thus, it is not easy to realize the objectives of the national energy policy, especially in renewable energy, because it does not have a solid legal standing. However, before going into a deeper discussion on this matter, it is better to know the legal definition of renewable energy in Indonesia's policy document.

The definition of renewable energy can be found in Law 30/2007 on Energy. In Chapter 1 Article 1, point 7. It is explained that: "renewable energy is energy that comes from renewable energy sources." While renewable energy sources, according to the law in number 6 in the same Chapter and Article, are "... sources of energy produced from sustainable energy resources if managed properly, including geothermal heat, wind, bioenergy, sunlight, flow, and waterfalls, as well as movements and differences in the temperature of the sea layers." This understanding is then also used by regulations at lower levels.

Tables 1, 2, and 3 will present the policy instruments at the national or central level that currently regulate renewable energy development in Indonesia. The table shows that the new energy development policy is still fragmented into many different regulations hierarchically in Indonesia. These policies are
divided into 3 (three) policies in the form of laws (with all three still in effect), 3 (three) policies in the form of government regulations (with two of them still in effect), 3 (three) policies in the form of presidential regulations (with two of them still in effect).

Table 1. Indonesia's renewable energy policy instrument at the central/national level in the form of a law.

| Policy | Description and Instrument Used | Regulating Renewable Energy | Status |
|--------|---------------------------------|-----------------------------|--------|
| Law 30/2007 | Policy framework for energy development and management | Article 1, number 4, 5, 6, 7: Explaining renewable Energy's general concept or provision. Article 4, paragraph 2: Explains the rules and benefits of renewable energy resources. Article 20, paragraphs 2, 4, and 5: Describes the provision of renewable energy. Article 21, paragraphs 2 and 3: Explains the use of renewable energy. Article 29, paragraph 2, concerning research and development of renewable energy. Article 30, paragraph 3, concerning the financing of research and development of renewable energy. | In force |
| Law 30/2009 | Regulates the supply and utilization of electric power as well as electric power supporting businesses | Article 6, paragraph 2 concerning the utilization of primary energy sources must be implemented by prioritizing renewable energy sources. | In force |
| Law 21/2014 | Regulate the utilization and development of geothermal energy | Article 3, letter b concerning increasing the use of geothermal energy as Renewable Energy. | In force |

Table 1 shows that renewable Energy is slightly mentioned in Law 30/2007, namely the law regulating Energy. Energy referred to in this law is all Energy, both in the form of fossil and non-fossil. Renewable Energy is mentioned in several articles in this law, namely Article 1, Article 4, Article 20, Article 21, Article 29, and Article 30. The parts that are regulated are the concepts or general provisions of renewable energy. Regulations and benefits of renewable energy resources, renewable energy utilization, research and development of renewable energy, and financing of research and development of renewable energy. This law has a total of 34 articles with 121 paragraphs and points.

The following law that regulates the use of renewable Energy is Law 30/2009 on Electricity. In this law, renewable Energy is stated in Article 6 (2) that the use of primary energy resources aims to ensure the supply of sustainable electricity by prioritizing new energy sources and renewable energy. This law has 58 articles with approximately 121 paragraphs and points. At the same time, the last law that regulates renewable Energy in its article is Law 21/2014 on Geothermal. Article 3 (b) states that renewable Energy in geothermal aims to meet national energy needs. This law has 88 articles with approximately 128 paragraphs and points.

This condition certainly shows that existing regulations at the policy level still do not fully regulate the utilization and management of renewable energy. Of the three previously mentioned laws, only eight articles and 14 paragraphs or points mention Renewable Energy. If in total, three laws have 170 articles with approximately 370 paragraphs and points. This means that only 4.71% of the articles mention renewable Energy, and 3.78% of articles and items mention Renewable Energy. The three laws are still in effect.
Table 2. Indonesia's renewable energy policy instruments at the central/national level are in the form of government regulations.

| Policy | Description and Instrument Used | Regulating Renewable Energy | Status   |
|--------|---------------------------------|----------------------------|----------|
| Government Regulation 14/2012 | Regulate the business activities of providing electricity | Article 25, paragraph 4 letter b concerning the purchase of electricity using Renewable Energy | Changed |
| Government Regulation 23/2014 | Replaces Government Regulation 14/2012 | Article 25 paragraph 4 letter a concerning the purchase of electricity using renewable energy can be done by direct appointment. Article 1 points 4, 5, 6, and 7 regulate the general provisions of renewable energy, which refer to Law 30/2007 Article 9 point f-number 1 regulates the target of the primary Article 10, paragraph 2, letter a concerning increased exploration of renewable energy resources, potentials, and reserves. Article 11, paragraph 2 letter a concerning maximizing the use of Renewable Energy by considering the economic level. Article 12, paragraph 1, letters a, b, c, d, e, i, and j concerning the distribution of renewable energy utilization. Article 18, paragraph 2, letter a concerning the acceleration of the provision and utilization of renewable energy sources in the framework of energy conservation. Article 20 paragraphs 2 and 5 concerning the price of renewable energy. Article 21, paragraph 2 letter b concerning renewable energy price subsidies. Article 22 paragraphs 1, 2, and 3 concerning incentives for developing, exploiting, and utilizing renewable energy. Article 23 paragraph 2 letter d and Article 24 paragraph 2 letter b concerning renewable Energy supporting infrastructure development. Article 27 paragraph 5 letter a and paragraph 6 concerning strengthening funding by national banks in developing renewable Energy | In force |
| Government Regulation 79/2014 | Regulates the national energy policy, which contains the development, management, and utilization of Energy | Article 1 points 4, 5, 6, and 7 regulate the general provisions of renewable energy, which refer to Law 30/2007 Article 9 point f-number 1 regulates the target of the primary Article 10, paragraph 2, letter a concerning increased exploration of renewable energy resources, potentials, and reserves. Article 11, paragraph 2 letter a concerning maximizing the use of Renewable Energy by considering the economic level. Article 12, paragraph 1, letters a, b, c, d, e, i, and j concerning the distribution of renewable energy utilization. Article 18, paragraph 2, letter a concerning the acceleration of the provision and utilization of renewable energy sources in the framework of energy conservation. Article 20 paragraphs 2 and 5 concerning the price of renewable energy. Article 21, paragraph 2 letter b concerning renewable energy price subsidies. Article 22 paragraphs 1, 2, and 3 concerning incentives for developing, exploiting, and utilizing renewable energy. Article 23 paragraph 2 letter d and Article 24 paragraph 2 letter b concerning renewable Energy supporting infrastructure development. Article 27 paragraph 5 letter a and paragraph 6 concerning strengthening funding by national banks in developing renewable Energy | In force |

Furthermore, regulations that are hierarchically under the law are Government Regulations. At the level of this legislation, three policies mention renewable Energy, with 2 (two) still valid. The first is Government Regulation 14/2012 concerning Electricity Supply Business Activities. Renewable Energy is mentioned in Article 25 (4) letter b, about purchasing electricity from Renewable Energy. However, now this regulation is no longer valid and replaced by Government Regulation 23/2014. In this regulation, renewable Energy is mentioned in Article 25 (4) letter a, namely the purchase of electricity.
using renewable energy can be made by direct appointment. This Government Regulation has 55 articles with approximately 154 paragraphs and points.

The last Government Regulation that touches on renewable energy in its contents is Government Regulation 79/2014 on National Energy Policy. 11 articles with 16 paragraphs and points regulate renewable energy (see table 2) for more details. This regulation itself has 33 articles with approximately 97 paragraphs and points in it. In total, of the two government regulations that are still in effect, there are 12 articles and approximately 251 paragraphs and points. This means that renewable energy is only found in 4.78% of the articles and approximately 6.38% of the two regulations' paragraphs and items.

Table 3. Indonesia's renewable energy policy instrument at the central/national level is in the form of a presidential regulation.

| Policy                  | Description and Instrument Used                                                                 | Regulating Renewable Energy                                                                 | Status            |
|-------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------|
| Presidential Regulation 4/2016 | Regulate the acceleration of electricity infrastructure development                           | Chapter III on the provision of primary energy for electricity and the use of renewable energy (Articles 13 and 14). | Changed          |
| Presidential Regulation 14/2017 | Replaces Presidential Regulation 4/2016 concerning the acceleration of electricity infrastructure development | There are no changes with Presidential Regulation 4/2016                                   | In force          |
| Presidential Regulation 22/2017 | Regulate the general national energy plan                                                      | The article in this regulation does not explain renewable energy, but this regulation is one of the references in developing renewable energy until 2050. An explanation of that is in the appendix to the regulation. | In force          |

The following policy instrument is the Presidential Regulation. There are 3 Presidential Regulations that mention renewable energy, namely Presidential Regulation 4/2016 concerning the acceleration of electricity infrastructure development, Presidential Regulation 14/2017, which replaces Presidential Regulation 4/2017, and Presidential Regulation 22/2017 concerning Regional Energy General Plans. In Presidential Regulation 4/2016, which was replaced by Presidential Regulation 14/2017, renewable energy is discussed in Chapter III Articles 13 and 14. While Presidential Regulation 14/2017 discusses the General National Energy Plan. This presidential regulation in its articles does not explain renewable energy, but it becomes a benchmark for national energy development in increasing the energy mix derived from renewable energy. This regulation is also crucial in the constellation of national energy policies because it becomes a reference in making general regional energy plans.

Existing national regulations show that policies regarding renewable energy are still pervasive in many policies. The policy portion is also limited and is only “tucked in” between policies concerning Energy and electricity in general. With the strategic role of renewable energy in the future, it is necessary to have a policy regulating renewable energy governance to develop and become the primary energy source. Next, we will discuss integrating these policies at the national level into policies at the regional level in the form of Regional Regulations concerning the General Plan of Regional Energy, especially those related to renewable energy.

3.2. Integration of national and regional energy policies

Law 30/2007 in Article 17 and Article 18 requires the central and regional governments to formulate policies on the general national energy plan and regional general energy plan to ensure integration in
energy development at the central and regional levels. The national energy plan is the central government's policy regarding the national-level energy management plan, which is the elaboration and implementation plan of the cross-sectoral National Energy Policy to achieve the national energy policy targets. Meanwhile, the regional general energy plan is the provincial government's policy regarding the provincial level energy management plan, which is the elaboration and implementation plan of the cross-sectoral national energy general plan to achieve the targets of the national energy general plan.

Furthermore, the general national energy plan was ratified in Presidential Regulation 22/2017, while the regional energy general plan was ratified in regional regulation. So far, 20 provinces have regional regulations governing the general regional energy plan. This general national and regional energy plan is prepared for a period of up to 2050, which serves as a reference for the preparation of central development planning and regional development planning documents; preparation of the National Electricity General Plan (RUKN) and the Electricity Supply Business Plan (RUPTL); and Preparation of the State Revenue and Expenditure Budget (APBN)/Regional Revenue and Expenditure Budget (APBD) by state ministries/non-ministerial government agencies and Regional Governments and their implementation.

In addition, this General Plan of National and Regional Energy also functions as a guideline for State Ministries/non-ministerial government agencies to prepare strategic plan documents; Ministries and Local Governments to implement cross-sectoral energy planning coordination, and the public to participate in the implementation of national development in the energy sector. The Energy Policy, the National Energy General Plan, and the Regional Energy General Plan can be seen in Figure 1 below.

![Figure 1. Position between energy Policy, NEGP, and REGP-P.](image)

**Description:**
- **NEGP**: National Energy General Plan
- **SMP**: Sectoral Master Plan
- **RWP**: Regional Work Plan
- **GWP**: Government Work Plan
- **NMTDP**: National Master Development Plan
- **SP of M/A**: Strategic Plan of M/A
- **WP of M/A**: Work Plan of M/A
- **BWP**: Business Work Plan
- **BWP-M/A**: Business Work Plan of M/A
- **BWP-LGA**: Business Work Plan of LGA
- **Pres. Reg. No. 22/2017**: Presidential Regulation No. 22/2017
- **Gov. Reg. No. 79/2004**: Government Regulation No. 79/2004
- **Gov. Reg. No. 1/2014**: Government Regulation No. 1/2014
- **Pres. Reg. No. 2/2017**: Presidential Regulation No. 2/2017
- **Adjusted through Musrenbangnas**: Adjusted through Regional General Assembly

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SP of M/A : Strategic Plan of Ministry/Agency
WP of MA : Work Plan of Ministry/Agency
REGP-P : Regional Energy General Plan – Province
NLTDP : National Long-Term Development Plan
RMTDP : Regional Medium-Term Development Plan
NMTDP : National Medium-Term Development Plan
BWP-LGA : Budget Work Plan – Local Government Agency
BWP-M/A : Budget Work Plan – Ministry / Agency

Figure 1 shows the strategic position of Presidential Regulation 22/2017 on the General National Energy Plan. Because this policy is a link between energy policy at the national level and energy policy at the regional level. Especially in renewable Energy, this policy is a guide in increasing the national and regional energy mix. Therefore, with the issuance of this regulation, regions are also required to have energy development plans.

When this article was written, not all provinces in Indonesia had regional regulations on general regional energy plans, but only 20 provinces had them. The twenty provinces are; Central Java, West Java, West Nusa Tenggara, North Kalimantan, East Java, Lampung, Bengkulu, Central Sulawesi, Gorontalo, East Nusa Tenggara, East Kalimantan, Jambi, Aceh, Bangka Belitung Islands, West Sumatra, South Kalimantan, Yogyakarta, South Sumatra, Bali and West Sulawesi.

3.3. Regional renewable energy mix target
One of the regional regulation stipulations essential is the plan to increase the regional renewable energy mix. Increasing the renewable energy mix in the regions aims to achieve the national renewable energy mix target. The rules regarding increasing the energy mix have previously been set in Government Regulation 79/2014 and Presidential Regulation 22/2017. The two regulations set a target for the renewable energy mix of 23% in 2025 and 31% in 2050. More details on the target for the renewable energy mix can be seen in table 4.

Table 4. Provincial energy mix target.

| Province              | Regional Regulation | Validation      | Starting Point (%) | Mixed Target (%) | 2025 | 2050 |
|-----------------------|---------------------|-----------------|-------------------|-----------------|------|------|
| Central Java          | 12/2018             | 19/12/2018      | 8.88              | 21.32           | 28.82|
| West Java             | 2/2019              | 14/1/2019       | 10                | 22.94           | 20.13|
| West Nusa Tenggara   | 3/2019              | 9/5/2019        | -                 | 23              | 31.2 |
| North Kalimantan      | 3/2019              | 22/7/2019       | 19.6              | 55.95           | 76.55|
| East Java             | 6/2019              | 7/8/2019        | -                 | 17.09           | 19.56|
| Lampung               | 9/2019              | 18/9/2019       | 11                | 36              | 47   |
| Bengkulu              | 7/2019              | 14/10/2019      | 37                | 37              | 52   |
| Central Sulawesi      | 10/2019             | 16/10/2019      | 15.62             | 30.51           | 42.09|
| Gorontalo             | 7/2019              | 29/7/2019       | 1                 | 15.4            | 37.9 |
| East Nusa Tenggara   | 10/2019             | 15/10/2019      | 0.12              | 24              | 39   |
| East Kalimantan       | 8/2019              | 6/11/2019       | 3.13              | 12.39           | 28.72|
| Jambi                 | 13/2019             | 18/10/2019      | 7.46              | 24              | 40   |
| Aceh                  | 4/2019              | 18/10/2019      | -                 | 33.9            | 43.3 |
| Bangka Belitung       | 3/2019              | 11/11/2019      | 2.87              | 17.21           | 30.97|
| West Sumatra          | 11/2019             | 25/11/2019      | 19.6              | 51.7            | 70.9 |
| South Kalimantan      | 1/2020              | 9/1/2020        | 6.33              | 19.6            | 24.7 |
| Yogyakarta            | 6/2020              | 3/8/2020        | 17 (Fuel)         | 9 (Fuel)        | 15 (Fuel) |
|                       |                     |                 | 1.18              | 2.52            | 2.16 (electricity) |


| Province    | Regional Regulation | Validation       | Starting Point (%) | Mixed Target (%) |
|-------------|---------------------|------------------|-------------------|------------------|
| South Sumatra | 4/2020              | 24/7/2020        | 3.01              | 21.06 22.56      |
| Bali        | 9/2020              | 28/9/2020        | 0.27              | 11.15 20.10      |
| West Sulawesi | 2/2021              | 7/1/2021         | 11.3              | 46 65            |

Of the twenty provinces that have prepared a general regional energy plan, only ten provinces have their energy mix targets in 2025 and 2015 above the national energy mix targets, namely West Nusa Tenggara and North Kalimantan Lampung, Bengkulu, Central Sulawesi, Gorontalo, East Nusa Tenggara, Jambi, Aceh, West Sumatra, and West Sulawesi. Meanwhile, the other ten provinces set a target for the renewable energy mix below the national target. This condition certainly illustrates implicitly and explicitly how Indonesia’s renewable energy development in the future. With the existing policy instruments in the regions, not to mention the limited authority and budget (this relates to the authority of local governments as regulated in Law 23/2014 on regional government), regions that set a renewable energy mix target above the national target will also be quite challenging to meet the target.

Therefore, more systematic policy integration is needed to connect and support Indonesia's renewable energy development plan. Several studies, for example, show that the success of a policy depends on how well the policy is integrated with other policies, both within one sector and with others [21,22]. However, as a first step, we propose that the most urgent policy integration to be carried out at this time is the integration of policies in one renewable energy sector before later being supported by policies in other sectors outside of renewable energy.

4. Conclusion
In this article, we have explored policies on renewable Energy both at the national and regional levels. We see that there are insufficient legal instruments and renewable energy policies at the national level. The instrument is still fragmented into several policies with very minimal portions. In other words, a policy at the national level that specifically regulates renewable Energy is needed. Therefore, in this conclusion, we suggest that the government and the House of Representatives (DPR) need to immediately prepare a legal and policy instrument at the level of law on renewable Energy because the existing instruments do not have sufficient legal standing. As well as preparing derivative regulations from the law in the form of government regulations and presidential regulations to have one policy umbrella. In this case, regions must also integrate their regional regulations with existing policy instruments at the national level. So that with good integration of national and regional policies, it can accelerate the development of renewable energy in Indonesia, and the existing targets are not only ambitions written on paper.

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