

## **Decision Making Strategy In Regional Based New And Renewable Energy Governance Planning As A Supporter Of State Defense (East Nusa Tenggara Case Study)**

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### **Abstract**

The important role of energy in the country's economy causes the need for energy security, such as availability and ease of access. Limited fossil energy sources require diversification from the use of new and renewable energy sources (EBT). Therefore, the important role of energy in the economy is directly linked to the element of national security. The national defense sector, which has the duty and responsibility of maintaining regional sovereignty, requires energy to support national defense efforts. The reciprocal relationship between defense and energy shows the urgency of energy. In the area of Indonesia that is in energy use, when viewed from the level of electrification ratio, the province of East Nusa Tenggara (NTT) is the region with the lowest level. Energy supply support to support defense in the NTT region must be planned effectively, efficiently and sustainably. NTT has the potential for wind energy worth 10,130,000 MW and the potential for solar energy worth 9,930,000 MW. The potential needs to be managed through the right policy planning strategy. The formulation of targets, alternative engineering and evaluation of alternatives are needed in strategic planning so that the assessment of alternatives based on assumptions can fully identify the policy needs of the NTT region.

**Keywords:** Strategy, Planning, New and Renewable Energy, Defense.

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### **PENDAHULUAN**

Energy has an important role in a country's economy. Not only energy as an export commodity but energy is used as a driver in doing activities or making things. The economy is increasing, the energy use continues to grow (Boedoyo, 2012). Guaranteed energy availability to ensure the continued running of the economy becomes an important focus by every country. Energy derived from fossil energy sources or derived from new and renewable energy sources needs to be managed effectively and efficiently in order to realize equitable energy. There are limited resources for fossil energy, because it takes a long time in the process of formation, while the processed fossil energy still dominates the utilization of energy in Indonesia needs to be optimized.

The solution to the limitations of fossil energy is one of them by diversifying energy, namely the use of new and renewable energy (EBT). The most energy use is currently in the transportation sector. Fossil energy for transportation still dominates, although renewable energy for transportation has already begun to be marketed. Constraints on technology and market prices are obstacles to the use of renewable energy in the transportation sector.

Judging from the importance of energy to carry out activities, limitations of fossil resources and technological developments, it is also necessary to pay attention to the energy needs for the defense sector. The defense sector that has the duty and responsibility in safeguarding the sovereignty of the country needs assurance in the availability of energy supplies. The role of defense and energy has a reciprocal relationship, where defense requires energy to be able to maintain the sovereignty of the country in accordance with its main duties and functions, and energy requires defense to be able to maintain energy sources located in the sovereign territory. Border areas that are the focus of defense in performing basic tasks and functions require energy supply and there are several locations in the border area that have abundant strategic energy sources that need to be maintained. For example, East Nusa Tenggara (NTT) region, which when viewed from the electrification ratio is the province with the lowest electrification ratio rate in Indonesia. In fact, NTT is a province that is directly adjacent to the country of East Timor and there is the Masela Block, rich in gas energy sources that are prone to disputes. Energy supply support to support defense in ntt region must be planned effectively and efficiently and sustainably.

### **Planning Management**

In making a good planning should contain 6 (six) elements covering 5 W 1 H, namely:

1. What - What will be done? A detailed explanation of the activities to be carried out, what factors are needed to carry out the activity to achieve the objectives.
2. Why - Why is the activity done? A convincing explanation was made as to why the activity should be carried out with its objectives to be achieved.
3. Where - Where will it be carried out? In the planning there must be clarity of the location of the activities to be carried out, because it is related to the provision of infrastructure and equipment to do the work.
4. When - When is the work carried out? Time is made in the form of schedule of activities from the beginning to the end of the work.
5. Who - Who will work? The planning must be made provisions on personnel doing the work along with clarity of their authority and responsibilities.
6. How - How do I carry out the work? Made clear about the techniques, methods and systems used to carry out the intended work (Taufiqurokhman, 2008).

Based on some of the above understandings and explanations, it can be synthesized that planning management is the process of making future activity plans effectively and efficiently by using the resources owned and paying attention to the elements of 5W 1H (What, Why, Where, When, Who, How) in order to achieve the goals that have been set.

### **Decision-Making Strategy**

The strategy referred to here is a way or method to take an action in this case taking decisions made by a leader. Each day each individual makes a decision to determine what to do throughout the day even for some time to come. When doing so of course well thought out can even use a certain way or method. Similarly, in an organization, decision making made by a leader requires careful thinking, advice and input from staff or experts and using the right methods in order for the objectives to be achieved.

There are several traditions in decision making, Brinckloe (1977) said one of them is the System Analysis Flow. This school believes that each problem is in a system, then the system consists of several subsystems that

are as a whole into one interconnected entity and have an impact on each other. System analysis is a cycle of a series of activities as follows: 1) formulating goals (problems and opportunities); 2) engineer alternative systems to achieve these goals 3) evaluate alternatives taking into account effectiveness and cost 4) question all targets assuming their assumptions; 5) open new alternatives; 6) set new goals; and 7) repeat the above steps until satisfactory completion (Wijaya & Rifa'i, 2016).

Based on the above understanding and explanation, decision-making strategy is a method used by leaders to make decisions that are best in the interests of the organization to achieve its goals by analyzing existing systems and paying attention to future changes.

### **New and Renewable Energy Governance**

Indonesia as an island nation located in the equatorial region has abundant natural resources that can be used as new and renewable energy sources. Examples of new and renewable energy sources include solar energy, water energy, wind energy, and so on. In the face of the threat of availability or energy crisis, Indonesia has implemented several energy use policies. Through the National Energy Policy (Kebijakan Umum Nasional/KEN), the government plans energy management based on equitable, sustainable, and environmentally sound principles in order to create Energy Independence and National Energy Security. Energy Independence is guaranteed the availability of energy by utilizing as much potential as possible from domestic sources. Energy Security is a condition of guaranteed energy availability and public access to energy at an affordable price in the long term while paying attention to environmental protection. The intended energy management is in particular the management of energy resources that have not been done optimally to meet the energy needs in the country (Pemerintah Republik Indonesia, 2014). In achieving both, the government seeks the involvement of new and renewable energy to support the use of fossil energy so as to reduce its concentration level.

In KEN, there are 3 policies that are made to manage energy use, namely:

1. Energy Conservation

Encourage efficient and rational utilization of energy without reducing the use of energy that is absolutely necessary. Conservation can be done from the side of the plant with the beginning of an energy audit. Energy conservation can also be done by reducing the use of electricity that is consumptive, beautiful, and comfortable. Replacement of electrical equipment and time of use of electrical equipment can realize energy conservation.

2. Energy Diversification

Is an effort to vary the provision and utilization of various energy sources in order to optimize the provision of energy. In order to achieve the goal of energy diversification, changes are made to the use of energy from non-renewable energy to renewable energy, for example:

- a. Initiating efforts to replace fuel with Biodiesel.
- b. Encouraging the construction of micro hydro power plants in rural areas.
- c. Reducing the war on fuel generation and replacing it with non-fuel plants.

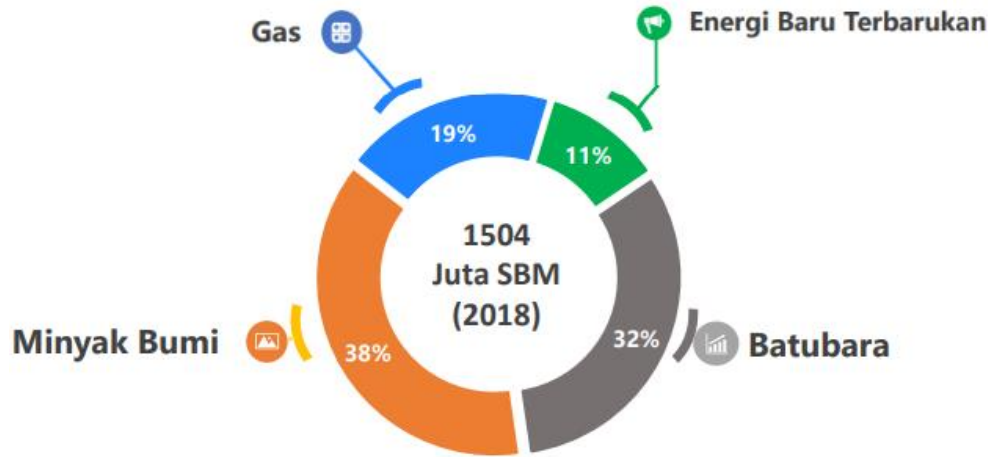
3. Intensification of Energy

By finding new energy sources in order to increase energy reserves to be used to generate electricity, especially in areas that are still lacking electricity (Lubis, 2007).

KEN in its implementation is cross-sectoral. KEN is also the basis for the preparation of the National Energy General Plan (Rencana Umum Energi Nasional/RUEN) and the National Electricity General Plan (Rencana Umum Ketenagalistrikan Nasional/RUKN). RUEN is stipulated Peraturan Presiden Nomor 22 Tahun 2017 concerning The National Energy General Plan. RUEN is a national energy management plan. As for the regional

(provincial) level, it is called the Regional Energy General Plan (Rencana Umum Energi Daerah/RUED). In general, RUEN explains the national energy management policies and strategies. In connection with ruen cross-sector, ruen becomes a guideline for ministries / institutions to draw up strategic plan documents, including with local governments and coordinate between sectors and involve the community to participate in the implementation of national development in the energy sector (Pemerintah Republik Indonesia, 2017).

Ruen explained that the utilization rate of EBT is still low while the potential of EBT is abundant. Based on the results of energy management in 2015, the utilization rate of EBT is only 5% when compared to fossil energy sources. The latest data from BPPT, the percentage of primary energy mix in 2018, EBT experienced growth to 11% as ebt role in the substitution of oil and gas share.



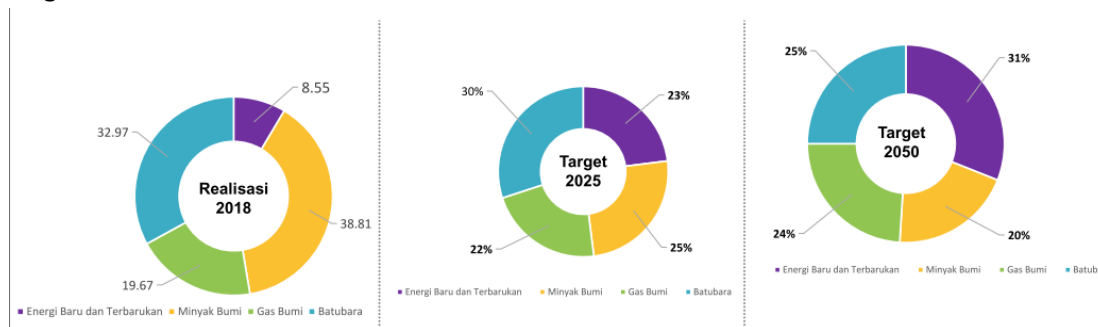
Picture 1. Primary Energy Mix 2018

Source: (BPPT, 2020)

The low level of utilization and development of EBT is caused by several things, including:

1. Regulations that have not been able to attract investment.
2. Land and spatial problems.
3. Not yet maximal implementation of price policy.
4. The licensing process is complicated and takes a long time.

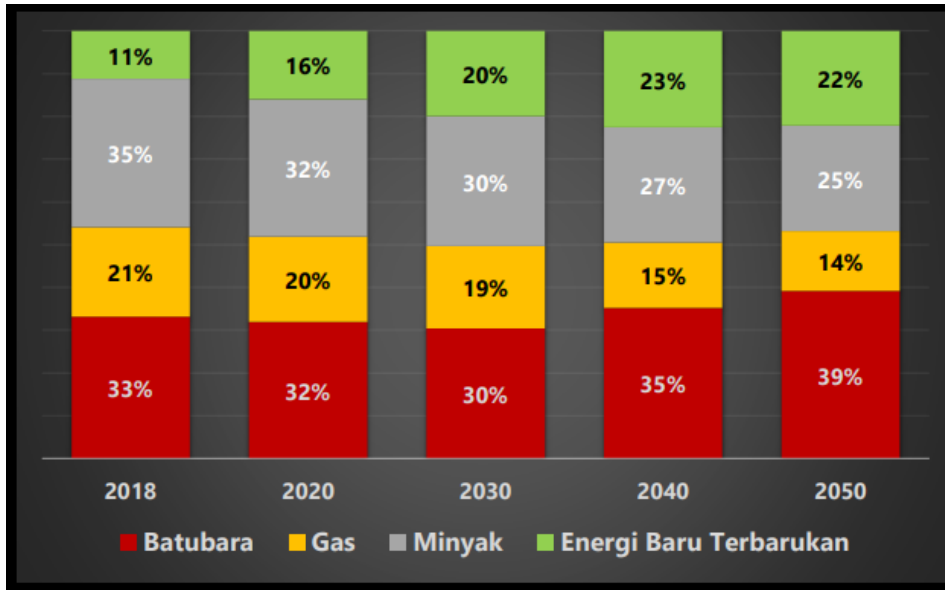
Therefore, ken mandated target of EBT in 2025 is 23% and in 2050 by 31% (RUEN, 2017). With the increase of targets on the EBT bolt, there will be a reduction in the use of oil. Here's a picture of energy-fusion targets until 2050.



**Picture 2. National Energy General Plan Target**

**Source: (DJEBTKE, 2019)**

Based on data processed by BPPT in Energy Outlook 2020, EBT has increased in the energy mix, as shown in Figure 1. But the projected energy mix until 2050 cannot reach the target previously made in ruen. Although the use of petroleum decreased with substitution to EBT, coal use increased. The projected data until 2050 can be seen in the image below.



**Picture 3. Primary Energy Mix Projection Until 2050**

**Source: (BPPT, 2020)**

In order to optimize ebt management, the government has previously had spatial regulation in which in spatial arrangements pay attention to the potential of natural resources so as to realize cohesion in their use by paying attention to human resources. The regulation is in the form of Undang-Undang Nomor 26 Tahun 2007 on Spatial Planning. The purpose of spatial planning is the existence of infrastructure and facilities for the public interest (Pemerintah Republik Indonesia, 2007).

**Defense Area Setup**

In carrying out article 22 paragraph (2) of Undang-Undang Nomor 3 Tahun 2002 on State Defense and article 17 paragraph (7) of Undang-Undang Nomor 26 Tahun 2007 on Spatial Planning, the government sets the policy of Peraturan Pemerintah Nomor 68 Tahun 2014 on The Arrangement of State Defense Areas. The arrangement of defense areas is the determination of defense areas based on a process of planning defense areas, utilization of defense areas, and control of the utilization of defense areas. The arrangement of the defense area is governed by the Defense Area Plan (Rencana Wilayah Pertahanan/RWP). The defense area is set to pay attention to the interests of the region and the functions of defense. Areas in question include:

1. Military bases or kesatrian;

2. Military training areas;
3. Military installations;
4. Military equipment and weaponry test areas;
5. Explosive and other hazardous goods storage areas;
6. Areas of disposal of ammunition and other hazardous defense equipment;
7. Strategic national vital objects; and/or
8. The importance of air defense.

Through this regulation, the Defense sector as an energy user can participate in supporting energy management. And through Undang-Undang Nomor 23 Tahun 2019 on National Resource Management which explains the management of key components, spare components, and supporting components. Energy (natural and artificial resources) fall into the category of spare components and supporting components (Pemerintah Republik Indonesia, 2019).

## **RESEARCH METHODS**

This study was created using an estimation approach or estimation method is an approach to estimate a value using existing values or can be a sample. Merging complex data can bring up trends or patterns used to estimate a value. The purpose of using the estimation method is to predict future events using assumed current state data. This method is used when planning a work program or when setting a decision-making strategy. Reliability in conducting analysis is the main key in making estimates. According to Chase, 2000 in Satyarini, 2007 there are two reasons for the need for an estimation approach, namely as a tool of controlling good inventory management requires future planning, where future planning requires good forecasting. Where the need for future planning will be good if the raw material manager wants the company's operations to run smoothly, prepare market conditions in the future, and to minimize problems in the provision of raw materials; and in order to predict the future with the same level of accuracy.

There are 3 models in the estimation method, among them:

1. The extrapolation model is the most conservative prediction method, using historical performance as the basis, to indicate the future direction. The assumption that the value has prevailed will not change.
2. The projection model predicts a variety of possible future possibilities based on the assumption that the values that have prevailed in the past will change.
3. The forecasting or forecasting model is to determine the future of the alternative target, not just the most likely future. Forecasting is able to formulate alternative futures and scenarios that are most likely to occur in the future (UNHAN RI, 2021).

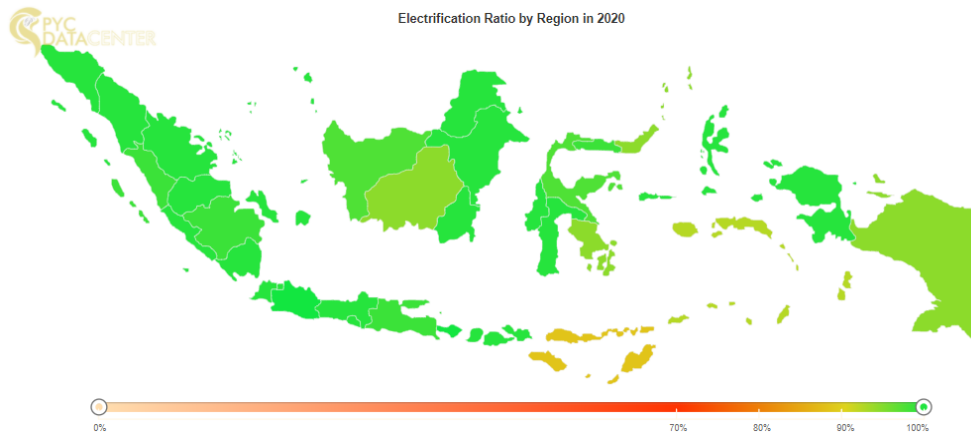
Analysis of the strategic environment using estimation methods by looking at the current condition of Indonesia's picture and future targets, with the approach of forecasting models with the aim of providing several alternatives based on assumptions or future scenarios. Therefore, decisions can be chosen and taken in relation to Indonesia's future needs in terms of energy support to defense in NTT.

## **ANALYSIS AND DISCUSSION**

### **Energy Support Conditions for Defense in NTT**

As an energy user, the defense sector needs energy support in conducting operational activities. The use of energy for defense is grouped by 3 functions, namely for combat vehicles (kendaraan tempur/ranpur), tactical vehicles (kendaraan taktis/rantis), and military bases. The use of energy in the defense sector for combat vehicles and tactical vehicles is still dominated by fossil fuels(BBM), while for military bases use electricity from PLN. Constraints on technology, where fuel is currently still unable to adjust to the engine of the vehicle, especially in combat vehicles. This is an obstacle for rantis and ranpur to be able to switch to using EBT. As for military bases can use EBT to support operational activities.

Judging from the electricity needs in East Nusa Tenggara, it has challenges in meeting its needs. based on 2020 data, the electrification ratio of East Nusa Tenggara (NTT) is at the lowest level in Indonesia, with a percentage of 88%. Here is a map of the electrification ratio in Indonesia.



**Picture 4. 2020 Electrification Ratio in Indonesia**

**Source: (Purnomo Yusgiantoro Center, 2021)**

Constraints experienced in the expansion of electricity in the NTT region are limited financing/economic capabilities of rural communities and the need for sustainable access to electrical energy for rural communities (PT PLN (PERSERO), 2019). What is meant is not only fixated on the percentage level of the electrification ratio, but needs to be increased on the level of electricity consumption per capita.

Energy management in the defense sector can assist in achieving the target of the NRE mix, in addition to providing access to electricity for villages around military bases can drive the wheels of the surrounding economy, which ultimately has an impact on the national economy. The obstacle currently occurring in NTT in terms of providing access to electricity is the lack of interest from investors because they consider the location to be uneconomical, in addition to regulations from the government such as incentives that are less attractive so that investors are less ogled by investors. Defense can play a role through strategic plans (renstra) made for electricity programs at military bases. In addition, the NTT area which is directly adjacent to foreign countries and has national vital objects in the Masela Block can also support TNI operational activities there.

#### **Decision Making Strategy in NRE Planning in NTT**

Decision making in NTT planning in NTT needs to be prepared by conducting a system analysis through the following stages:

1. Target formulation

In this study, the target to be achieved in decision making is the formulation of the most effective and efficient and sustainable EBT Planning in NTT.

2. Engineering alternative systems

In connection with the targets that have been determined, several alternatives are made for the manufacture of EBT-based power plants by taking into account the potential that exists in NTT.

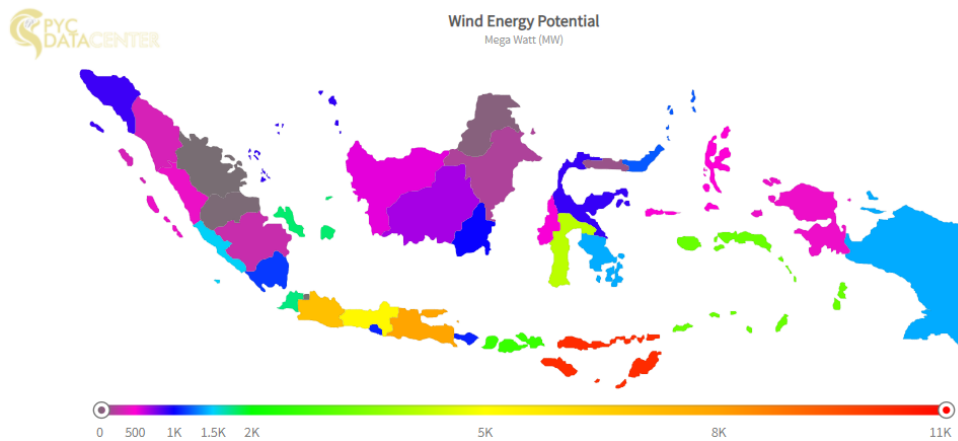
a. Alternative 1, Wind Power Plant (PLTB)

b. Alternative 2, Solar Power Plant (PLTS)

3. Evaluation of alternatives

a. Evaluation of PLTB construction

Judging from the energy potential in NTT, based on data from the PYC Data Center, the potential for wind energy in the NTT region is the highest in Indonesia, which is worth 10,190,000 MW. The following is an image of a map of the potential for wind energy in Indonesia.



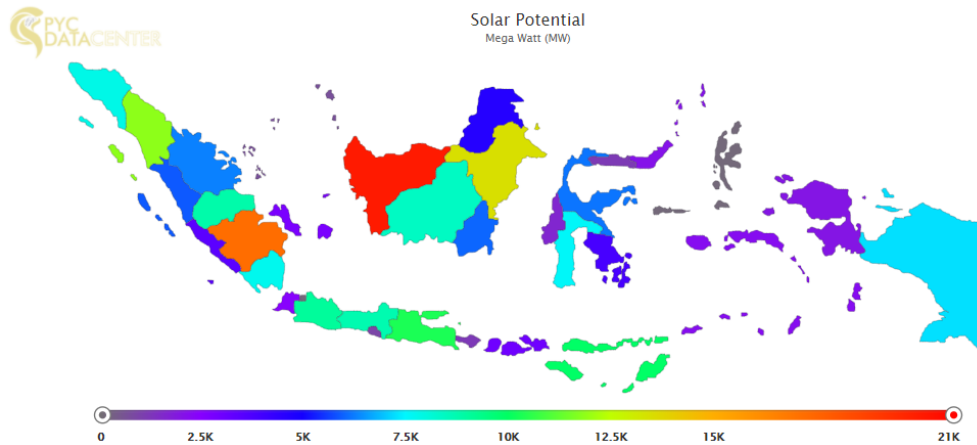
Picture 5. Wind Energy Potential Map in Indonesia

Source: (Purnomo Yusgiantoro Center, 2021)

b. Evaluation of the manufacture of PLTS

Judging from the energy potential in NTT, based on data processed by the PYC Data Center, the potential for solar energy in the NTT region is 9,930,000 MW. The potential of solar energy is not greater than the potential of wind energy. The manufacture of PLTS is more technologically friendly and can be applied to military bases such as PLTS Roof, the use of PLTS Communal can also be a reference. The following is an image of a map of the potential for solar energy in Indonesia.





Picture 6. Potential of Solar Energy Map in Indonesia

Source: (Purnomo Yusgiantoro Center, 2021)

#### 4. Questioning the target with its assumptions

In this section, further investigation is carried out regarding the possibility of achieving the target or not with the assumptions that will occur in the future. This is done with Estimative Methodology, namely making estimates of things that will happen or will be faced in the future based on estimates. Seeing the potential of the two alternatives and considering the cost of maintenance and sustainability, making PLTS is more likely to be done.

#### 5. Unlock new alternatives

This can be done if the alternatives that have been made in the beginning do not meet the requirements and when needed.

#### 6. Setting new goals

New goals are needed as a guide in the future in making further plans.

#### 7. Repeat the steps above until a satisfactory solution.

This activity is carried out when the evaluation shows that the results of the implementation have not been able to meet the targets optimally.

Access to electricity owned by the military base, which comes from PLT EBT, can be distributed or provided for residents around the base, especially those in border areas. This will have an intangible impact in terms of protecting the border area.

## SUMMARY

Based on the research that has been done, the following conclusions can be drawn:

1. The condition of energy supply in NTT, especially electrical energy, is still low, as evidenced by the data on the electrification ratio where NTT is in the lowest rank of 88%. The low level of electricity in NTT has an impact on the defense sector, where NTT is in an area directly adjacent to those that require access to electricity for operations.
2. The decision-making strategy in NTT planning in NTT requires system analysis through stages, namely the formulation of targets; Engineering alternative systems; Evaluation of alternatives; Question all goals

with their assumptions; Unlock new alternatives; Setting new goals; Repeat the steps above until a satisfactory solution is reached.

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