The attitude of local government officers toward renewable energy in Indonesia

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Abstract. One of the causes of climate change is the use of fossil fuels. therefore, this triggers efforts to use renewable energy as a substitute fuel. According to REN21 data the development of renewable energy has declined from 2011-2016 along with the world's energy needs. This issue is triggered, one of which is the policymaking of budget policies from several countries in the world, including in Indonesia. In this context, policy and government are the main components of implementing renewable energy. Therefore, the government's attitude towards renewable energy plays an important role in the success of developing renewable energy. We conducted a survey to explore the attitude of the local government to the potential of renewable energy in Indonesia which has the potential to vary from each region. One area may have more renewable energy potential than the other. The results of this quantitative study are expected to help national policies on the development of renewable energy not only in Indonesia, but also in other countries where the diversity of opportunities spread throughout the region.

1. Introduction
Presently, the impact of human activities is so significant on the geological and ecosystems of the earth, thereby, affecting climate change [1–4]. This phenomenon is better known as global warming. The use of fossil resources has led to serious ecological crisis such as climate change due to humans neglect on the adverse effects of these substances. [5].

However, various efforts have been carried out to tackle this adverse climate change including international agreements such as the Kyoto protocol and global energy management proposals and community-based adaptation measures [6]. Unfortunately, these actions have proven to be less efficient in overcoming the problem. This is evident from the accumulation of atmospheric emissions of CO₂ [7] which was one of the consequences of the increasing use of fossil fuels.

The average use of petroleum across the globe is 32.6%, while coal is 23.7%. [8] This consumption of fossil fuel cannot be overlooked due to its diminishing availability. According to the 2016 Energy Outlook data, petroleum will run out in 12 years, natural gas in 37 years, while coal has the longest timeframe of 70 years. Therefore, in the next couple of decades, fossil energy will go extinct, and this is a major concern to every country in the world. The estimated time for it to disappear has led into the invention and use of renewable energy resources.
Indonesia is a country rich in renewable energy resources, however, there are several obstacles associated with it such as technological and financing problems. The use of technology is due to the inability of human resources in development. There are still limited number of experts on renewable energy, leading to the use of experienced foreign workers. The second problem is that of finance, which is attributed to inability to agree with the political budget by the conservation business sector. Although a budget exists for energy, a greater percentage is commonly used to build oil and gas infrastructures. The government needs to immediately implement a fuel diversification program such as gas fuel in the transportation sector and additional renewable energy such as bio solar.

Furthermore, the renewable energy mix is targeted to be 25% by 2025 (National Energy Agency, 2018). However, it is currently at 6% [10]. This has also been stated in the Presidential Decree of the Republic of Indonesia Number 5 Year 2006 Paragraph 2. In March 2017, the government announced an effort to develop renewable energy by introducing RUEN (National Energy Bill Draft) to all regions. It is also expected that all regions have a RUED (Regional Energy Bill). During a data update in March 2018, there were only 3 provinces that complemented the RUED these include Central Java, Jakarta and West Nusa Tenggara.

1.1. Ngawi Regency as a case study
Ngawi Regency is located in the western region of East Java Province and directly adjacent to Central Java Province. It covers an area of 1,298.58 km2 and geographically located at 110 o10' - 111 o40' East Longitude and 7 o21' - 7 o 31' South Latitude, with 39 percent or around 504.76 km2 in the form of paddy fields. In accordance with its Regional Regulation (Perda) in 2004, the region was administratively divided into 19 sub-districts and 217 villages, with 4 of the villages. This area comprises of large water energy sources, livestock and forestry such as biogas, micro hydro, and biomass which can be used as a source of renewable energy. Figure 1 and Figure 2 show data about the potential for renewable energy in the Ngawi area.

**Figure 1.** Biogas potential from cow manure [11].

| No | Sub-District | Number of cows |
|----|--------------|----------------|
| 1. | Karangtengah Prandon | 30 |
| 2. | Setono | 15 |

**Figure 2.** Potential of debit based water power [11].
The renewable energy for biogas and hydropower has been officially registered, while that of the forestry sector which can be utilized as a biomass energy source has not been mapped. The forest region is 44,995 Ha with 2,992 Ha protected and 42,003 Ha used for production [12].

This regional government consists of 15 Government Offices, and in previous studies its policies plays an important role in the development of renewable energy. Therefore, this research aims at determining the attitude of the regional government towards renewable energy.

The benefit includes adding knowledge on the potential of renewable energy by the formulation of regional policies comprising of RUED and Regional Regulation on ESDM. This research was also the first to be conducted in Indonesia, therefore it is expected to be a reference for future studies thereby, making the data a national scale guideline.

2. Method
This research was conducted in Ngawi District, East Java Province from November 2018 to April 2019 with the agencies related to local government such as DPRD utilized. This study emphasizes the nonchalant attitudes of the Indonesian regional officials in Ngawi District to renewable energy, using a quantitative approach. Quantitative research uses scientific methods with criteria such as fact-based, free from prejudice, using principles of analysis, hypotheses, objective measures and quantitative data.

The descriptive research technique was used to solve the problems associated with the research. This is carried out to determine the value of the independent variables, without making comparisons. This research was conducted to describe the knowledge, perceptions, and attitudes of Indonesian regional officials in Ngawi District on renewable energy.

The regional officials and related government agencies in Ngawi Regency were the data sources utilized in this research. It comprises of a total of 25 people who were legislative office holders from 2014-2019 and echelon I and II officials from 2017-2018.

The variables of this study are attitudes, which are either accepted or rejected. There are 5 questions with the available answers from the Likert Scale namely: (1) Strongly Agree, (2) Agree, (3) Doubt, (4) Strongly Disagree, and (5) Disagree. [13]

3. Results and discussion
The total amount of data collected is 50 (N = 50) completed questionnaires. Respondents were qualified according to age in the following form 15 aged 30-39 years, 14 aged 50 years and over, 12 aged 40-49 years, and 9 aged 20-29 years. In terms of gender, 36% of men and 14% of women, had were educated with 26% in S2 and 24% in S1, indeed the difference is not huge. SPSS 24.0 is used for data analysis. Descriptive statistics and non-parametric tests were used to find the differences between research variables.

3.1. Attitude of regional officials against renewable energy
In this section the personal attitudes of regional officials towards the development of renewable energy is examined. Table 1 shows the frequency of responses to five statements with local officials showing a positive attitude towards renewable energy. More than 70% of them strongly agree or agree to pay more to receive clean energy at home and work and also volunteered to raise awareness for the benefit of the community RE (items 1 and 2).

A total of 93% regional officials strongly agreed to install solar water heaters (SWH) at home. This is mainly due to the fact that the application of SWH is simple and widely used. The community recognizes the benefits of SWH compared to electric heaters for example, 92% of regional officials strongly agree to drive electric cars. Although one third of the regional officials did not show interest in RE, majority were keen.
Table 1. Results of attitude assessment.

| Attitudes Statements                                           | Strongly agree (%) | Agree (%) | Not sure (%) | Disagree (%) | Strongly disagree (%) | Mode     |
|----------------------------------------------------------------|-------------------|-----------|--------------|--------------|-----------------------|----------|
| I am willing to pay more to receive clean energy at my home   | 13,33             | 60        | -            | 26,67        | -                     | Agree    |
| I would like to work voluntarily to raise public awareness of renewable energy | 20                | 53,33     | 26,67        | -            | -                     | Agree    |
| I would like to install a solar water heater at my home        | 26,67             | 66,67     | 6,67         | -            | -                     | Agree    |
| In future, I would like to drive a car that runs by electricity instead of gasoline | 46,67             | 46,67     | 6,67         | -            | -                     | A half S. Agree and Agree |
| Renewable energy is, indeed, not of my interest               | -                 | 33,33     | 13,3         | 26,67        | 26,67                 | Disagree |

The Mann-Whitney and Kruskal Wallis tests were used to uncover important statistical differences. Furthermore, significant differences between the sexes were found in willingness to install SWH at home (item 3), where female regional officials showed higher scores ($z = -2.325, p < 0.05$) compared to their counterpart. The results also show that regional officials with postgraduate degrees (Masters and PhD) were more willing to install SWH (item 3) with ($z = -2.484, p < 0.05$).

The age of participating regional officials did not have a significant effect on their attitude towards RE. The amount of teaching experience and education in regional officials also had no significant effect on attitudes towards RE. Overall, female regional officials have a slightly more positive attitude, although it is not statistically significant for most of the proposed statements.

4. Conclusions
The installation of renewable energy in the homes of government officials will positively influence their surrounding environment. This helps in the proper development of renewable energies. However, many regional officials do not want to learn about renewable energy, therefore, there is adequate need for the government to employ experts so as to provide knowledge to the government and society. The lack of experts on RE in this context will hinder too in drafting the RUED and the Regional Regulation.

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