



The 5th Sustainable Future for Human Security (Sustain 2014)

## Alleviating energy poverty as Indonesian development policy inputs post-2015: improving small and medium scale energy development

Dewa Ayu Putu Eva Wishanti\*

*\*Lecturer, International Relations Department at Brawijaya University, Jalan Veteran, Malang, East Java, 65145, Indonesia*

---

### Abstract

Energy security is positioned during the 21<sup>st</sup> century as one of the worldwide development policy focal points, mainly The Millennium Development Goals, which timeline ends in 2015. Despite its rich energy resources, Indonesia has failed to provide equal access to energy as a mean to eradicate poverty. This implicates on the widening national developmental gaps among provinces, namely the agriculture and industrial sectors, the two of major sectors to provide the largest employment percentage in the country. Otherwise, the government still struggles to enforce the renewable energy policies into practices, and the policies of exporting oil and coal are still dominant as the major income of the country. It results in energy poverty when many poor Indonesian people have very limited access to energy. This article seeks to measure the Indonesian government concern upon energy crisis and its impact on poverty eradication, by focusing on the gaps of energy access as the main indicator to measure energy poverty in Indonesia. By utilizing the national gap analysis, this article urges the needs of investment in small-scale energy development. The investment may collaborate the role of government energy policies with the international private sectors to perform technology proliferation and access. This article also proposes the small-scale energy development as a focus of post-2015 development agenda.

© 2015 The Authors. Published by Elsevier B.V This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).  
Peer-review under responsibility of Sustain Society

*Keywords:* energy security, energy poverty, Indonesia, development policy, post-MDGs

---

---

\* Corresponding author. Tel.: +62-8788-8639-308;  
E-mail address: [e.wishanti@ub.ac.id](mailto:e.wishanti@ub.ac.id)

## 1. Introduction

Energy poverty presents as a concept of the lack of access to basic energy source for simple cooking and heating in household level [1]. Many underprivileged Indonesians are still using firewood and kerosene for their daily activities. According to the World Bank, Indonesia stands as the world's largest exporter of coal by weight, and was the eighth largest exporter of natural gas in 2011. By contrast, the country also has approximately 130 million people who rely on wood and biomass cook stoves. Indonesia is in a great dependence to fossil-fuel to establish and run its national economic activities. The export of raw oil, coal, and other minerals are the nation's major revenue. Indonesia projects itself to become a more industrialized country, meanwhile poverty and lack of renewable energy development are present as obstacles to the goal.

The United Nations (UN) has been campaigning on Sustainable Energy for All which aimed at three goals: universal access to modern energy services, reducing global energy intensity by 40 per cent, and increasing renewable energy globally to 30 per cent of total primary energy supply. These actions urge collaboration among governments, companies, and civil society [2]. By 2015, the Millennium Development Goals (MDGs) Agenda will reach its end, with less specific targets on increasing the access to basic energy source for the people.

Indonesia has contributed to upbrining the energy issues internationally as a policy input to post-MDGs national development agenda, which contains four more agenda to add to the previous eight; one of them is *Secure Sustainable Energy* (point 7) on The Report of the High Level Panel of Eminent Persons on the Post-2015 Development Agenda. However, the Indonesian Blueprint of National Energy Governance 2005-2025 exposes many obstacles facing the challenge to deliver energy access for the poor. The blueprint does not particularly acknowledge to re-establish and re-manage the role of energy policy stakeholders. The blueprint also views energy sustainability on a more trade-related perspective rather a development-related perspective, which puts human development upon its concern. Furthermore, as published on Indonesian Energy Outlook 2013, the country still struggles to distribute energy for transportation and mineral processing industries [3].

The subsidy policy of basic energy, mainly on petroleum for daily basis utilization, has been conducted by the government of Indonesia to shortly reduce political tensions and civil unrests. In the long term, petroleum subsidy will result in a more critical state of energy poverty, when the energy use is largely allocated to consumptive activities. Moreover, the energy export value is lower than the imported refined petroleum and liquid natural gas (LNG), as the above Blueprint states.

Upon political field as a ground of decision making process on national interests, energy poverty is conceptually new to Indonesian government, apart from its ineffective institutions and regulations, less collaborative business frameworks, and less-organized civil society. Therefore, there is an urgent need to re-frame the concept of "energy security" into "energy poverty" focused on the access to small and medium scale energy development as an integral entity to national energy planning and international energy cooperation. The expected result is to transform the underprivileged society to an energy-empowered one, providing them with more power and mobility to enhance the economy and participation in decision-making.

## 2. Conceptual Frameworks

### 2.1. Post-2015 Energy Poverty Paradigm

The UN Advisory Group on Energy and Climate Change has acknowledged that there is no particular concern upon energy related to MDGs, but it is considered more significant after several calls on the need for universal access to modern energy by 2030 [4]. The targets would be access to electricity and access to clean cooking facilities. There are several implications on fuel poverty and energy inefficiency, such as housing quality, energy prices, and income level.

### 2.2. Energy Development in Indonesia

Government of Indonesia has imposed The Presidential Regulation (Peraturan Presiden) no. 5/2006 on National Energy Policy (Kebijakan Energi Nasional, KEN). It aims at a target for the optimal energy mix in 2025. The major key policies and objectives related to energy in Indonesia consist of four main themes: (a) Diversification; (b)

Rational Energy Pricing; (c) Energy Sector Reform; and (d) Rural electrification. The KEN favors the argument that energy pricing policy is the basic term of the concept on "access to energy", while every local and provincial problem greatly varies. On the other side, a thorough need-assessment is needed as a basis for financing to actually scale up the diversification of energy source [5].

However, on political field, foreign intervention on national energy policy allows the government to reduce its self-determination from foreign transnational corporations (TNCs) and foreign investment. In addition, energy policymaking in Indonesia is largely based on populist approach, given the political context in post-reformation governance restructuring. The fossil fuel subsidy policy is the most controversial subject when it materializes to the purchasing power markdown of the lower economic class of the society, as it directly affects the poverty rate.

### 2.3. Methodology

This article utilizes two methods of gap analysis to measure energy poverty, which are (a) the policy gap between the four kinds of policies above and the implementation during 2005-2013 (starting in the year of the Blueprint to recently); (b) the gap and/or trends between energy use on national consumption and industrial activities during 2005-2013 mainly on fuel, electricity, and the rate of household access to modern energy. Those two analysis will be assessed to identify the problem, and conceptualize them to reframe the perspectives upon National energy policy inputs. The data were obtained from International Energy Agency, The Indonesian Ministry of Energy and Mineral Resources, UNDP Human Development Index, UNIDO, and other relevant indices.

Since poverty consists of multidimensional approaches, this article uses a pragmatic point of view in recommending the policy inputs, bringing an open-ended conclusion thereafter.

## 3. Discussion and Findings

### 3.1. National Energy Development Policy

Poverty is a concept of social convention that is relatively inconsistent in terms of policy discussions. Poverty line in Indonesia is often based on the basic expenditure of food consumption and households [6], meanwhile there is so little account on basic modern energy access. On the other hand, energy sustainability on macroeconomic level is quite instable. The UN Sustainable Energy for All Initiative (SE4ALL) at the end of MDGs in 2015 allows its member countries to proceed in following several steps: (a) country opt-in; (b) stock-taking and gap analysis; (c) strengthening National Action Plan and Program; and (d) Implementation and Monitoring (IESR, 2013). This implies that post-2015 energy development agenda is focused on 2030 SE4ALL targets, and recently Indonesia is on the phase of stock-taking and gap analysis, which makes this research is relevant to date. On this stage, the article will focus on the potential of multi-party consultation and potential partnership.

The National Development Agency or Bappenas has formulated the National Long-Term Development Plan or *Rencana Pembangunan Jangka Panjang Nasional (RPJP) 2005-2025*. The plan focuses mainly on developing renewables, increasing the oil and gas production, optimizing energy infrastructure, maximizing the outreach of electricity sector, and developing science and technology to cope with energy crisis [7].

The four indicators of KEN can be derived into four major policies, which are (a) *energy mix* plan to be reached by 2025; (b) rational energy pricing by price subsidy or fuel price rationalization, and green-technology stimulus; (c) energy sector reform and (d) rural electrification.

The *energy mix* program, based on the framework, does not involve the civil society and local stakeholders. The Directorate General of New Energy, Renewable Energy, and Energy Conservation of The Energy and Mineral Resources Ministry propose seven programs of energy conservation, relying on macroeconomic approach rather than local approach, namely the incentives, fiscal, etc., and they also plan to conduct public awareness events which only can be accessed in urban areas [8].

A state on the rise should emphasize more attention on its national stakeholders to achieve the targets, namely on development and planning, public enterprises and national treasuries. These actors should adapt to cross cut issues and local parties like civil society, private sector actors, as well as formal and informal local structures [9]. Business relations usually pay respects toward producers and consumers' interests, and they also imply in state-civilians

relations, in order to build trust and to channel feedbacks to each parties. Upon achieving the goals of MDGs, it is relatively low on risk when involving civil society into education or health issues, or environment. However, it is more complicated to govern energy issues when it comes to embrace society insights on access, affordability, and quality.

The *energy sector reform* has left many agenda to come by. Rural area becomes the basis of energy development so that the underprivileged people are covered. On that account, GoI established the Master Plan of Acceleration and Expansion of Indonesian Economic Development or simply called MP3EI as a breakthrough in placing Kalimantan Island Corridor as a frontline of "*Energy Stock*", naming it as a Center of Mining Stock Production and Processing, and National Energy Shed. Nevertheless, this does not abandon the fact that urban areas are also still facing energy poverty, especially in developing world. To date, Java and Bali Island as the most populated area in Indonesia are also facing energy crisis, particularly on electricity. The State Electricity Company or Perusahaan Listrik Negara (PLN) states that in 2016, electricity access will be in alarming status as the electricity reserve margin gradually declines when there is no new power plant projects which are operational due to unexplained delay. Kalimantan energy megaprojects like MP3EI are also vulnerable to reduce energy efficiency and flexibility, so that small scale energy projects, on solar, wind, or other renewables, will increase reliability, security, and also greater flexibility to reduce lifetime costs [10].

Indonesia has gone through energy sector reformation for several decades from the New Order era until the Reformation Era. The country also breaks through the choices to liberalize energy sectors to create national political and social stabilization. The provision of energy and energy price can be a weakness in political maneuvers, so that the development policy also becomes the main ground for the economic technocrats. Indonesia became a member on OPEC at the same time of oil boom and its export earnings from oil taxes, paid by foreign oil companies, grew sharply [11]. On the other side, the liberalization have increased the energy price and underprivileged citizen has very little purchasing power. Indonesia is out from OPEC and becomes an oil net importer. When energy subsidy in the form of cash subsidy is introduced, it is a sign that Indonesia has a serious problem of *energy inequity* and the country answers the challenge with a rather reactive energy subsidy on fossil fuels. It can be understood to slow down the inflation rate; however, under the 2001 Oil and Gas Law, energy sector reform based on price subsidy is proven to be ineffective in reducing poverty. Widening the fossil fuel exploration and exploitation projects of oil blocks is also on the verge of political conflicts and authorities overlap among the government energy agencies, namely the SKK Migas, PT Pertamina and Ministry of Energy and Mineral Resources.

To get rid of the institutional clash of interests and to be able to perform structural change in energy management, government should not be steered by unidentified interests from certain stakeholders, unless states desire to face stagnation in development. This is usually between business communities and civil society, as rapid industrialization often negatively affects the surrounding local communities. Local communities as well as NGOs are a growing and active population aware of local issues. These groups of civil society cover a wide range of social, political, even environmental issues to be addressed. Despite their quite limited magnitude of actions, these groups could perform micro risk and gap analysis between the pattern of local energy use and energy sustainability. Macro indicators are limited in measuring access to the poor and their policy flaws toward energy affordability and quality. Most of the rural areas and other area with geographical challenges face different circumstances of potential energy sources. This has to be highlighted in governance. The governance would be best performed in multi-actor collaboration, while also acknowledging the role of civil society, beside industry and policymakers.

Industrialization is often embedded in national economic policy in developing countries as the process contributes directly to economic growth, by assuming that growth will create more growth. The role of energy in bridging the industrial interest and poverty eradication interests is in the term of technology [12]. Energy equity would be more accelerated when government also stimulates to invest in technology.

Upon assessing *rural electrification*, Government of Indonesia (GoI) finds it difficult to establish new power plant outside the island of Java, namely in Bali. There is a strong opposition by locals toward PT. Indonesia Power to operate the new plant in Pesanggahan, which claims that it destroys the balance of the ecosystem and breaches the sacred land. After all, there are two main obstacles in rural electrification in the country, that are (a) the centralized Java-Bali electrification on policy and financing; and b) the less inclusive electricity policymaking at the provincial and districts level. About 53.28% of the population did not enjoy the electrification by the end of 2011, though the electrification trend was positive each year on increasing the average percentage of 3.06% in 2005-2011. However,

the data in 2013 show that 94.2% of the population owned access to electricity, which could be assumed as a huge leap (referring to 2013 Energy Sustainability Index vol.2). This apparently large gap in data delivery not only presents the methodological gap in researching, but also reflects different perspectives on measuring the electricity access rate. Another possibility of data gap on rural data collection and measurements is the lack of involvement of the civil society in policymaking.

### 3.2. Trends and Gap on Small and Medium Scale Energy Access

Small and medium energy scale is varied in measurements by each energy sector. A benchmark is exemplified by wind energy capacity output measurements, where small scale is on minimum 10 kilowatt per installation, and the medium scale is from 50-100 megawatt per installation [13]. The development of small and medium scale energy installation, especially on electricity, is not yet explicitly recommended by National Energy Policy (KEN), as there is no national research on its feasibility and it lacks of need assessments. Most developing world countries, like Bangladesh, Lebanon, and China, identify that suitable energy and methods of power-generating installations are off-grid; shifting to local potentials such as hydropower, solar and wind; and should be decentralized from the main grid. [13] [14]

The development of solar energy includes the use of solar power plants in the rural and city areas, which support the commercialization of solar power plants by maximizing the private sector role, the development of domestic solar power plants industry, and the creation of an efficient funding system through the involvement of banking sector.

Human Development Index (HDI), as calculated by UNDP, expands on how the goals of MDGs are reflected and measured. In addition, post-2015 goals also include more goals on *secure sustainable energy*, which could be viewed through the Energy Development Index (EDI). EDI consists of four indicators that instantly and broadly explain the energy poverty status of a country, which are:

- (a) per capita commercial energy consumption (*tonne of oil equivalent* or *toe*);
- (b) per capita electricity consumption in residential sector (*toe*);
- (c) share of modern fuels in total household sectors energy use (percentage); and
- (d) share of population with access to electricity (percentage).

The indicators combine economic development status and particularly upon medium and to 1). As global poverty rate experiences change per year, the benchmarking countries also differ every year. The index is explained by the following formula:

$$\text{Indicator} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

Fig. 1. Formula of Measuring Energy Poverty (International Energy Agency, 2011)

Table 1 presents the minimum and maximal values used in the calculation of 2010 Energy Development Index by using the data from Pusatin, Ministry of Energy and Mineral Resources year 2012.

Table 1. The Minimum and Maximal Values Used in the Calculation of the 2010 Energy Development Index

<i>Indicator</i>	<i>Minimum Value (Country)</i>	<i>Maximum Value (country)</i>
Share of modern fuels in total residential sectors energy use (%)	1.4 (ethiopia)	100 (Yemen, Lebanon, Syria, Iran)
Share of population with access to electricity (%)	11.1 (D.R. Of Congo)	100 (Jordan, Lebanon)

Source : International Energy Agency, 2011

By assuming the value is stable, the modern energy is defined by the access to LPG, gas, and electricity based on the 2012 Handbook of Energy and Economics Statistics of Indonesia. The calculation of point (c) and (d) is used to measure energy poverty as follows:

- i. Share of modern fuels in total Indonesian household sectors energy use (2009-2011 data) :

<i>Year</i>	<i>Percentage</i>	<i>Index</i>
2009	70	0.7
2010	82.31	0.82
2011	88.2	0.88

- ii. Share of Indonesian population with access to electricity (2009-2011 data)

<i>Year</i>	<i>Percentage</i>	<i>Index</i>
2009	41.7	0.34
2010	44.92	0.38
2011	46.7	0.40

Numerically, the latest trend shows that energy affordability increases every year, but the challenge of energy quality and productivity remains unassessed. Comparing the index directly with HDI would create lack of interconnectedness between indices and could not explain social transformation and policy direction. Energy poverty, on the other hand, has fundamental effects on political stability. The KEN blueprint views energy in trade perspectives, where oil and gas are considered tradable commodities. Although the article's interpretation is widely blurred, energy sector reform and subsidy policy reform are not proven to increase more productivity and competitiveness of civil society as mandated by the constitution. Government is not well-informed that off-grid solutions are being discussed and practiced on the grassroot level, e.g. the Dayak Iban tribe in deep Kalimantan forest has begun to develop solar panels with the assistance of local and international NGOs.

The KEN blueprint also addresses energy diversification and rational energy pricing as one of the frameworks to enhance energy access. However, as mentioned above, energy problem across the nation is varied and this sub-framework tends to create high tension politically, as populist approach is still favoured by the government.

By 2009, there were 82 million people (36%) in Indonesia without access to electricity, and 124 million people (54%) still utilize traditional biomass for cooking activities [15]. Most of people spend a large portion of their income to purchase energy, on the other side people with higher purchasing power have no access to modern energy supply. Nevertheless, innovations on small and medium scale energy and electricity plants in isolated areas are ongoing [16]. Researchers have calculated the economic efficiency of renewable energy based village grids (RVG), and it is proven to be less costly in Indonesian village as it also reduces diesel content. Although GoI has provided USD 43 million and collected grants from international donors, private investors are fundamentally needed to add up the gap of financing energy infrastructure, especially for renewables and rural area outreach.

One of the most feasible off-grid electricity accesses in Indonesian villages is the micro-hydropower and solar battery which are also environmental friendly and reduce CO<sub>2</sub> emission by significant amount of 63.5 - 205.4 tCO<sub>2</sub> per year per village, compared to diesel substances.

### 3.3. Analysis

Government agencies are often missed in relating energy poverty and development plans to each other and stand independently in separate goals and targets. Thus making the goals in poverty eradication in general is stalled. Institutional adaptation and cooperation are urgently required among the national energy stakeholders. Public and private sectors have several essential differences in assessing rural energy needs and how to socialize them on shifting traditional use of energy source to the cleaner sources. Moreover, there is also weighted difference on targets of development among government agencies, whether it is social or economic. However, indicators on

energy development do not automatically reflect its sustainability [17]. This might be the reason why countries set their own indicators and freely interpret sustainable development, thus create a gap in concept and government structure of knowledge.

Tackling energy poverty needs rural approach, while GoI has allocated its efforts to fulfill the energy necessity in emerging urban areas. However, GoI still struggles to maintain its conventional energy policy, which has major dependency on fossil fuels. On grassroots level, the people also experience hard time in converting kerosene and traditional cooking equipment to cleaner source of energy, namely gas and solar panels. On the other hand, most developing world governments simply view "access of energy", that is in principle of "have" or "have not", rather than an energy capacity to stimulate productive activities, living up communities, and ability to serve basic household necessities. Overall, fossil fuels dependency still stands as a hindrance to alleviate people from poverty, furthermore, extreme poverty. The role of energy in poverty eradication should be defined from its utilization outcome, rather than a mere static circumstance of provision with any possible access without sustainability.

GoI needs to improve its strategic and institutional structure, when there is less single perspectives upon economic growth, which is on industrial level, in order to balance the development needs of its society. Economic growth could give more tangible political and diplomatic impact on incumbent government's profile, but sacrificing the human development is not an option. Foreign investment on oil since the dawn of fossil fuel price rationalization has increased, particularly on the clause to subsidize production process and to lower the retail price of goods.

Energy financing is also closely related to energy sector reform, particularly on electricity sectors and program of GoI to achieve *energy mix* on 2025. Electricity and cleaner cooking facilities become the main priority to achieve a goal in MDGs to eradicate extreme poverty. The expansion of electricity grid is expected to cover 95% of national demand in 2025; however, the expansion of access and new power plant development requires large amount of fund. There are also insights on expanding off-grid energy access but they are mostly ignored by policymakers.

Most of energy development fund comes from foreign aid and assistance. Foreign interests indirectly affect the national structure and strategies for energy development. It is safe to assume that foreign investments and aids are aimed to comply with their national interest, which creates market in developing countries. Globally, most of bilateral energy development assistance among countries is mainly allocated on fixed capital access and technology transfers in developing world, with less than 10% of the global assistance funds from 1979 to 1991 was used to improve the local capacity and energy self-sufficiency [18].

For comparison purposes, Japan as the largest donor of Official Development Assistance (ODA) to Indonesia also delivers energy assistance. Japan's interest in Indonesian energy sector is proven through its major allocation in energy sector on 2003-2005. The ODA breakdown is as follows : Loan Aid for energy dominates other sectors by USD 2,019.41 million or 62.89% from total USD 3,211,15 million; while grant aid on energy sector is only USD 18.36 million from total USD 132.90 million [19]. Larger element of grant is paramount necessity, where national development agenda could be relatively maximized. When it relates to energy mix goals, these financing challenges can slow down the progress in achieving the target for the mix on renewables and non-renewable energy source.

Energy sector development is a substantial trigger to stimulate the economic growth and human development. However, this sector has more economical risk than other development sectors, which make energy development aid is essential. While Indonesia gains it mostly from Japan, Indonesia has lack of bargaining position to add more portion to technical assistance and lack of grant aid to assist local energy development sectors which can provide more room for improvement. Local energy development presents several challenges on geography, native culture, market type, and gap on level of economic development and gap of education level among provinces.

MDGs also provides two types of indicators: income-generating and non-income-generating indicators. It is relatively easier to measure targets of universal education, or even more the intensity of cooperation and the increase of wage. However, the non-income indicators on quality of environment, health status of the citizens, energy and women empowerment are not the top priority for the populist government to eradicate poverty and to increase productivity. In President Yudhoyono era, several economic approaches were conducted to become the bumper of poverty incline after the petroleum subsidy was lifted gradually. One of them was *bantuan langsung tunai* or direct cash subsidy for vulnerable families. This controversial policy did not address the decline of productivities and community services, thus brought social unrest among the poor.

Post-2015 development agenda implementation should emphasize more on balancing energy sectors trapped between trade perspectives and development perspectives. Development policies are meant to bring economic

transformation as well as social transformation. Poverty and access to welfare should be more related on the latter without abandoning the economic sectors. Economic growth may be increased per year, but the number of poor people remains unmoved in percentage. Even the decline of political patronage by the provincial government to central government could not bridge the economic gap among provinces particularly in eastern parts of Indonesia.

### 3. Conclusion

This article is initially designed to produce policy inputs, which lead to the analysis to the outcome of integrating energy access into national development strategies and are supported by integrated financial and technological system at macro-economic level. Identifying the opportunities to build small and medium-scale energy development will be the main source for formulating the policy inputs

Government of Indonesia is urged to establish capacity building for the people in maintaining the risk of energy poverty and the potential loss from it. An integrated policy between human development and national energy policy should not be limited to the state-centered cooperation schemes, but it extends the capability and capacity of the people to access and maintain the basic daily energy necessity.

### 4. References

1. Bazilian, Morgan; *et. al.*, Partnerships for Access to Modern Cooking Fuels and Technologies. *Environmental Sustainability*.2011;**3**; 1-6
2. Sovacool, Benjamin K; *et. al.*, What Moves and Works: Broadening The Consideration of Energy Poverty. *Energy Policy* 2012; **42**; 715–719
3. Sugiyono, Agus *et. al.* (eds), Indonesia Energy Outlook 2013. 2013; Indonesian Agency for The Assessment and Application of Technology
4. IEA/OECD. World Energy Outlook, 2010
5. Blueprint of National Energy Governance 2005-2025. Government of Indonesia
6. Pradhan, Meno *et. al.*, Measurements of Poverty in Indonesia : 1996, 1999, and Beyond. 2000; Social Monitoring and Early Response Unit (SMERU) Working Paper
7. Bappenas, Rencana Pembangunan Jangka Panjang 2005-2025.
8. EBTKE Directorate, Ministry of Energy and Mineral Resources. Mencapai Target Energi, Energi Terbarukan dan Konservasi Energi di Indonesia: Tantangan/Hambatan dan Strategi. Public Dialogue. 2013
9. Bazilian, Morgan; Smitha Nakhoda, Thijs van De Graaf. Energy Governance and Poverty. 2014. *Energy Research & Social Science* **1** (2014) 217–225
10. Thaler, Jeffrey. Fiddling as the World Floods and Burns: How Climate Change Urgently Requires a Paradigm Shift in the Permitting of Renew-able Energy Projects. 2012. *Environmental Law Journal* **42** 1101 (2012)
11. Hossain, Akhtar. Macroeconomic Developments, Policies and Issues in Indonesia, 1950-2005: a Review. *Malaysian Journal of Economic Studies*; Jun-Dec 2006; **43**, 1/2;
12. Moe, Espen. Energy, Industry and Politics: Energy, Vested interests, and Long-Term Economic Growth and Development. *Energy* **35** : 2010.1730–1740
13. Anwar, Yunita; and Martin Surya Mulyadi. Income Tax Incentives on Renewable Energy Industry: Case of USA, China, and Indonesia. *The Business Review Cambridge*. 2011. **17**:2
14. Khodr, Hiba and Khatarina Uherova Hasbani. The Dynamics of Energy Policy in Lebanon when Research, politics, and policy fail to intersect. 2013. *Energy Policy*. **60** : 629–642
15. IEA/OECD. World Energy Outlook, 2011
16. Blum, Nicola U.; Ratri Sryantoro Wakeling, Tobias S. Schmidt. Rural electrification through Village Grids—Assessing the cost Competitiveness of isolated renewable energy technologies in Indonesia. 2013. *Renewable and Sustainable Energy Reviews* **22** : 482–496
17. International Atomic Energy Agency. Energy Indicators of Sustainable Development: Guidelines and Methodologies. 2005
18. Martinot ,Eric; Chaurey Akanksha, Lew Debra, Moreira Jose R, Wamukonya Njeri. Renewable Energy Markets in Developing Countries. Annual Review Energy Environ 2002;**27**:309–48
19. Official Development Assistance from Japan to Indonesia. Japan's Official Development Assistance White Paper 2004-2007