

# Understanding The Partnership Landscape For Renewable Energy Development In Indonesia

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## **Abstract**

*Renewable energy development in Indonesia is still young compared to its sister sector, the upstream oil and gas sector, which have invited many investors to develop the market. As the commitment for COP 21 Paris, Indonesia is bounded to develop the renewable energy sector to provide a cleaner energy source and reduce CO<sub>2</sub> emission via various national programs. The formal partnership has become the prominent model for engaging various stakeholders; the government, non-government organization, private sector, academia, local community, etc. Through a closer look to the dynamic of the regulatory framework, this article presents different cases of partnership in the renewable energy sector in Indonesia while at some point benchmarking to the similar development in other countries and its sister sector. The study shows that the formal partnership model in the form of PPP is suitable for the large-scale power systems while 5P is suitable for small-scale and decentralised power systems. Conclusions and recommendations of how the mission-oriented partnership is narrated to strengthen Indonesia's renewable energy development roadmap is drawn at the end.*

**Keywords:** *renewable energy, mission-oriented partnership, sustainable development*

## **Abstrak**

Perkembangan sektor energi baru dan terbarukan di Indonesia masih relative baru dibandingkan dengan sector energy hulu migas yang pasarnya diminati oleh banyak pemodal baik domestic maupun asing. Sebagai bentuk komitmen terhadap COP 21 Paris, Indonesia sepakat untuk mengembangkan sektor EBT melalui berbagai program nasional yang menyediakan sumber energy bersih dan mengurangi emisi CO<sub>2</sub>. Kemitraan formal menjadi model untuk melibatkan berbagai *stake holder*; pemerintah, lembaga swadaya masyarakat, sector swasta, akademisi, komunitas lokal, dan lain-lain. Dengan menganalisa lebih dalam mengenai kerangka peraturan yang berlaku di Indonesia, artikel ini menyajikan beberapa contoh kemitraan di sektor energi terbarukan di Indonesia sembari membandingkan contoh di negara lain dan sector hulu migas nasional. Ditemukan bahwa model kemitraan formal seperti PPP cocok untuk sistem pembangkit EBT skala besar sementara 5P cocok untuk sistem pembangkit EBT skala kecil dan terdesentralisasi. Laporan studi diakhir dengan menyimpulkan bagaimana kemitraan berorientasi misi dinarasikan untuk memperkuat *roadmap* membangun sektor EBT di Indonesia.

**Kata kunci:** energi baru terbarukan, kemitraan berorientasi misi, pembangunan berkelanjutan

## **1. Introduction**

Indonesia aims to increase the renewable energy shares in the upcoming years by its promise at COP 21 Paris for reducing threats of the climate change. Its target, depicted in National Energy Policy, is to meet 23 % of the national energy mix from renewable sources by 2025 consisted of 10 % of bioenergy, 7 % of geothermal, 3 % of hydro, and 3 % of other renewable energy sources. With the abundant resource of renewable energy, it is not doubted that Indonesia can meet this target. The country has shown its commitment to provide a supportive environment for the foreign and

domestic investors to come investing for the renewable energy sector in Indonesia. Even though the energy sector is not yet fully liberalized, and no market mechanism exists to support the competitive and open energy exchange; the Government of Indonesia (GoI) seems to provide some rooms for improvisation to strengthen the national energy supply by placing private investment mechanism for renewable energy. GoI published the regulations to incentivize the private renewable energy investors by using the widely-used Feed-in-Tariffs (FiT) mechanism called Biaya Pokok Penyediaan (BPP) or the electricity generation cost. The mechanism provides a fixed premium for the developers to cover the capital costs and associated risks with the renewable energy projects; and guaranteed over ten (10) to thirty (30) years of the contract period. The underlying business transaction does not change. PT. PLN (Persero) purchases the produced electricity from the renewable energy power plants under the specified contract period. At the end of the period, PT. PLN (Persero) will take over the infrastructure from the operators under the scheme of BOOT (Build, Own, Operate, Transfer).

A study has found that the multi-players (including governments, private sectors, NGO, international organizations, academia, local community, etc.) partnership showed limited initiatives to address the climate change and sustainable development in developing countries (Pinkse, 2011). The different interests of the stakeholders may collide and further prevent the positive collaboration. The governments are intended to provide their citizens greater availability, accessibility, and acceptability of the energy resources. While on the other hand, the private sectors who own the financial resources and master the technology, value more their business sustainability – both in the short and long run.

Universal values must be drawn from different interests so that the objectives of all stakeholders (government, the private sector, or citizen) can be achieved without harming the interests of one and another. Sustainable Development Goals (SDGs) have been adopted by most of the countries targeting a broad spectrum of sustainable development. To such an extent, private players can harvest the benefit from the implementation of one of the SDGs. SDG 7 ensures the universal access to affordable, reliable, and modern energy services. Indonesia translates the goal as the provision to the accessible and affordable energy across the archipelago. By 2025, GoI targets the ratio of electrification to 100 % including the outermost and border regions where the income level is still low. Electricity sector has high entry barriers where the capital cost is high preventing new private players from coming. Without involvement from the private sectors, it is going to be difficult for PLN to remove the barriers and achieve the national target. There is no doubt that partnership in the electricity sector plays essential roles to develop and sustain the renewable energy power generation in Indonesia. Under Presidential Regulation No. 39/2014, the maximum foreign shares in the small-scale power generation sector are 49 % while in the large-scale power generation is 95 %. The opportunity of collaboration and strategy with foreign business entities exist in the light of wider energy access and affordability for the society.

## 1. Research Question and Methodology

The main research question for this descriptive study is:

*RQ: How can the partnership be used to strengthen the development of renewable energy in Indonesia?*

To answer this research question, the concept of formal and informal partnership in the renewable energy sector is presented along with the current cases in Indonesia and good benchmarks to the similar development in other countries. The business perspective is being used to examine the existing partnership models. The regulatory landscape for renewable energy influences the creation and operation of the partnership. Identifying the essential functions of the partnership is essential to strengthen the roadmap of renewable energy development in Indonesia. Conclusions and recommendations are drawn at the end of the study. Systematic literature review (SLR) is used to gather all relevant interdisciplinary researches particularly in the field of renewable energy development and partnership to serve as the basis to conclude the current landscape of partnership in renewable energy development in Indonesia. Secondary sources from government reports, non-profit organization reports, and mass media will be used to frame the answers towards the main research question such as the study can propose of how to strengthen the renewable energy development through partnership.

## 2. Regulatory Landscape for Renewable Energy

There are currently limited studies to understand the role of partnership in the renewable energy development in Indonesia. It is worth to be noted that the regulatory framework is seen to be essential to gain wider insights into the success of renewable energy development (Kruckenberg, 2015). Under the pressing goals to develop and sustain the national energy sector, Indonesia faces many challenges from the regulatory framework to socio-economic aspect. The total production of renewable energy in Indonesia as per November 2016 is around 26 GWh from the total production of 224 GWh (RUPTL, 2017). The national strategic project of 35 GW of power generation has shown a slow progress and is predicted to provide only 23 GWh capacity in 2019 (Kompas, 2017). It may also impact the development of renewable energy generation especially considering the dynamic of Indonesia's regulatory framework. A recent survey conducted by PwC reveals that the strict financing timelines in the current scheme of Power Purchase Agreement (PPA) were viewed to increase the risk of financial collapse (PwC, 2017). It further suggests that the investment market for the power sector may move to the farther from the equilibrium point where the developers may not reach its economic value. The close development cooperation among the stakeholders (government and business sector) is necessary to break down these constraints.

The renewable energy sector was not fully opened to private sectors until the early 2000's when GoI issues UU 23/2003 to develop the geothermal power plants with the similar concept with the development of upstream oil and gas. The current capacity of the private geothermal power plants is doubled of the state-owned geothermal power plants (RUPTL, 2017). This is not the

same with the hydropower where the state-owned companies are dominating the hydropower ownership. The market for private hydropower plants was unlocked when Permen ESDM 31/2009 regulating the purchase of electricity using renewable energy sources for small and medium scale or for excess power was in-place.

The case of G-to-B model only applies to the upstream geothermal sector where GoI takes full control to Wilayah Kerja Panas Bumi (WKP) or the geothermal working area under the recently issued PP 7/2017. In the downstream sector, like other renewable energy sources, the operators sell the electricity to PT. PLN (Persero) with Business to Business (B-to-B) model under the defined contract period. It makes the business model, not a pure B-to-B because the government interferes with the business relationship with the policies that aim to develop the renewable energy sector. PLN is seen of having broad remit and power with a number of conflicts of interest in the electricity market - the powerful single player, single buyer, and the largest owner of power generation assets in Indonesia (Bridle et al, 2018).

### **3. Role of Partnership**

The context of partnership has been widely known in the public and private sectors since the 1980s where it was identified as an essential gear to achieve the delivery of service to the customers. OECD (1990:18) defined partnerships as:

*Systems of formalised co-operation, grounded in legally binding arrangements or informal understandings, co-operative working relationships, and mutually adopted plans among a number of institutions. They involve agreements on policy and programme objectives and the sharing of responsibility, resources, risks and benefits over a specified period of time.*

From the business perspective, the partnership fills the empty gaps to receive mutual understanding and expectations from the different level of stakeholders towards the business objectives. The synergy among the stakeholders in a sort form of “the sum is greater than the parts” is the greatest motive underlying the creation of partnership (McQuaid, 2000). When it comes to project development, the involvement of the partners in a shared ownership is started from the beginning of the project of which the basis to incubate the project is being grounded, to the end of the cycle of which decommissioning activities will be performed to ensure no left-over to the society and environment. A study finds that the shared ownership is undermined by the trust and negative expectations of different stakeholders along the life cycle of the business (Goedkoop, 2017). He also suggests further investigation into the role of the community in shared ownership as the belief and norm are locally shared. This may sound true for small-scale power generation where the involvement of the domestic investors, who sometimes have more attachment to the community, are more likely to happen.

The most critical path where the partnership for the business is being tampered with is during the decision-making process where trusts and positive expectations towards the successfulness of the business goals are taken into consideration. Partnership, in general, brings together a

coalition of the common values to achieve common interdependent interests. It entails the public sectors (i.e., the centre government, the provincial government, regional government, municipal government, policy makers, etc.) and the partnered private sectors (i.e., joint-venture partners, contractors, third-parties, etc.).

### **3.1. Formal Partnership**

Many studies have been performed to observe the different type of the partnership in the community. It was Harding who introduced the terminology of Public-Private Partnership (PPP) as *any action which relies on the agreement of actors in the public and private sectors and which also contributes in some way to improving the urban economy and the quality of life* (Harding 1990). This type of partnership resembles the business model of Government to Business (G-to-B), which is usually conducted in the upstream energy sector in Indonesia. G-to-B model offers the maximum flexibility for the private sector to run the business under the supervision of government agency. The governance is ruled by government regulations to ensure that the business is performed in accordance with the given corridor of law. There are not too many studies analysing the relationship of G-to-B in the energy sector, but it is clearly seen that there is information asymmetry between the government and the private sector that might further degrade the trust and reputation in keeping the business relationship (Butter, 2012). In the case of upstream oil and gas sector, the private sectors can carry out the best development strategy for the field based on their analysis approved and authorized by the government at different authority levels. The formal partnership is mostly marked with formal structure ranging from formal legally binding to public or general agreements to co-operate (McQuaid, 2000).

### **Public-Private Partnership**

PPP in Indonesia is regulated by Presidential Regulation No. 38/2015 for every different sector, including the energy sector. However, there is a limited participation of the renewable energy sector so far in the PPP as the criteria set by GoI are bit cumbersome and project uncertainty. Three hydropower plants with total capacity of 1,310 MW were promoted as PPP projects in 2012 (PPP Book, 2012). Karama power plant in West Sulawesi was among the three PPP projects and estimated to operate in 2012. However, the plan needs to be re-assessed due to the societal issues that were identified years after (RUPTL, 2016). PwC identifies such underdeveloped political, legal, and regulatory system with conflicting regulations and controls extending across several levels of government becoming one of the challenges in implementing PPP (PwC, 2013). When the PPP scheme is applied for the power projects, the fiscal incentives are provided to support the project developments (see Table 1). However, there is no power sector listed in the latest PPP scheme – mostly infrastructure projects, even though GoI aims at strengthening national connectivity to guarantee energy security (PPP Book, 2017). It seems that renewable energy is not yet a serious attention to the national development plan.

Fiscal Incentives	Description
Land capping, revolving, & acquisition fund	Cash funding for accelerating the land procurement
Viability gap fund	Cash funding for supporting the construction works
Guarantee fund	Guarantee for the project risks
Infrastructure fund	Additional funding to finance the project

Table 1: Fiscal incentives under Indonesia’s PPP scheme (BKPM, 2017)

A new context of PPP that extends the basic services for the poor community has been seen to provide a community-based solution for the energy access. The so-called “Pro-Poor Public-Private Partnership” is a business model that involves both community and private sectors in the ownership of the project (UNESCAP, 2017). This form of a partnership may take important roles for the energy access which is much beyond the physical assets – something that is missing from the model of traditional PPP, i.e., empowering the targeted community (Chaurey, 2012). A case in Indonesia has been able to demonstrate its sustainability since 2004. A 120 kW micro-hydro power plant in West Java were funded partly by UNESCAP and PT HidroPiranti. YayasanIbeka (InstitutBisnisdanEkonomiKerakyatan), a local NGO, was in charge to provide project dissemination and training facility. KoperasiCintaMekar manages the income from selling the green electricity to PT. PLN (Persero) and return most of the profit to the community in the form of education scholarship, infrastructure development fund, village daily operation allowance, etc. (WWF, 2009). The project itself is sustainable because of the financial and institutional arrangement allow the power plant to operate while contributing to the community (Tumiwa, 2009). A further study concludes that the dividend of “fifty-fifty” between the private sector and community has given appropriate margin to both stakeholders (Sutomo, 2015). The private sectors and community may express different rationale for engaging in the shared-ownership (Goedkoop, 2016). Private sectors may seem to engage in shared ownership because of the economic reason while the community aims at empowering the local people with further possibility to participate in larger scale project. It is worth to be noted that the business sustainability can be hampered under the different regime of electricity tariff, especially when the regulated electricity tariff cannot recover the operational cost of the power plant.

A case from *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) shows that international non-government organization can take the lead in capacity building for the community (EnDev, 2016). This is something similar to the purpose of 5P model, but the partnership is geared via the instrument of foreign policy. In 2015, GIZ launched a series of workshop on the capacity building for the community in the outer islands of Indonesia. The aim of the workshop is to enable the local community to operate and maintain the micro solar power

plants so that the power plant can sustain for the long run. MEMR installed the micro solar power plant in forty-one (41) islands in Eastern Indonesia with the total capacity of 1,935 kW using the State Budget. Like the case of CintaMekar above; the community capacity, both technical and accounting, needs to be upgraded to such a level to meet the business sustainability.

### **Transferring the Risk**

It is evident that the government plays an important role in the partnership with the private sectors to develop the energy sector as they both share risks to assets, people, reputation, and environment. Private sectors are required to demonstrate how to run the business with sufficient measures to mitigate the risks. One neat example of an industrial accident in the energy sector of which the risk was mutually shared, was occurred during the exploration of gas field is the Sidoarjo mud flow spewing up to 180,000 m<sup>3</sup> of mud per day disrupting the social-economy in the surrounded villages in East Java. GoI provides the fund taken from the State Budget to reduce the societal impact by establishing *Badan Penanggulangan Lumpur Sidoarjo* (BPLS). In early 2017, the purpose of the organizational, now called *Pusat Penanggulangan Lumpur Sidoarjo* (PPLS), is shifted from tackling the societal impact to the technical impact; and repositioned under the Minister of Public Work (Tempo, 2017). However, the flaw may happen. The private sectors often ask to transfer the risks that may harm or halt the capital circulation to the government (Safitri, 2015).

### **Social Responsibility**

The importance of building a formal partnership is obvious since the beginning of the investment. For a large-scale project, the formal program of Corporate Social Responsibility (CSR) becomes the main vehicle for the partnership with local organizations and institutions where the investment is laid down. It acts as the legal and moral responsibility of the private sectors to the local community. The expectation to make a proactive and reactive response to the surrounding attract the attention of stakeholders (government, policymakers, society, media, etc.) as such that the presence of the business is perceived to be effective in achieving the business goals (Lim, 2017). There are various organizations and institutions that can become the partners for the private sectors depending on the nature of the business.

As the ultimate goal of the CSR is to empower the local economy, capacity building is needed so that the local community can improve their skills and knowledge to fully participate in the economic activities. People's capacity can be built via formal and informal education. Thus, education organizations and institutions are important for this purpose. It can be in a form of partnership with academia (i.e. schools, universities) or non-government sectors (i.e. the community sectors).

CSR as a formal partnership may have an important role in influencing decision making taken by the government levels to proceed with the investment. Thus, these activities need to be reported

to the public to generate the domino effect of the good intention of business settlement. A study shows that companies for the upstream energy sectors listed in *Bursa Efek Indonesia* (BEJ) disclose their CSR more often than other sectors in their annual reports (Dalina, 2016). This is consistent with Lim said that the presence of private sectors in business space is important to achieve the business goals (Lim 2017). The importance of CSR as a formal partnership is now seen as the key-factor for the successful business sustainability in Indonesia, especially for the energy sector.

In the similar strain like CSR, a partnership between universities, research institutes, and non-government organisations can strengthen the capacity building of the local community. Kemala or *Konsorsium Energi Mandiri Lestari* gave the technical and socio-economics consultation to the rural society in the villages of Jorong Tandai Bukik Bulek, West Sumatera; Sungai Rambut, Jambi; and Rawasari, Jambi in response to the development of decentralised solar power plants. In collaboration with university and socio-religious organisation, Kemala strengthened the community capacity building by providing training to operate and maintain the systems. The funding to run the system is financed collectively via *Tabungan Energi Terbarukan* or *Tabungan SURYA* (Budiarto et al., 2017).

### **3.2. Informal Partnership**

Perrucci and Pilisku articulate that community representative may have political or social links with key decision makers in some of the government agencies (Perrucci, 1970). These informal structures are either to by-pass or influence the decision-making procedures. In this context, it can be seen related to the individual players within the informal structures participating in the different networks.

Business players can be involved in an informal partnership at various levels such as joining the informal working groups to identify their interests, to perform joint advocacy, or to share best practices with the broader community. An example is *Masyarakat Energi Terbarukan Indonesia* (METI) which provides the platform to strengthen the partnership with the government to maximize the production and investment for the clean energy. The members come from the different level of stakeholders in the renewable industry including the government, electricity operators, private sectors, etc. When Permen ESDM 12/2017 was issued, METI expressed their concern about the new regulated tariff for the electricity purchase from renewable energy (Tribunnews, 2017). It was the regulated maximum tariff of 85 % from the basic electricity supply cost (BPP) that might discourage the investors to step into the renewable projects. In less than six months, the ministry revised the regulation to the new Permen ESDM 52/2017 to accommodate the concerns of the business players.

This example shows that informal partnership may ignite more fluid communication between the public sectors and the private sectors in many occasions as what has been described by Perrucci and Pilisku above.



#### 4. Strengthening the roadmap

Understanding how the business partnership can promote the renewable energy development in Indonesia would mean to understand the whole national narration of the project lifecycle including the different stakeholders that are involved along the way. The scale of the project is also determined how the partnership becomes the key-enabler, not only to achieve the project success but also to build the capacity of the community, as it is the only answer to reach a sustainable development of renewable energy sector. The term of mission-oriented approach is lately well-known through the works of Mazzucato on the innovation policy. She argued that the mission-oriented approach involved tackling specific problems, such as increasing the uptake of RES by a given percentage over a specific year period. This mission requires multi-sectors to come together in new ways to reach the mission (Mazzucato, 2017). Using the similar term, the mission-oriented partnership is deemed to be the suitable approach to strengthen the sustainable renewable energy development using a systemic approach (roadmap) and a collaborative interaction between multiple-stakeholders. There are three functions of partnership in building the sustainable roadmap for renewable energy development in Indonesia; (1) supporting the national renewable energy policy, (2) closing the gap between economies of scale and energy access, and (3) providing adequate technology transfer. The formal partnership is able to mostly provide the provisions due to its formal structure and strategic focus. The informal partnership however can have a substantial impact upon the creation and operation of partnership (McQuaid, 2000).

Mission-Oriented Function	Formal Partnership i.e. PPP, P5P, GIZ, CSR, Kemala	Informal Partnership i.e. METI
Supporting the national policy	●●●	●●○
Closing the gap between economies of scale and energy access	●●●	●○○
Providing knowledge and technology transfer	●●○	●○○

Notes: ●●● = major relevance, ●●○ = moderate relevance, and ●○○ = minor relevance to the provision to build the roadmap for sustainable renewable energy development.

Table 2: Function of Partnership in Sustainable Renewable Energy Development

#### Supporting the national policy

PPP is able to demonstrate how GoI is willing to involve in the multisector development by transferring some part of financing and accountability into the various instruments. Limited participation of the renewable energy project via PPP, even with the benefit of some the project

cost is borne by GoI, may indicate that the renewable energy market in Indonesia is still not attractive to be explored. The new projects funded through PPP scheme must be listed in the Masterplan for Acceleration and Expansion Indonesia Economic Development (MP3EI) with criteria that must be met in the coherence of the main goals of the development plan.

There is limited show-case how 5P model can contribute to the energy access in the poor community. CintaMekar can sustain its business model throughout the years with the partnership between the private sector and local community. All the stakeholders might have different objectives and views but the long-lasting mutual partnership guards them on the right track. The micro solar power plants in the outer islands of Indonesia is an obvious example how the national funding did not include the capacity building for the community as such the gap was identified at the later stage and filled by the partnership between international NGO and GoI.

Renewable energy communities – a case of METI above – in Indonesia can speak out their stand when GoI issued the new regulation of the electricity tariff. This form of partnership among the market players has shown their influence in the policy development – even though it is still not so clear why the public hearing was failed in the first time to provide the inputs for Permen 12/2017. The market may wait for a little while before deciding to invest in the energy sector. 83 % of the power market respondents think that regulatory uncertainty becomes the major barrier to investing in new large-scale power generation (PwC, 2017). An analysis in developed countries reveals the dependence of the investment to national policy (Cedrik, 2017). The good renewable policies reduce the country risks and consequently attract more investor for the implementation of new and large energy projects.

### **Closing the gaps between economies of scale and energy access**

Some renewable projects might have the generation capacity less than 10 MW. However, larger capacity costs more than lower capacity due to economies of scale. However, the power purchase prices under MERM Regulation 12/2017 and 50/2017 are not deemed insufficient for the power developers to recover their investments (Bridle et al, 2018). Indonesia is an archipelago with a problem of energy access because of the geographical distribution of the island. There is a substantial development cost between centralized and decentralized power energy system. The centralized system means to build the big capacity of power plants with lower cost, due to the economy of scale, with great connectivity to the consumer. The decentralized system means to build the small capacity of power plants that power the neighbouring community without any access to the national grid – the people in the outer islands. Depending on the goal of GoI, the focus on the partnership can differ. Both centralized and decentralized power system requires good policy climate. A study has shown that the good climate was required for the centralized power system *albeit* when the investment is costly (Cedrik, 2017). A larger renewable project may benefit from PPP scheme but so far there is limited participation from the domestic or foreign investors. CSR activities in the large-project can empower the local community using the partnership concept in various context. This has been proven not only in the renewable

energy sector but also in other sectors i.e. tourism, mining, etc (Lee, 2018;Narula, 2017). While in the decentralized power system that aims to open the access to the community in the isolated or remote area; 5P model can become one of the solutions as long as there is a strong and evident interest from the NGOs, private sectors, philanthropies, and other sources of funding. Most of the procurement methods conducted by the Indonesian government agency for public funder projects use the reverse-auction method where the winner of the bidder must have the lowest bidding value in the auction. It suggests that the investor cost shall be as lowest as possible, but not hamper the profitability, to be able to compete in the auction. What Forsyth discovered in Thailand and the Philippines strengthens the argument that partnership can be a key-enabler for the project success by closing the gaps between economies of scale and energy access in the disadvantaged regions.

#### **Providing knowledge and technology transfer**

As developing country, Indonesia still needs to close the wide gap of the players' capacity building; for example, the public sectors, private sectors, academia, non-government organization, etc. A lesson learned is drawn from the neighbouring countries, Thailand and the Philippines, that the technology transfer via successful renewable energy partnership may reduce the investors' cost and increase the relevance of new technologies for local people (Forsyth, 2005). Either the project participation is the business model of G-to-B or B-to-B, profitability is a precise measure of the attractiveness and sustainability of the business. The knowledge and technology transfer answers the challenges of both large- and small-scale renewable energy development such as the absence of technical knowledge in the border and outermost regions, the misalignment of the goals of energy development in Indonesia, and lack of support for operating and maintaining the facilities (Pertiwiningrum and Budiarto, 2011). Kemala demonstrated that a consortium of university and socio-religious organisations could successfully play important roles for the sustainable operation of the renewable energy system in the disadvantaged regions.

#### **5. Conclusions and Recommendations**

Literature reviews in this article have shown that partnership, formal and informal, played an important role in the development of the renewable energy sector in Indonesia. Several local cases have been presented to see how well the partnerships are engaged. The landscape of regulatory framework is important for investment decisions, no matter what business model (B-to-G or B-to-B) is used in Indonesia. The history has shown that the supply of energy commodities was highly influenced by world economic crisis and civil disorders. There are inherent risks from the dynamic pressure of external factors in any infrastructure project like in the electricity sector where it takes longer time for return on investment. The dynamic is more likely to be politically-driven rather than economically-driven (Noreng, 2002). The global pressure affects the local policy landscape with no country has an exception. The transition from fossil-fuel to renewable energy in developing countries like Indonesia maybe not as fast as in other developed countries due to the pulling and stretching of its national economic interest (O'Connor, 2010).

The study in this article was able to answer the research question by identifying that the partnership using PPP scheme brings benefits for the investors for the large-scale renewable energy project due to the support of the government via its various fiscal incentives. The business model of 5P has demonstrated its success to answer the sustainability of the small-scale renewable power projects. The role of the government in the 5P model can be extended to such a level. A study conducted in India shows that the government can be pro-actively involved in the project by providing funding support beyond the physical boundary of the project, such as the grid connectivity to the households (Chaurey, 2012). Empowering the community means enhancing and transferring the technology, as suggested by Forsyth in his study. Thus, it can minimize the transaction cost, strengthen collaborative mechanism among the stakeholders, and maximize public trust of partnership (Forsyth, 2005). The case of GIZ and Kemala demonstrates that people in the outermost and border regions may benefit from the formal partnership model to sustain the power generation. Both formal and informal partnership can strengthen Indonesia's renewable energy roadmap by the provision to support the national renewable energy policy, close the gap between economies of scale & energy access, and provide knowledge & technology transfer. GoI should be able to design, support, and reinforce the partnership models (i.e. PPP or 5P) with more mission-oriented approach in response to the challenge of sustaining the development of renewable energy in Indonesia.

Going forward, it is recommended to have the further study in the different sector of renewable energy development to reveal the implementation of the partnership. Hydro, solar, and wind power plants are suitable for decentralized power system while geothermal power plant exhibits higher entry barrier due to the high investment cost. The study in this article doesn't reach that far. The role of innovation in the renewable energy sector has not yet been seen in Indonesia as the market is not market-oriented, rather still fully regulated (Bardshaw, 2017). The study of how such mission-oriented partnership can provide the vehicle for disembarking to the innovative environment may be useful to understand how to accelerate the renewable energy development in Indonesia. Partnership is a key-enabler to stimulate the innovation process and technology creation in the transition towards renewable energy system (IRENA, 2018).

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