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Revisiting the role of international climate finance (ICF) towards achieving the nationally determined contribution (NDC) target: A case study of the Indonesian energy sector

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ABSTRACT

Climate change has impacted development progress and increased global inequality. Therefore, all emitters, both developed and developing countries, must implement climate change mitigation and adaptation actions. Indonesia is one of the developing countries that signed the Paris Agreement. In its NDC document, Indonesia has pledged to reduce greenhouse gases emission by 29% using domestic resources (unconditional) and 41% with international support (conditional) from the business as usual (BAU) scenario by 2030. This commitment gives Indonesia the right to take advantage of various types of support, including ICF opportunities offered by the ADB through the non-UNFCCC financial scheme and the Global Green Growth Institute through the UNFCCC financial mechanism. This paper explores to what extent ICF supports the achievement of Indonesia's Nationally Determined Contribution (NDC) target. The study uses qualitative analysis to provide a general overview of ICF in Indonesia, its climate finance strategies, and the case study of the energy sector. The study finds that ICF in Indonesia continues to develop, albeit with many limitations. Several ICF channels could be utilized more optimally such as, loan and grant instruments. Indonesia cannot rely solely on international support to meet its enormous climate finance needs; it must develop innovative financing through various instruments, such as green sukuk. ICF also plays a role in facilitating the energy transition from coal-based to renewable energy sources and increasing energy efficiency.

1. Introduction

Climate change has impacted development progress and increased global inequality. Therefore, all emitters must undertake climate mitigation and adaptation efforts, both developed and developing countries (Cooper, 2012). Climate finance is considered an integral element of the future climate regime to address climate change issues (Urperlainen, 2012). According to the United Nations Framework Convention on Climate Change (UNFCCC), developed countries have a moral obligation to support developing countries in addressing the consequences of climate change by providing sufficient financial resources. Through the Copenhagen Accord in December 2009, developed countries promised to provide US$30 billion for the period 2010-2012 and to mobilize long-term finance of US$100 billion a year by 2020. This funding supports developing countries to reduce greenhouse gases (GHG) emissions and facilitates adaptation to climate change impacts in the most vulnerable countries. This financing can originate from public and private, multilateral and bilateral, and other alternative financial sources (UNFCCC, 2009).

However, Carty et al. (2020) stated that the funding from developed countries had not reached US$100 billion per year as of the year 2020, mainly because negotiators never agreed on how to measure precisely the commitment (Timperley, 2021). In addition, Bhattacharya et al. (2020) stated that the accord does not specify the proportion of financing for each scheme, e.g., loans and grants, which complicates calculating its achievement. Therefore, according to Robert et al. (2021), the Paris Agreement stipulates that a new goal for climate finance must be agreed upon prior to 2025, with a minimum value of US

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$100 billion per year. Research commissioned by the UN Secretary-General also found that donors were over-reporting climate finance data by around US$3-4 billion (Nature, 2021). The absence of a clear definition, methodology, and rules in calculating funding under the UNFCCC causes developed countries to report all available schemes as "climate finance" (Bhattacharya et al., 2020; Carty et al., 2020).

More than 80% of climate finance in developing countries consists of loans (Nature, 2021). This type of loan scheme has several disadvantages, such as the obligation to be repaid on time with additional loan interest. It also tends to be directed toward projects that demonstrate a return on investment (Nature, 2021). Timperley (2021) states that there is a dominance of mitigation activities because loan schemes rarely fund adaptation activities. In 2018 of the total climate finance, mitigation finance reached 70%, while adaptation finance was only 21% and cross-cutting 9% (OECD, 2020). Another reason why most climate finance was used for mitigation compared to adaptation is that measuring the result of mitigation initiatives is easier (Timperley, 2021). On the other hand, most developing countries are highly vulnerable to climate change, so the funding of adaptation activities has to be fulfilled with the assistance of developed countries (Mertz et al., 2009). Nevertheless, Khan et al., (2019), have argued that the trend of climate finance allocations from developed countries is based on their vested interests instead of considering developing countries' actual needs.

Climate finance plays a vital role in supporting developing countries to mitigate and adapt to climate change impacts (Weiler et al., 2018). Article 2 of the Paris Agreement states that finance flows are essential to achieve the long-term goals of low GHG emissions and climate-resilient development. To date, climate finance has delivered a tangible impact through structural shifts in financial flows, policies, innovations, and other elements needed to move towards a low-carbon and climate-proof development pathway (Carty et al., 2020). To meet climate funding targets, both developed and developing countries must establish realistic plans through innovative financing and straightforward structures that can address their needs (Roberts et al., 2021). Nevertheless, in reality, most developing countries are only willing to invest limited resources to adopt and implement effective mitigation policies. Therefore, international support is essential to achieve the level of decarbonization required in developing countries (Urperlainen, 2012).

Indonesia is one of the developing countries that are vulnerable to climate change. The country has signed the Paris Agreement which was ratified by Law No. 16 of 2016. Indonesia then strengthened its commitment to reduce GHG emissions through its NDC document, pledging to reduce emissions by 29% (unconditional) and 41% (conditional) from the BAU scenario by 2030. International support for climate finance in Indonesia has considerably advanced. From 2007 to 2019 (cut-off date November 15, 2019), the country received cumulative international support for climate change of US$12,060 million, with a gradual realization of US$6,416 million (FPA, 2019). Nevertheless, ICF still needs to be enlarged to support Indonesia in increasing its resilience to the impacts of climate change, reducing vulnerability, and lowering GHG emissions in line with NDC targets. Therefore, this article analyzes the extent to which ICF can contribute to financing climate change mitigation and adaptation in Indonesia.

2. Revisiting literatures of ICF in developing countries

To date, there is no clear definition of climate finance. The UNFCCC generally identifies climate finance as local, national, or transnational funding to support the mitigation and adaptation of climate change (UNFCCC, 2014). Meanwhile, according to Nakhooda et al. (2014), climate finance refers to the financial resources mobilized to fund actions that mitigate and adapt to the impacts of climate change. Gupta et al. (2014) define climate finance more specifically for developing countries as a financial resource used to tackle climate change globally and serve as a financial flow to developing countries to assist them in coping with climate change. This last definition is in line with Watson & Schalatsek (2021), who defined climate finance as financial resources mobilized by developed countries to fund climate change mitigation and adaptation actions, including public climate finance commitments by developed countries. This article refers to climate finance as funding that aims to reduce GHG emissions, reduce vulnerability, and maintain and increase the resilience of communities and ecological systems against the negative impacts of climate change.

According to the OECD (2020), the total of climate finance mobilized by developed countries was US$78,9 billion in 2018, consisting of bilateral public, multilateral public, export credits, and private sector funding. Developed countries provide several financial instruments for climate finance, i.e., loans, grants, equity, and guarantees. In 2018, climate finance support from developed countries in the form of loans (US$46.3 billion) exceeded that of grants (US$12.3 billion) (OECD, 2020). The share of grants decreased from 27% in 2013 to 20 % in 2018 (ibid). Carty et al. (2020) also stated that most of the funding instruments provided by developed countries are loans and other non-grant instruments, including non-concessional financial instruments detrimental to developing countries by causing debt burdens. Thus, the current provision of climate finance in grants is still very minimal.

The financing imbalance between adaptation and mitigation has become a global trend (ibid). In 2018, total adaptation finance provided by developed countries reached US$16,8 billion, while finance for mitigation reached US$55 billion (OECD, 2020). According to Wijaya (2014), developing countries have limited capacity to cope with the impacts of climate change. Therefore, developed countries should bear the responsibility to fund adaptation efforts in developing countries.

The basis for calculating climate finance is still being debated (Bhattacharya et al., 2020). The Paris Agreement serves as a continuous urge for developed countries to meet their commitment. It is necessary to have globally agreed-on rules for counting what qualifies as climate finance to assess the achievement of these commitments. According to the UNFCCC Secretariat and World Bank reports, the global actions responding to climate change still face a huge financing gap (Zhang & Pan, 2016). One of the efforts to overcome the financing gap is to utilize ICF effectively by recasting the approach to climate finance through rethinking the objectives of climate finance flows, defining climate finance, and establishing more explicit rules on how climate finance instruments are used (Carty et al., 2020; Roberts et al., 2021).

In Indonesia, ICF contributes to financing climate change adaptation and mitigation projects through two multilateral and bilateral mechanisms. Multilateral mechanisms are provided by institutions such as Multilateral Development Banks (MDB) and United Nations (UN) agencies. There are two types of multilateral schemes: UNFCCC and non-UNFCCC financial mechanisms. Meanwhile, bilateral mechanisms are generally carried out through financial institutions from donor countries that operate in recipient countries. This agency has a mandate from the donor governments to provide long-term funding for both public and private sectors. Examples of such agencies are Agence Française de Development (AFD), Australian Agency for International Development (AusAID), United Kingdom Department for International Development (DFID), Kreditanstalt für Wiederaufbau (KfW), Japan International Cooperation Agency (JICA), Overseas Private Investment Corporation (OPIC), and United States Agency for International Development (USAID).

3. Methods

This research used qualitative analysis methods. Primary data were obtained through in-depth online interviews and discussions with key informants from the Ministry of National Development Planning (MoNDP), the Ministry of Energy and Mineral Resources (MoEMR), and the Ministry of Foreign Affairs (MoFA) representing relevant national actors, the Global Green Growth Institute (GGGI), and a multinational geothermal energy company in the period of December 2020 to

December 2021. All discussions and interviews were conducted in Indonesian.

These interviews aimed to collect data to assess the role of ICF in the achievement of Indonesia's NDC targets. First, the interviews identified the role of ICF by extracting information about climate finance: the definition and the role in achieving NDC targets, climate finance strategies (domestic and international), and international support in national programs related to climate change. Meanwhile, secondary data were obtained from regulations and policies related to ICF, Indonesian planning documents (e.g. the National Medium-Term Development Plan-RPJMN), and other relevant literature.

Qualitative content analysis (QCA) is a method for analyzing data and describing material that requires some degree of interpretation (Schreier, 2012). QCA is a descriptive process that focuses on summarizing the data by identifying the relations between the data. This paper used QCA for analyzing the results of in-depth interviews with stakeholders related to climate finance, supported by a literature review. We used a coding framework in the analysis process by defining the main categories as a reference for synthesizing the data results. The main categories are the aspects that will become the focus of the analysis (Schreier, 2012). The main categories used in this study are (1) Indonesia's NDC targets, (2) national strategies to achieve NDC targets, (3) climate change funding in Indonesia and national strategies for tapping climate finance, (5) climate change programs (SIEP and GGGI), and (6) issues relevant to Indonesia. As a case study, we focus on analyzing climate finance in the energy sector, as this is one of the main targeted sectors for NDC (FPA, 2019).

4. Results

4.1. An overview of international climate finance

Until now, the definition of ICF is still unclear and has not been agreed upon globally, nor are there globally agreed rules to calculate international climate finance (Roberts and Weikmans, 2017). The absence of an agreed-upon definition of international climate finance has made it unclear how much funding can count as part of the US$100 billion commitment by developed countries. However, based on an interview with the Director of Development, Economics, and Environment-MoFA (2020), Indonesia defines ICF as funding that was originally intended to finance climate change. Thus, although funding comes from international sources, it cannot be categorized as ICF if its aim is not for financing climate change.

"International funding, both grants and loans which aimed for climate activities are automatically included as ICF for achieving the conditional NDC target (41%)"(1).

International support for climate finance in Indonesia is well-developed. International funding support during 2007-2019 is dominated by the climate change mitigation sector (58%), climate change adaptation (9%), and cross-sector climate change mitigation and adaptation (33%) (FPA, 2019).

Apart from the absence of an agreed-upon definition of ICF, there are also no stardardized indicators to measure the success of achieving the NDC target (FPA, 2019). Monitoring of international funding support for climate change has not been carried out periodically. Based on the interview with the Director of Development, Economics, and Environment-MoFA (2021), the absence of clear rules in calculating climate finance and the difficulty of measuring the achievement of the NDC target has caused every country, including Indonesia, to use rules according to the perception of each country. This practice caused a lot of funding previously not categorized as climate finance to be claimed as climate finance. Weikmans and Roberts (2019) also stated that there is still no agreed definition on climate finance, so each country can decide what it counts.

"NDC targets are still difficult to measure, each country still used its own rules. Many cases that were not previously included in climate finance have turned into climate finance" (1).

The failure to measure the role of climate finance must be addressed, particularly by establishing more transparent rules about classifying climate finance (Roberts et al., 2021). Addressing this problem is critical, as according to FPA (2019), fulfilling Indonesia's commitment to reduce GHGs by 41% is still a challenge. Thus, Indonesia has to convince developed countries to increase their international climate finance to achieve the NDC target of a 41% GHG reduction.

4.2. Public funding as climate finance strategies

Climate finance is categorized into public and non-public funding in Indonesia (see Fig. 1). As reported by the Fiscal Policy Agency (Badan Kebijakan Fiskal, or BKF) and Climate Policy Initiative (CPI) (2014), climate change funding in Indonesia is dominated by domestic funding originating from the government budget (FPA, 2019).

In the Updated NDC document, Indonesia estimated that the amount of funding required to achieve the NDC target by 2030 is US$322.86 billion. A significant amount of funding is needed mainly by the energy and forestry sectors, which are the main target sectors for NDCs. Notably, the energy sector requires US$228 billion to fund the targeted GHG emissions reduction in the period of 2018-2030.

4.2.1. Domestic funding

Apart from Indonesia's global commitment to achieve the NDC target, National Medium-Term Development Plan (RPJMN) 2020-2024 also contains actions to address the impacts of climate change. The Indonesian government (GoI) has developed several funding mechanisms to finance climate change actions: Domestic Source, Foreign Loan, Domestic Loan, Government Securities (SBN), and Grants (MoNDP, 2020).

However, the GoI still faces obstacles closing the gap between climate finance availability and the required funds to achieve the NDC target. To meet climate financing needs, the GoI established an innovative financing scheme by issuing Green Bonds and Green Sukuk.

"There is a significant gap between the availability of climate finance and the ambition to be achieved. We need to find innovative sources of funding." (1).

Green Sukuk is a financial obligation instrument to encourage potential investors to finance green projects such as renewable energy development. As part of its efforts to fulfill the Paris Agreement, in March 2018, Indonesia successfully issued the first Global Green Sukuk. According to MoF (2019), the first issuance of Green Sukuk was utilized to refinance completed projects from the 2016 budget onward (51%) and to finance new projects from the 2018 budget onward (49%).

Green Sukuk enabled the development of renewable energy projects. However, according to the 2020 Green Sukuk Report, financing in the renewable energy sector has decreased from 2018 to 2019 (see Table 1). Furthermore, according to the 2021 Green Sukuk Report, no funding was allocated for the renewable energy sector in 2020. Nevertheless, the energy projects financed by Green Sukuk had contributed to increasing the electrification ratio and reducing emissions amounting to 1,319,620.41 tonnes from NRE Projects in 2017 (MoF, 2020). This contribution shows that Green Sukuk has a significant role in facilitating the achievement of Indonesia's 29% reduction target contributed by the energy sector.

4.2.2. International funding

Indonesia has experienced difficulties in tapping the ICF. Currently, ICF in Indonesia only contributes 34% of the total climate change funding. Of this total ICF, 58% is used for climate change mitigation, 9% is used for climate change adaptation, and 33% is used for the cross-sector projects (mitigation and adaptation). Based on an interview with a representative of MoFA, international donors provided no funding for adaptation through GGGI because adaptation projects are only classified as co-benefit of mitigation.

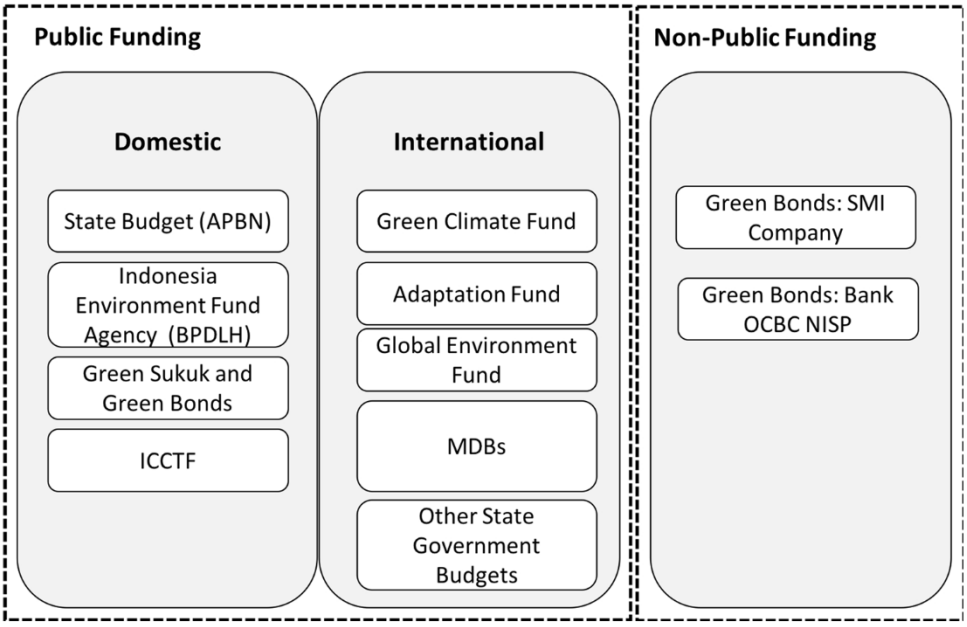

Fig. 1. Sources of Climate Change Funding in Indonesia.

Table 1
Green Sukuk issuance for NRE projects.

Year	Total Amount Issued
2018	USD 3,913,133.47
2019	USD 1,319,620.41

Indonesia faces constraints in tapping ICF, especially for grants because of Indonesia's status as a middle-income country and the 15th largest economy globally, as stated by a key informant from the MoFA:

"Grants/ODA are indeed difficult to tap because these are usually prioritized for low-income countries or countries with special needs. We, as the country with the 15th largest economic power in the world, are no longer a prioritized country"(1).

This statement is in line with the findings obtained from the MoF report that from 2007 to 2019, Indonesia received ICF support in loans and grants of USD 6.416 million. Moreover, based on the agreement on Foreign Grants and Loans (Pinjaman dan/atau Hibah Luar Negeri, or PHLN), the loan instrument dominates climate change funding (FPA, 2019) (see Fig. 2). The Indonesian government has developed more innovative funding mechanisms such as green sukuk and public-private partnerships to overcome the challenges of tapping international funding.

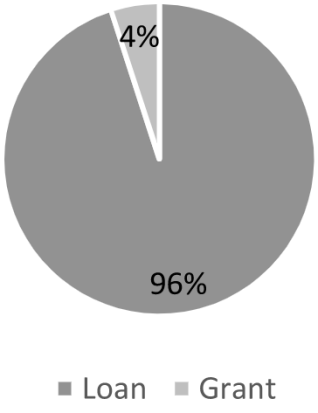

Fig. 2. Realization of Foreign Grant and Loan (PHLN) for Climate Change in Indonesia (FPA, 2019).

In most developing countries, grants are more in demand because they can finance adaptation and mitigation projects, while loans are generally limited to mitigation projects (Carty et al., 2020). This is because mitigation projects generally can generate returns on investment (Timperley, 2021). However, in the case of Indonesia, grants are no more desirable than loans, and the vested interest of the funders often influences their issuance. The amount of funding obtained is also generally limited (1).

Most of the grants obtained from international donors were directed to technical assistance for strengthening climate programs to achieve the NDC targets(4). Indonesia also has limited capacity to meet the requirements for tapping international climate change funding. In the case of the GCF, Indonesia has not taken advantage of it effectively until now due to a lack of capacity in composing qualified project proposals.

"Indonesia is still having constraints in submitting project proposals to the GCF due to limited capacity"(1).

Another problem with GCF is the time gap between submitting proposals to program realization, as was evident from an interview with the Secretary of NRE Directorate General, MoEMR (2020). This time gap between the submission process and the realization of the problems can cause the issues raised in the proposal to be no longer relevant to the previous problems. An example is the case of the Market Transformation for Renewable Energy and Energy Efficiency through Design and Implementation of Appropriate Mitigation Actions in the Energy Sector (MTRE3) program (a program related to RNE and energy efficiency). Its proposal was submitted in 2013-2014, but the funding was only obtained in 2017.

" The MTRE3 project proposal was submitted in 2013-2014 but only realized in 2017. In general, the time required from the submission of a proposal to the issuance of the budget for project implementation may take 2-4 years"(2).

Regarding the utilization of international funding by the private sector, an interview with a resource person from a multinational geothermal company reveals that the Asian Development Bank was directly involved in funding geothermal power projects in 2014, 2016, and 2018 through the Clean Technology Fund (CTF). Recently, this company has also started to inquire to the SMI Company and the World Bank on the possibility of using ICF for developing new geothermal power plants.

4.3. The case studies of international climate finance (ICF) in energy sector

International climate finance is an important source of funding for countries with a limited national budget to implement environmental legislation and energy policy (Cholibois, 2020). In Indonesia, the transformation of coal-based energy to renewable energy is supported by international donors consisting of the Global Green Growth Institute (GGGI) through the Sustainable Green Growth, Climate, and Environment program (SGGP) and the Asian Development Bank (ADB) through the Sustainable and the Inclusive Energy program (SIEP) (see Fig. 3).

Initially, GGGI focused on the forestry sector, but through a dialogue with the GoI, the GGGI agreed to also finance other sectors, including the energy sector (GGGI, 2021). The SGGP provides grants in the form of technical assistance to formulate policy recommendations for accelerating investment in renewable energy and energy efficiency. It also provides investment assistance through SMI Company Guarentees to finance derisking of renewable energy projects developed by private companies (Mudiantoro, 2019).

SIEP, a project financed by the ADB, provides policy-based loans to produce laws and decrees that enacted renewable energy investment and energy efficiency. Initially, SIEP focused on the electrification ratio (SIEP-1) through adopting economic tariffs for electricity and improving the role of the public sector. However, SIEP shifted its focus toward the development of renewable energy through various instruments and policies (see Fig. 4). The difference between activities carried out under the SIEP and SGGP projects is that the deliverables of the SIEP project were in the form of a legalized policy to support the implementation of renewable energy and energy efficiency initiatives. In contrast, the SGGP project only produced policy recommendations as a background study for the RPJMN 2020-2024. The formal policies produced the SIEP were generally in the form of ministerial regulations. SIEP also contributed to preparing presidential regulations relating to Renewable Energy and Energy Efficiency, namely Presidential Regulation No 77/2018 concerning Environmental Fund Management and Presidential Regulation No. 55/2019 concerning Acceleration of Battery-Based Electric Motor Vehicle Program.

In addition to SIEP's policy focus, ADB took a more practical approach with the private sector through the Clean Technology Fund (CTF). This CTF contributed to several geothermal power plant construction projects. Based on an interview with a resource person from a multinational geothermal company, this company obtained funding assistance from CTF in 2014, 2016, and 2018. The first project in 2014 was in line with the implementation of SIEP 1, while the second project in 2016 coincided with the implementation of SIEP 2, and the last project in 2018 coincided with the implementation of SIEP 3. Fig. 3 shows that ADB's approach comprises facilitating policy formulation and providing project finance.

"In developing geothermal projects, ADB is involved in funding because ADB is included in a consortium. Funding is carried out for exploration activities"[5].

4.3.1. Renewable energy (RE)

As a policy-based financing program, SIEP has supported the formulation of several renewable energy investment policies. These policies were the output of SIEP-3, which generally aimed to improve regulations to strengthen access to clean energy and efficient energy. Climate-related policies on preparing and utilizing environmental funds from BPLDH, included economic instruments mainly related to subsidies and access to clean energy and energy efficiency.

. Regarding renewable energy investment, GGGI's SGGP project produced several policy recommendations related to economic instruments (subsidies, taxes, and royalties) and information management programs (related to data management and community capacity,

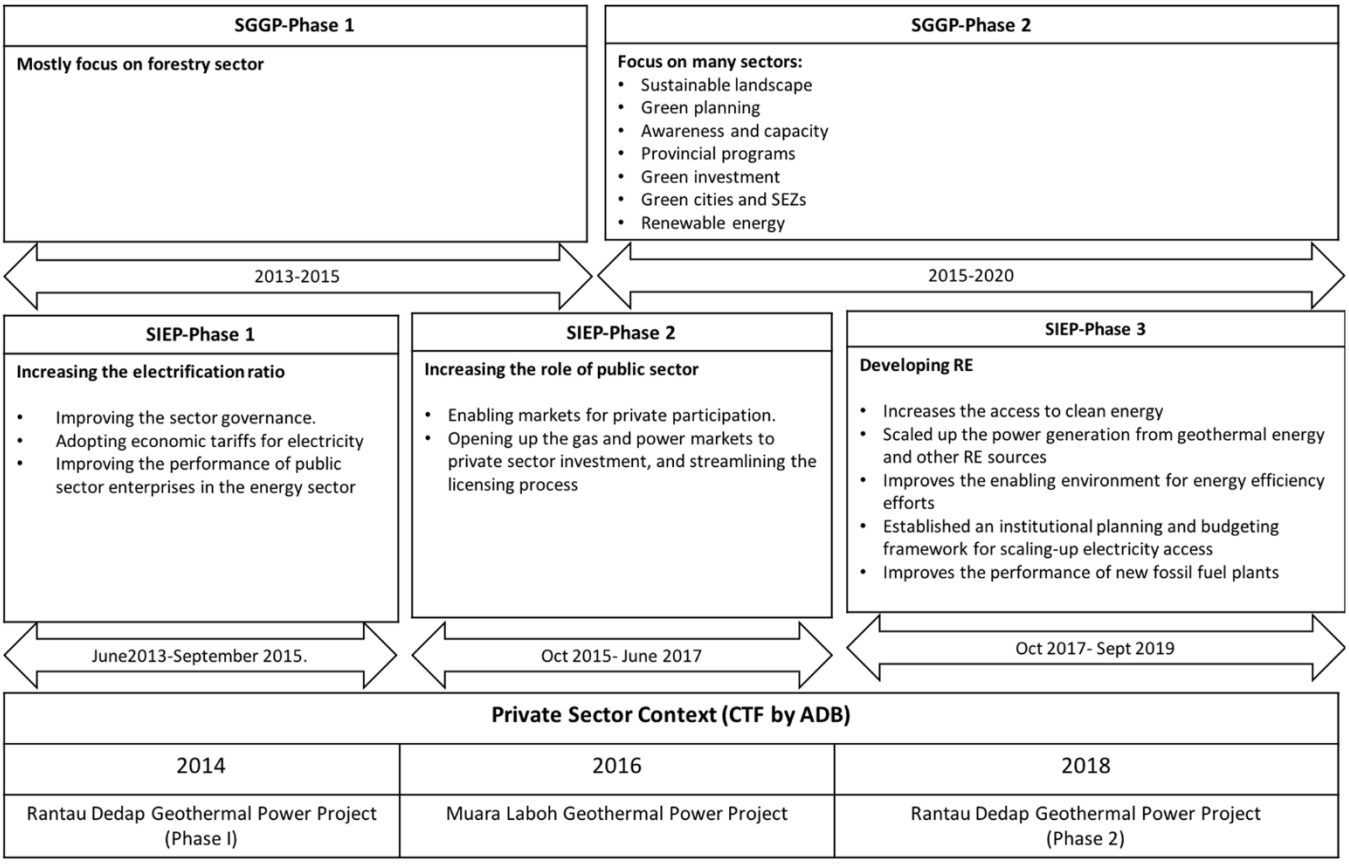

Fig. 3. International Climate Finance in the case of SIEP, SGGP and CTF (Authors' analysis, 2021).

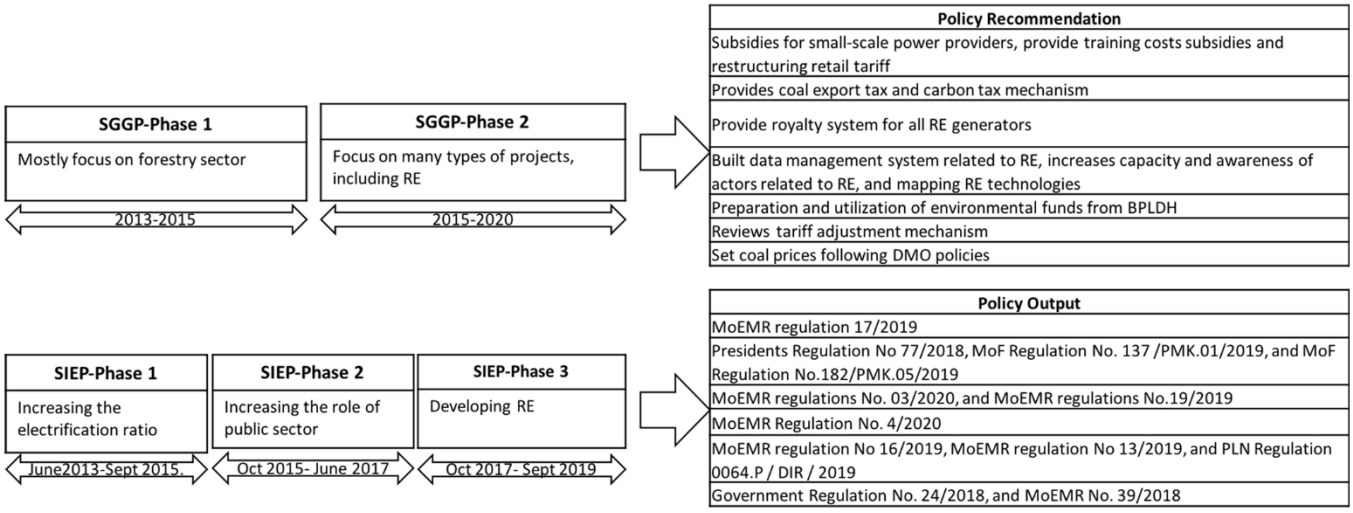

Fig. 4. Climate-related Policies Regarding RE Investment (Authors' analysis, 2021).

financing support, tariff adjustments, and bankability). The policy recommendations produced by SGGP are also in line with the outputs of SIEP-3, namely optimizing subsidies and preparing and utilizing environmental funds from BPLDH. In more detail, the policies produced by SIEP and SGGP are presented in the following scheme (see Fig. 4).

The SIEP and SGGP projects encourage renewable energy development by creating policies and policy recommendations that promote private sector involvement. For example, SIEP-3 produced MEMR Regulation No 16/2019 and MEMR Regulation No 13/2019 related to strengthening private participation by providing cost reductions for private installation owners, granting business permits for electricity supply, and facilitating the private sector transition to electric vehicles. SIEP-3 also promoted the involvement of the private sector in the supply of electrical energy through Government Regulation No. 24/2018 and MoEMR No. 39/2018. Under these policies, the Ministry of Energy and Mineral Resources and the Investment Coordinating Board enable the endorsement of integrated licensing services at the national and local levels for electricity projects to facilitate the faster implementation of independent power generation projects. Meanwhile, based on the SGGP policy recommendations, the involvement of the private sector in energy supply is also promoted by providing subsidies for small-scale power providers and a royalty system for all RE generators.

4.3.2. Energy efficiency (EE)

SIEP and SGGP both generated several policies in energy efficiency. For example, SIEP-3 produced an economic instrument related to energy efficiency, i.e., the procedures for providing subsidies to the PLN (Electricity State-own Company) based on specific fuel consumption and promoting the incentives mechanism on the electric vehicle program. Besides producing several economic instruments, SIEP also promotes energy efficiency by creating technical regulations on solar rooftop PV and floating solar development and formulating policies related to NRE as part of the green recovery from COVID-19. The policies produced by SIEP and SGGP are presented in more detail in Fig. 5 below.

As an effort to increase energy efficiency, SIEP-3 encouraged the issuance of Presidential Decree No. 55/2019 and the Minister Regulation of Energy and Mineral Resources No. 13/2020 related to the strategy of shifting cleaner fuels to the transportation sector.

5. Discussion

Although there is no agreed definition of International Climate Finance, ICF in Indonesia has enabled climate change mitigation and adaptation actions. Nevertheless, it is still a daunting challenge for Indonesia to meet its 41% reduction in greenhouse gases emissions through mobilizing international support. Therefore, a framework is needed to map donor support and optimize international funding, including a generally-agreed definition of ICF.

International support in Indonesia is still largely based on the preferences of donor countries. For instance, SGGP initially focused only on the forestry sector because Norway, as the leading donor, prioritized the forestry sector. However, over time by investigating local needs, Norway provided Indonesia the flexibility to use its funds for developing renewable energy. The MoNDP leads the RE program as chair of a joint

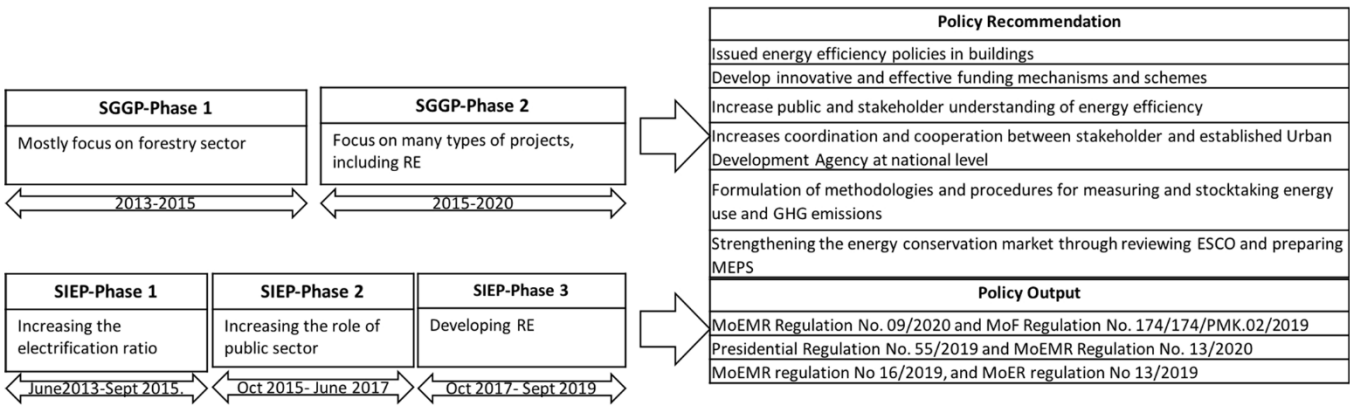

Fig. 5. Climate-related Policies Regarding Energy Efficiency (Authors' analysis, 2021).

steering committee representing the MoMER, the MoEF, the MoF, and government agencies from Central and East Kalimantan Provinces. As a result, the SGGP also produced policy recommendations related to renewable energy and energy efficiency.

International climate finance is in disbalance in supporting mitigation and adaptation in developing countries and those with a very high vulnerability to climate change. ICF is dominated by loans rather than grants. However, this type of instrument causes challenges for developing countries because loans need to be repaid on a term and are added with interest. Nevertheless, in the case of Indonesia, loans are considered preferable to grants by a key informant from MoFA.

"After being calculated quantitatively, the social and economic benefits obtained from projects funded by loans are greater than grants" (1).

Indonesia also has other types of ICF opportunities to access, such as the Green Climate Fund (GCF), Adaptation Fund (AF), and Global Environmental Fund (GEF). These funding sources are tremendous in terms of the total amount to be accessed, although they have been underutilized so far.

Developed countries have committed to providing US$100 billion per year to support developing countries reduce GHG emissions and the most vulnerable countries to overcome the negative impacts of climate change. However, until 2020, this commitment has not been fulfilled. The lacking climate support is partly due to the unclear ICF definition and process of calculating the ICF, which has caused each country to have a different perception of the commitments made.

The above background highlights that Indonesia cannot rely solely on international support. Instead, it is necessary to develop innovative financing to support the achievement of emission reduction targets. Currently, Indonesia has developed innovative funding in the form of Green Sukuk to meet climate finance needs. Such innovative financing of development needs to be strengthened and mainstreamed as a strategy in climate change finance to achieve the NDC targets. The Indonesian government (GoI) needs a tremendous amount of climate finance to meet these targets. Green Sukuk could play a significant role in implementing more energy sector programs towards this goal. Green Sukuk mechanisms also allow Indonesia to achieve the NDC target (29%) without compromising 41%. Currently, climate finance in Indonesia is still dominated by the public sector. The GoI needs to reduce the allocation of climate finance originating from the state budget, especially domestic sources. For that, a more innovative climate change financing strategy could include the following funding sources, such as the non-public sector through banking, the capital market, and securities instruments to attract domestic and international funding. Notably, Bangladesh has successfully met climate change adaptation funding by considering the private sector as a supplier of innovative goods and services to reduce vulnerability and exposure to climate risks. According to Atteridge (2011), the idea of tapping funding from the private sector is an effective instrument in developing countries to meet required climate change funding.

This research found that funding through the private sector has begun to be promoted in Indonesia, especially in the energy sector. The energy sector has the highest funding needs. It is also one of the main sectors in NDCs. Between 2018 and 2030, GHG emissions reduction in the energy sector are estimated to require funds of US$228 billion. Despite the increase in funding in Indonesia, the budget for the energy sector, particularly related to renewable energy, has continued to decline. This trend can be seen from the decline in the number of projects related to the energy sector and renewable energy in the State Budget (APBN). To address the significant funding gap in the energy sector and achieve NDCs targets, the Indonesian government urges the involvement of the private sector. Private sector involvement in energy supply is also promoted through the ICF. The national government could strengthen private sector involvement in renewable energy development by facilitating the SIEP and SGGP programs consisting of policies on incentives, subsidies, and permits for private parties, both installation owners and business license holders for electricity supply. Nevertheless, so far, the role of the private sector has not been counted as a national effort in achieving the 29% NDC target. Besides promoting the involvement of the private sector in the energy sector, SIEP and SGGP also support the achievement of Indonesia's NDC targets by stimulating the energy transformation from coal-based to renewable and more efficient forms of energy.

6. Conclusion

International support for climate finance should be strengthened to achieve the NDC target in Indonesia of reducing GHG emissions by 2030. Indonesia obtains international funding support through bilateral and multilateral cooperation in the form of loan and grant schemes. ICF has contributed to the development of innovative financing through the SIEP and SGGP, which generate policy outputs and policy recommendations to promote the involvement of the private sector through incentives, subsidies, and licensing facilities.

ICF in Indonesia continues to develop, but it also has many limitations. Several ICF opportunities, such as GCF, AF, and GEF, could be accessed more optimally by disseminating information on the standards required for each type of ICF source. In addition to optimizing existing funding for climate change, Indonesia should develop various financing instruments, such as optimizing the role of the private/non-public sector through banking instruments, capital markets, and securities instruments. Furthermore, although ICF is provided mainly through loan instruments, its provision through grant instruments in the form of technical assistance needs to be utilized optimally to strengthen efforts to achieve the NDC target.

Under the UNFCCC, developed countries should meet the commitment to provide US$100 billion a year by 2020 to support developing countries in reducing their GHG emissions and facilitate climate adaptation in the most vulnerable countries. Therefore, clear definitions, new rules, and accounting standards for climate finance under the UNFCCC are needed to ensure developed countries fulfill their commitments and developing countries receive the necessary support to respond to the impacts of climate change.

Notes

(1) Interview result from Director for Development, Economic, and Environmental Affairs, MoFA (February 24, 2021)
(2) Interview result from Secretary of NRE Directorate General, MoEMR, (March 4, 2021)
(3) Interview result from Green Investment Specialist-Global Green Growth Institute (February 11, 2021)
(4) Interview result from Deputy of New Renewable Energy and Energy Conservation, MoNDP (January 14, 2021)
(5) Interview result from Multinational geothermal energy company (December 08, 2021)

Credit authorship contribution statement

Djoko Santoso Abi Suroso: Conceptualization, Writing – review & editing. **Budhi Setiawan**: Conceptualization, Methodology, Writing – review & editing. **Pradono**: Conceptualization, Writing – review & editing. **Zahara Sitta Iskandar**: Writing – review & editing, Visualization. **Mulia Asri Hastari**: Writing – review & editing, Visualization.

Declaration of Competing Interest

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