Policy Brief

Indonesian Feed-in Tariffs: challenges & options

The Indonesian government uses Feed-in Tariffs (FiTs) to accelerate the deployment of renewable energy, in particular for small and medium scale projects up to 10 MW. FiTs provide private investors with known, guaranteed and consistent revenue that can help make a viable business case for renewable energy projects, which may have higher generation costs. However, the success of a FiT system depends on its design, adequate tariffs and the flexibility of the system to adjust to macroeconomic changes. The recent variability in the value of the Rupiah and rising domestic interest rates in Indonesia has had serious negative impacts on the viability of renewable energy projects. This policy brief introduces the Indonesian FiT system, analyses the impact of recent currency depreciation and monetary inflation, as well as provides some options for revising the FiT system to improve its effectiveness.

Renewable energy planning in Indonesia

Accelerated economic development in Indonesia has led to a rapid increase in the demand for power, with Indonesia's installed capacity almost doubling since 2001, a trend that is expected to continue in the coming decades. The expansion in capacity has largely been met through the construction of coal and gas-fired power stations, complementing existing oil-based generation facilities and diesel-powered generators that provide electricity to many of the small islands and remote communities across the archipelago. At the same time, the Indonesian government is promoting the deployment of renewable energy technologies at all scales, recognising their importance in contributing to the country's rural electrification, energy security and climate change goals.

Renewable energy policy in Indonesia is defined by two major regulations. First, a future energy mix that seeks to reduce dependence on oil; draft regulation was recently passed that specifies that new and renewable energy should contribute 23% of total energy use by 2025, a challenging increase from the current share of 6% (ESDM, 2014). Second, pledges made by the government to reduce greenhouse gas emissions (GHG); to unilaterally reduce GHG emissions by 26% by 2020 from a business as usual baseline, with an additional 15% reduction conditional on acquiring international support. Meeting these goals will require a huge increase in renewable energy in order to achieve the necessary growth and diversification. In achieving this, the participation of the private sector will be vital for providing much of the needed investment.

Approximately 85% of Indonesia's installed power capacity is owned and operated by the state-owned electric utility PT Perusahaan Listrik Negara (PLN), which is also the sole operator of transmission and distribution services. However in recent years approximately half of new capacity has come from the

private sector through independent power producers (IPPs). The Government of Indonesia has taken steps in recent years to reform the energy sector, placing emphasis on partial liberalization of the energy market, decentralized energy planning and increased transparency.

To facilitate private investment in renewable energy, in 2002 a Ministerial Decree on small-scale power purchase agreements was introduced, which obliged PLN to purchase electricity generated from renewable energy sources by IPPs. The ruling was originally limited to installations up to 1 MW capacity, but additional regulation in 2006 adjusted this to 10 MW, and introduced a minimum power purchasing contract period between the producer and PLN of 10 years (Winrock International, 2007).

Feed-in Tariffs for renewable energy in Indonesia

A Feed-in Tariff (FiT) is a common economic instrument used to stimulate investments in renewable energy technologies. A FiT is a premium price paid to renewable energy generators for a guaranteed period (often 10 to 20 years), which helps to offset the higher capital costs and associated risks concerned with renewable energy projects. FiTs are the most widely adopted renewable energy incentive policy; implemented in roughly 100 countries and states (REN21, 2013). In Indonesia, the Ministry of Energy and Mineral Resources (MEMR) have introduced FiTs for a range of renewable energy sources (Table 1).

Table 1: FiTs for renewable energy sources in Indonesia

Energy source	Feed-in tariff	Conditions	Relevant legislation
Geothermal	US$ 0.01 - 0.19/kWh	Depends on location, and whether the power plant is connected to a high- or medium voltage network	MEMR Regulation No. 22 of 2012
Mini and Micro hydro	Rp 656 - 1,506/kWh	<10 MW, dependent on location and whether connected to low or medium voltage network	MEMR Regulation No. 4 of 2012
Biomass	Rp 975 - 1,722.5/kWh		
Municipal solid waste (non-biogas)	Rp 1,050 - 1,398/kWh		
Municipal solid waste (landfill gas)	Rp 850 - 1,198/kWh		
Solar PV	Price ceiling US$ 0.25 - 0.30/kWh	Purchase agreements through tenders. Price ceiling dependent on use of 40% local materials	MEMR Regulation No. 17 of 2013

The rates for the Indonesian FiTs are understood to be established using PLN's 'electricity base price', which is the marginal production cost that would be incurred by PLN to produce electricity at the location of the renewable energy project.[†] The calculated electricity base price is also supplemented with a stipulated return for investors, set by the regulators (Hasan & Wahjosudibjo, 2014).

The allocation of the FiTs for the various technology categories (with the exception of solar), are adjusted dependent on location, assuming greater costs, and increased value to society, of providing electricity to less economically developed regions in Indonesia. For example, a hydropower project in

[†] This is often referred to as the avoided costs of production

Java or Bali, the most developed islands in terms of energy infrastructure would receive a FiT base rate of Rp 656/kWh, whereas an identical project in the more remote Maluku or Papua region would receive 1.5 times the base rate, to reflect the higher marginal production costs faced by PLN in producing electricity in these regions (Azahari, 2012). A higher FiT is also paid to projects which connect to lower voltage networks, to account for higher transmission losses, as well as the reduced reliability and often localized nature of such networks.

BOX 1: Sipansihaporas hydro plant

When the majority of current FiTs were announced in 2012 these were, by and large, considered to be appropriate to support investment by IPPs. However, the depreciation of the Rupiah in 2013 has had negative effects on the financial viability of renewable energy projects, which could threaten the ability of the Indonesian government in reaching their policy objectives.

Impacts of currency depreciation and inflation

For small and medium scale hydro, biomass and city waste projects, FiTs are denominated in Indonesian Rupiah. Similar to the currencies of a number of other South-East Asian countries, the strength of the Rupiah relative to the US dollar experienced a sharp decline in 2013 of approximately 25% (Figure 1).

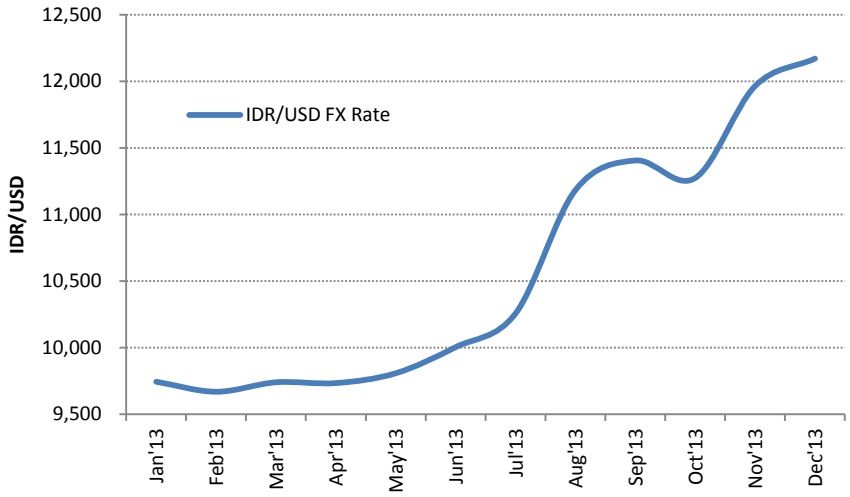

Figure 1: 2013 USD/IDR exchange rate (Bloomberg, 2014)

Renewable energy projects often require large up-front capital investments. In Indonesia, typically 50% to 80% of these investment costs are incurred in foreign currency (commonly USD) while project developers acquire loans denominated in Rupiah to cover these costs. Therefore, during the latter half

of 2013 due to the Rupiah depreciation, investment costs for investors have increased significantly. FiT rates on the other hand are static and many are denominated in Rupiah.

The second impact, linked to the currency depreciation, is the rising inflation rate in Indonesia. Inflation rose from less than 5% in January to 8.4% by December 2013. High rates of inflation have a detrimental effect on capital investments as they reduce the real returns to an investor during the lifetime of the investment. Indonesia currently operates a flat tariff structure, meaning that the tariff rates are not adjusted for inflation during the lifetime of the power purchasing agreement. A FiT established during a period of relatively low inflation could therefore have a negative effect on investments when inflation starts to rise.

The rise in inflation also represents another problem for renewable energy investments in Indonesia. In order to control inflation, the Indonesian central bank increased interest rates from a relatively stable 5.75% between January and May 2013, to 7.5% in December (Figure 2). Many investors in renewable energy projects in Indonesia are exposed to variable rate loans from local banks, therefore the interest rate fluctuation is an additional risk. Higher interest rates will mean higher debt repayments for investors who typically leverage investments with 70% debt. This results in a lower rate of return, the so-called financial internal rate of return (FIRR), of projects reducing their attractiveness to investors.

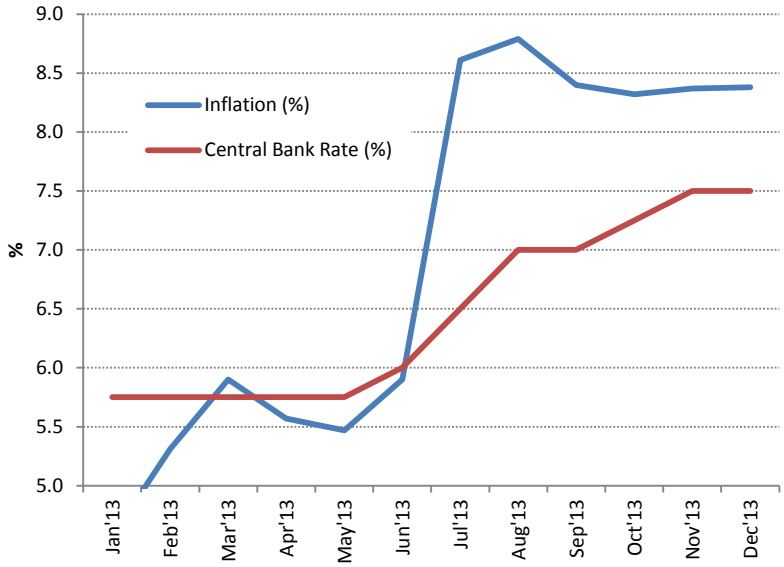

Figure 2: Inflation and central bank interest rates in Indonesia in 2013

In summary a distinction can be made between the impacts on new projects and the impact on existing projects. For new projects, currency exchange is necessary to cover capital costs for project components sourced internationally; therefore a weak Rupiah lowers the purchasing power of the Rupiah and increases the investment costs. In terms of existing projects, where revenues are received in Rupiah, returns are diminished due to higher borrowing rates on variable loans. There is also an additional risk for foreign investors of lower returns if they need to exchange revenues received in Rupiah back into their domestic currency.[‡]

To demonstrate the combined impact of these two effects on the attractiveness of new renewable energy projects, Figure 3 shows how the expected return of a typical small hydropower project in

[‡] There are also new restrictions on foreign investment which may further reduce growth of the renewable energy sector.

Indonesia could have fallen by almost 50% over the past year. Investors generally seek returns in excess of 20%, therefore a fall in returns of this magnitude will inevitably lead to projects not being developed.

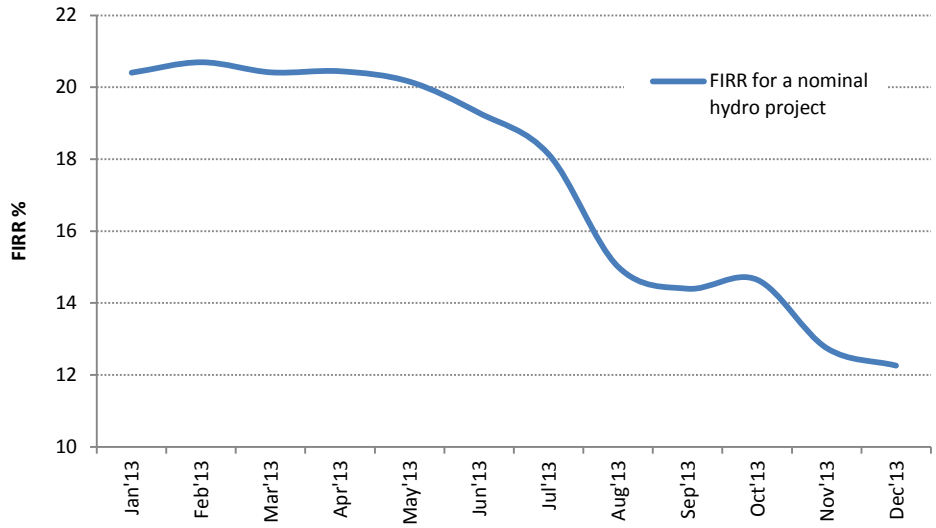

Figure 3: Impact of the Rupiah depreciation and interest rate rise on nominal hydropower FIRR in Indonesia

In order to achieve a similar return to investors in December 2013, as was achieved in January 2013, FiTs would need to have increased by approximately 28%.

FiT Reform

It is clear that without improvements in the macroeconomic circumstances, the Government of Indonesia will need to reform the FiT system in order for them to be effective at stimulating investment in renewable energy projects. No silver bullet exists in terms of how to counteract the two effects of a depreciating local currency and increasing interest rates. Combinations of policy options are available to counter these risks and improve the attractiveness of renewable energy projects. There are also other approaches to FiT system design in other Southeast Asian countries that may provide some valuable insights (Box 2).

One option available to mitigate currency risk is to use financial derivative instruments such as currency swaps and foreign exchange forward contracts, which are available through several financial institutions[§]. However, using these types of instruments is an expensive strategy to adopt and the costs can all but negate any financial benefits gained from mitigating the currency risk. Public funds using currency hedging products are already in existence, for example the Currency Exchange Fund, which is supported by the Dutch government, provides hedging products for currencies at a lower cost than commercial banks. It is possible that in the future something similar could be introduced in Indonesia; however there are major limitations with using these instruments, in terms of availability and cost in Indonesia and for small scale projects where such instruments may not be cost effective.

[§] TCX is one such company that provides currency hedging products. See here for more details https://www.tcxfund.com/

One method to reduce the impact of currency risk on projects is to index a portion of the FiT payments made for renewable energy output to a relevant foreign currency. The proportion of project revenues that are exposed to currency exchange risk, via the FiT which is paid in Rupiah, could be indexed to a foreign currency (e.g. the US dollar). In this case, the government would accept some currency risk exposure, but could potentially benefit from a reduction in the cost of supporting renewable energy of 30% or more, versus simply paying full FiTs in a foreign currency (CPI, 2014). This also helps avoid any potential currency hedging costs that can be responsible for a large share of the difference between developed and emerging country debt costs (CPI, 2014). As noted, the simplest, but also more expensive, option for the Indonesian government would be to pay the FiTs in US dollars, which is already the case for the Solar PV FiT. However, the government must be willing to accept the full transfer of currency risk from the investor to themselves.

BOX 2: Approaches to FiT system design in other Southeast Asian countries

FiTs have also been selected as fundamental policy instruments for accelerating the deployment of renewable energy technologies in other Southeast Asian countries.

In 2008, the **Philippines** passed its Renewable Energy Act that stipulated the introduction of a FiT system. As of 2012, tariff rates have been established for run-of-the-river hydroelectric, biomass, wind and solar power, guaranteed for a period of between 12 and 20 years, denominated in Philippine pesos. The tariffs awarded are based on the actual levelized cost of generating electricity from the project (including connecting to the grid), plus a set return on invested capital. Notably, the ERC will adjust the FiTs annually to allow pass-through of local inflation and foreign exchange rate variations. The methodology used for this adjustment can be found in the FiT rules (ERC, 2010). Rates are reviewed every 3 years and adjusted based on national targets for deployment and technology costs.

Malaysia's Renewable Energy Act of 2011 also introduced the use of a complex FiT system. FiTs are available for four main technologies - biogas, biomass, small hydropower and solar photovoltaic systems. Tariff rates distinguish between the type and size of installation, with a maximum installation size of 30 MW applicable for FiTs. The maximum FiT period varies between 16 and 21 years for different technology categories, and annual degression rates of between 0% (small hydropower) and 20% (solar photovoltaic) are applicable, based on assessments of technology costs. The Sustainable Energy Development Authority (SEDA), responsible for the calculation of the tariffs, use a methodology incorporating the levelized cost of energy for each project, plus a set return on investment(Green Prospects Asia, 2013). The tariffs are disbursed in Malaysian Ringgit, and are not indexed to inflation or currency fluctuations during the contract period.

The FiT could also be adjusted automatically and periodically in line with inflation. The aim here would be twofold, firstly to offset the impacts of a Rupiah depreciation, and secondly to counteract the interest rate effect on debt repayments. By increasing the FiT proportionally so that revenues increase in line with the rising periodic debt repayments, investors with variable rate loans will be less exposed to interest rate fluctuations. This approach has been adopted by the Philippines, who annually adjust tariffs rates for the entire contractual period based on the national Consumer Price Index (CPI) (Box 2). Uganda also adjusts Operation & Maintenance costs to account for inflation (UNEP, 2012).

A further mechanism that could be used is to offer a premium, which is built-in to the FiT to cover currency and interest rate risk faced by investors in renewable energy projects in Indonesia. This would simply mean an increase in the FiT from the outset to generate increased revenues for project developers and improve the attractiveness of investments in the sector. A FiT fund concept, that would 'top-up' payments has already been considered in the geothermal sector in Indonesia (Rickerson and Beukering, 2012). The idea behind the fund involves offering a guaranteed premium power price to geothermal projects that struggle to move forward because of the low power prices offered by the Indonesian state utility PLN. The fund idea is still being developed. Although different conditions apply, a similar approach has been adopted in the Uganda GET FIT scheme.[††]

Next steps

The current FiT system in Indonesia has provided an excellent basis for establishing an industry, but for the country to reach its targets for accelerating renewable energy generation, then that system should be revisited to ensure that companies are incentivised to develop new projects.

Good practice says that more transparency in the calculation methodology and foreseen adjustments of feed-in tariffs can increase investor confidence. Regular reviews of tariffs, for example annually, can allow changing macroeconomic conditions and technology costs to be accounted for. In addition there are a number of options that could be considered for addressing currency and inflation risk, such as pegging (part of) payments to a foreign currency, including inflation adjustment in the design and providing premium payments through an international fund.

Other Southeast Asian countries are progressing through an initial phase of FiT implementation and can also provide insights with regards to market response and expected investment. A more detailed comparative review of FiT implementation and performance may provide further indications of best practice for FiT system design in the region.

The viability of RE projects is controlled by more than just FiTs and macroeconomic conditions. In parallel to taking action on FITs, there is also a need to continue to build technical capacity within the industry, engage with the financial sector to encourage lending and provide certainty in infrastructure quality to new projects; ideas that are being developed by ESDM within the scope of the MitigationMomentum project that publishes this brief.

[††] For more details please see www.getfit-uganda.org/about-get-fit/

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