

# The fossil-fuelled feed-in tariff

Indonesia is mulling a novel approach to supporting renewable energy development that could replace donor and government funds with private investment. **Wilson Rickerson** and **Georges Beukering** explain

**T**he financial community is grappling with how to deploy capital most effectively for sustainable energy in emerging economies. The annual investment required to achieve energy transition on a global scale is projected to be hundreds of billions of dollars each year. The challenge of meeting this demand has inspired the development of several innovative financial concepts in recent years.

Most of these concepts envision the use of public grant funds to attract private capital by 'buying down' project risk. But given that public sector resources are limited, they will not be able to scale up sufficiently to meet the required capital demand.

However, a new renewable energy finance concept being developed by the Netherlands Development Finance Company (FMO<sup>1</sup>), the Dutch Ministry of Economic Affairs, Agriculture and Innovation's NL Agency, and the Indonesian government would forgo the use of aid funds and would instead seek to attract private sector investment using the prospect of increasing fossil fuel prices.

The Indonesian Feed-in Tariff (FiT) Fund has been developed to help develop geothermal projects in Indonesia. However, there is no reason that the concept – as outlined below – could not be deployed elsewhere in the world and for other types of renewable energy.

### Indonesia's renewables opportunity

Indonesia is home to 40% of the world's geothermal resources, or the equivalent of 27GW of potential electricity generating capacity. Approximately 10GW is thought to be economically viable, but only 1GW has been developed to date. Indonesia is experiencing rapid economic growth that will require the addition of 5GW of new generating capacity each year for the next decade.

Historically, Indonesia has relied on heavily subsidised oil-fired power plants to meet electricity demand, but

the country is attempting to diversify away from oil by significantly expanding its fleet of coal plants. The prices of both oil and coal have increased dramatically in the region, however, and are projected to continue to rise in the future.<sup>2</sup> These price increases have driven up the cost of electricity and therefore the cost of subsidies. In addition to new coal generation, the government is also pursuing an ambitious 25% renewable energy goal by 2025, with a heavy emphasis on geothermal and hydro.

Despite Indonesia's large and untapped resource, geothermal development has been hampered by a range of barriers such as exploration risk,

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permitting and siting issues, and the price paid to geothermal projects for the power they generate. The FiT fund aims to address the pricing barrier, while working in parallel with other efforts to address exploration and development risk.

During the past few years, geothermal developers have been awarded power purchase contracts through competitive tenders. The state utility

of Indonesia, Perusahaan Listrik Negara (PLN), is then required to purchase power at the prices awarded. A regulation issued in early 2011, however, capped the purchase price at \$0.097/kWh. This cap effectively blocked the development of promising projects whose contract prices are higher than the cap.

The goal of the FiT fund is to enable these projects (and others that were similarly derailed by low purchase prices) to move forward by 'topping up' the payments the projects would receive. The fund would be structured such that the utility company, responsible for purchasing the produced power, would pay a rate for geothermal power that is indexed to the price of fossil fuels. As the price of fossil fuels rises over time, the fund's investment would be paid back.

### The fund concept

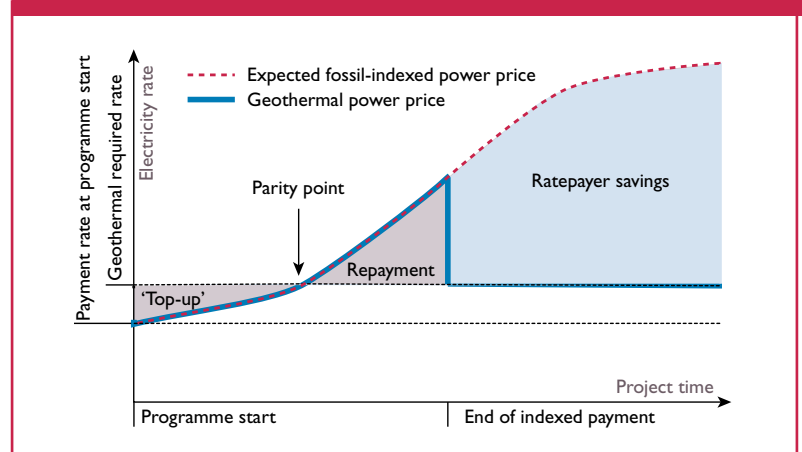
The fund is designed to provide geothermal projects with the income stability offered by a feed-in tariff policy, without the need to implement a feed-in policy at the national level. It would be implemented in several steps, as illustrated in Figure 1.

■ **Fund creation.** The FiT fund would be capitalised by development banks such as FMO and by other commercial equity providers.

■ **Project identification.** The fund identifies private geothermal projects that cannot be developed because the price they would receive for produced electricity is too low to attract investment.

■ **Investment.** The fund will provide funds to 'top up' the payment received by the generators per produced kWh of electricity in order to close the gap between the rate that these projects

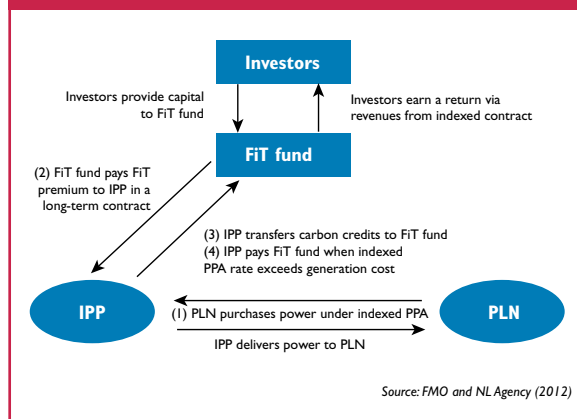
## I. Indonesian FIT fund mechanism



<sup>1</sup> Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden

<sup>2</sup> According to the International Energy Agency's World Energy Outlook Current Policy scenario, for example, coal prices are projected to increase from \$99 to \$209 per ton by 2035, oil prices from \$78 to \$247 per barrel, and natural gas prices from \$11 to \$26.8 per million Btu.

## 2. Indonesian FIT fund structure



receive and the rate that they need for development. This top-up required will vary over time, depending on changes in fossil fuel prices. The developer, however, will always receive a fixed price, based on a combination of a base price from the utility – which would be indexed to fossil fuel prices – and the top-up from the fund.

■ **Repayment.** The fund would be repaid from the project's electricity revenues. In order for the concept to work, the utility will need to agree on a mechanism whereby the purchase price for geothermal electricity is indexed to the price of the key energy commodities that influence wholesale power prices in Indonesia.<sup>3</sup> The price of fossil fuels is projected to rise over time, which will increase the price paid to geothermal generators. As long as the price for electricity rises, the top-up paid by the fund decreases and will eventually become negative. This is the point at which the fund will start earning back its investment. Put another way, once the price paid under the indexed contract rises above the rate that the geothermal developer requires, the fund will be paid back.

■ **Carbon credit sales.** The project would also transfer the rights to carbon credits in order to provide the fund with an additional stream of revenue from the sale of such credits.

■ **Ratepayer savings.** Once the fund has been paid back, the indexed contract would drop to the rate that the geothermal generator requires to operate (eg, 9.7c/kWh in Figure 1). This would generate savings for both Indonesian ratepayers and taxpayers (ie, in the form of reduced electricity subsidies) since the geothermal payment rate would likely be lower than the price otherwise paid for electricity from fossil fuels.

Figure 2 provides an additional view of how the relationships around the FiT fund are proposed to be structured. As can be seen, PLN purchases power from independent power producers (IPPs) under indexed contracts (1). The fund pays the IPPs the top-up so that they get the rate that they need in order to develop their projects (2). Over time, the IPP would transfer carbon credits to the fund (3) and the fund would be paid back using the income from the indexed contract (4).

### Fund feasibility

The fund concept was first proposed by the National Development Planning Agency of Indonesia (Bappenas), which partnered with FMO and NL Agency to conduct a feasibility assess-

ment of the concept in 2011. The key findings of the feasibility assessment were that:

■ There are no regulatory or legal barriers to designing such a fund. PLN would need to agree to contracts indexed to fossil fuel prices, but there is precedent for PLN doing this in the past for both geothermal and conventional generators.

■ Assuming a portfolio of projects with a combined capacity of 330MW, and assuming that fossil fuel prices follow the International Energy Agency World Energy Outlook 2011 projections, the fund could support a top-up payment of close to \$0.02/kWh and still generate an acceptable internal rate of return for the equity investors (eg, around 15–25% annually). This return was calculated without consideration of potential carbon credit revenues. The inclusion of carbon credit revenues would enable the fund to achieve its target returns in a shorter period of time.

■ Indonesian ratepayers and taxpayers would also benefit from the fund because it would unlock low-cost geothermal projects that might otherwise not move forward. Also, the lower rate paid by PLN after the fund is paid back could generate savings in avoided retail price increases and/or electricity subsidies of \$2.7 billion over a 35-year period.

The primary risk to the FiT fund concept is that commodity prices will trend downward rather than upward, which could drain fund resources. It is proposed that a combination of an Asian-style put option hedging 80% of the commodity indexes, as well as a foreign government guarantee and a power purchase agreement price floor from PLN, could be utilised to address this risk. These risk mitigation options were taken into account in both the fund feasibility modelling and accompanying sensitivity analyses.

### Potential in Indonesia and beyond

Although worst-case scenarios were considered (eg, near-term and significant declines in commodity prices because of economic recession), the assessment conducted by FMO and its

project partners found that the fund was feasible. Subsequent discussions with the Indonesian government have concluded that the fund could be a useful policy tool for unlocking geothermal capacity. From the investor side, there has also been interest in the concept from both commercial and development banks.

FMO, NL Agency, and Bappenas are therefore moving forward with their discussions with PLN and other Indonesian stakeholders to explore fund implementation. Indonesian government representatives have also indicated that the project's focus on pricing has had a positive influence on the development of new regulations. Commercial interest in the fund concept during the past year, for example, was a motivating factor in the development of new renewable energy policies – such as the August 2012 decree which created a new feed-in tariff regime, with regionally differentiated price floors for geothermal that range from \$0.10/kWh in Sumatra to \$0.18/kWh in Papua.

The promising initial findings of the assessment have raised interesting questions about whether the fund concept could be scaled-up to attract private capital, and under what circumstances. Although the concept was initially developed for Indonesia, the factors that motivated its development – ie, rapidly expanding electricity demand, rising fossil fuel prices, and untapped renewable energy potential – are not unique to the country. It is likely that the fund concept could be implemented in other fossil fuel-dependent countries around the world and to support other renewable energy technologies. Essentially, the fund is a hedge against rising fossil fuel prices, allowing governments to accelerate renewable power uptake with the same costs as fossil-generated power.

FMO and its partners plan to screen additional countries to determine where else and under what circumstances the concept could be applied. In the near-term, there may also be opportunities to connect the fund concept with other innovative financing initiatives in order to reduce or remove the need for grant funding to support renewable energy prices. **EF**

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<sup>3</sup> For the purposes of the study, it was assumed that the contract would be indexed to a basket of fossil fuel indexes that is weighted to reflect Indonesia's current electricity mix: ie, coal – 47% (indexed to API6), oil – 33% (indexed to WTI), and natural gas – 20% (indexed to AFEI).