

# SE Asia renewables

## Green tigers leap up

**T**he nations of Southeast Asia have some of the most abundant renewable energy resources in the world. As governments formulate policy reforms to encourage the development of renewable energy, we take a look at the markets and regulatory regimes in three countries that could be set to take off: the Philippines, Indonesia and Thailand.

### THE PHILIPPINES

More than 10 years after the act had first been introduced, the Philippine legislature finally enacted the Republic Act No 9513 or the Renewable Energy Act of 2008 (the RE Act), a landmark piece of legislation providing a regulatory framework for the renewable energy industry, which could make the Philippines one of the first Southeast Asian nations to have a renewable energy market as sophisticated as those of the US, Germany, Spain and other developed nations.

### Renewable energy sector background

To-date, most renewable energy efforts in the Philippines have related to hydro and geothermal power. At the end of 2007, the total electricity generating capacity of the archipelago nation was 15,937MW. Hydropower constituted 20.64% of the generation mix, geothermal 12.29% and other types of renewable energy less than 1%.<sup>1</sup> The Philippines is the world's second-largest producer of geothermal power, with a current generating capacity of 1,900MW.<sup>2</sup>

In addition to hydro and geothermal, the government also sees other forms of renewable energy as being an important part of its future energy mix. With more than 7,000 islands, electrifying outer-lying rural communities is a serious issue. Small-scale solar, wind and micro-hydro generators are ideal for villages located in far-flung areas where connecting to regional grids would

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be prohibitively expensive. The Department of Energy (DOE) has stated plans to develop these and other renewable energy sources in the Philippines' Power Development Plan 2004–2013.

### Renewable Energy Act

On December 16 2008, more than a decade after it was first introduced, President Gloria Arroyo signed and thereby passed into law the RE Act. The Act generally provides incentives and increased grid and market access for renewable energy projects, while also, among other things, setting policies for rural (off-grid) electrification and a green pricing mechanism to promote the consumer's option to purchase power generated from renewable sources.

### Regulatory structure

The RE Act establishes a formal regulatory structure for the renewable energy industry. The National Renewable Energy Board (the NREB), a president-appointed advisory panel created under the RE Act to oversee its implementation, comprises industry stakeholders, including representatives from concerned governmental departments, developers, distribution utilities, government financial institutions, NGOs and others. The Renewable Energy Management Bureau (the REMB), a sub-department under the DOE, also created under the RE Act, is charged with carrying out the information dissemination, research, monitoring and supervision functions made necessary by the policies outlined in the RE Act. The IRR (defined below) appoints the DOE to be lead agency mandated to implement the RE Act's provisions.

The RE Act also establishes the Renewable Energy Trust Fund to be administered by the DOE as a special account for government financial institutions such as the Development Bank of the Philippines, the Land Bank of the Philippines, the Philippine Export-Import Credit

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Agency (PhilEXIM) and others. The fund is to support the development of renewable energy by providing capital to finance R&D (especially the development of new resources to maintain national competitiveness), conduct nationwide resource and market assessment studies, and support knowledge accrual by providing grants to research institutions.

## Implementing rules and regulations (IRR)

The DOE issued the department circular titled the Implementing Rules and Regulations (IRR) of Republic Act No. 9513 (the IRR) on May 25 2009. The IRR sets out clear, detailed guidelines as to how each of the high-level policies of the RE Act are to be carried out. In addition to providing regulations for the development of renewable energy resources, the IRR also clarifies the responsibilities of the government entities to be involved in the renewable energy industry and their relationship to the NREB.

## Key policies further detailed in the IRR

Employing the framework set out in the RE Act, the IRR restates key policies, names the entities responsible for carrying them out and provides timeframes for their completion. Detailed rules are to be formulated, reviewed and enacted within one year of the passage of the RE Act in most cases. Key policies mentioned in the RE Act and further detailed in the IRR include:

1 – The creation of renewable portfolio standards (RPS) pursuant to which power generators, distribution utilities and suppliers must source or produce a certain percentage of their electricity from renewable-based sources;

2 – The establishment of feed-in tariffs and priority privileges to be enjoyed by generators employing certain types of renewable resources (notably, not geothermal) for at least 12 years;

3 – The development of a net-metering protocol, whereby qualified end-users may connect and supply power to the grid (including small-scale home and office solar PV units) to be netted against electricity delivered by the distribution utility; and

4 – The formation of a renewable energy market for the trading of RE Certificates.

## Incentives for developers and other renewables stakeholders

As is true elsewhere in the world, the generation of electricity in the Philippines from renewable resources is an expensive proposition. To help offset the requisite exploration and/or technology costs, the IRR details a comprehensive set of incentives to entice investors to develop renewable projects and reward those who have invested in existing renewable projects.

The incentives are offered to developers possessing a Certificate of Endorsement issued by the DOE through

the REMB, including developers of hybrid systems utilising both renewable and non-renewable based energy sources, in proportion to and to the extent of their project's renewable energy component.

Incentives include the following:

1 – Seven-year income tax holiday, available for new or existing projects, in each case starting from the commercial operations date. New and additional investments in an existing project also qualify for this, but only in respect to income attributable to the new investment and any one project may not enjoy the tax holiday for more than 21 years;

2 – Duty-free import of machinery and equipment needed for the project (regardless of whether the same is available in the Philippines) for 10 years from the registration of the project;

3 – Special realty tax rate of 1.5% on net book value of civil works, equipment, machinery and other improvements used for renewable energy facilities;

4 – Carry-over of net operating loss from the first three years of commercial operations as a deduction from gross income for the next seven consecutive taxable years;

5 – Corporate tax rate of 10% after expiration of the income tax holiday (or for qualified existing projects, upon the effectivity of the RE Act), provided that the developers pass on the savings to end-users in the form of lower rates;

6 – For projects failing to receive an income tax holiday before full operations, accelerated depreciation at twice the normal rate;

7 – Zero percent value-added tax on the sale of power or fuel from renewable sources, the purchase of local goods, properties and services for project development purposes, and payment for services in connection with the exploration and development of renewable sources;

8 – Tax-free sale of carbon emission credits; and

9 – Tax credit equivalent to 100% of the value-added tax and customs duties that would have been paid on machinery, equipment, materials and parts purchased locally had they been imported, provided that the purchase is made from a DOE-approved Philippine supplier.

In addition to incentives offered to developers, the IRR goes on to detail incentives for manufacturers of renewable energy generation equipment and farmers who plant biomass resources, as well as incentives for end-users to promote rural electrification and the use of net metering.

## Resource development contracts

The IRR provides that all sources of potential energy are owned by the state and that each developer must enter into a Renewable Energy Service/Operating Contract (RE contract) with the government (through the president or the DOE) under which the developer will have an exclu-

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# Indonesia has passed several laws intended to facilitate renewables

sive right to explore and develop a particular area for a specified period. The RE contract may have a term of up to 25 years (renewable for up to 25 years) and will cover two stages: pre-development (preliminary assessment and feasibility study up to financial close) and development (construction and installation of facilities up to operations).

As consideration for granting the exclusive right to utilise Philippine natural resources to the developer, the government receives 1% (or 1.5% in case of geothermal RE contracts) of the gross income received by developers attributable to sale of renewable energy. This "Government Share" is split, with 60% to go to the national government and 40% to the local government. The Government Share is not collected for biomass projects or projects on a micro scale less than 100kW.

The DOE has provided some further detail on RE Contracts in its circular titled Guidelines Governing a Transparent and Competitive System of Awarding Renewable Energy Service/Operating Contracts and Providing for the Registration Process of Renewable Energy Developers (the Guidelines), issued on July 12 2009. Under the guidelines, RE contracts can be awarded by competitive bid, direct negotiation or arrangements for existing projects can be converted to RE contracts in order for the projects to avail of the incentives provided under the RE Act. Direct negotiation can only be used to award new RE contracts if there is only one applicant for a project or for areas for which there is limited technical data (dubbed "Frontier Areas").

Under the IRR and the Philippine Constitution, RE contracts may only be entered into by Filipino citizens or corporations or associations at least 60% of whose capital is owned by Filipinos, although a special exemption is made for large-scale geothermal contracts under the Guidelines. The Joint Foreign Chambers of Commerce in the Philippines have expressed disapproval at this limitation on foreign developer investment in wind, solar and ocean energy and have requested a review of the interpretation of the IRR and the Constitution on the grounds that this limitation seems to conflict with the policy objectives at the heart of the RE Act.<sup>3</sup> There is also some controversy as to whether allowing wholly foreign corporations to invest in geothermal projects under the guidelines is in fact constitutional.<sup>4</sup>

## Looking forward

As noted above, within the next year or so the rules and regulations outlined in the IRR will be formalised, concerns surrounding foreign investment will likely be addressed and the picture will become clearer for developers. The response from the private sector has already been positive; the Philippine Star reported on July 14 2009, that there are now more than 100 renewable energy projects in the pipeline for investors influenced by the attractive incentives offered by the RE Act.

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## INDONESIA

The government of geothermal resource-rich Indonesia has recently announced a second phase of its "crash programme" whereby it expects to develop 10GW of installed generating capacity by 2014. A large portion of this has been set aside for geothermal power plants. The government will offer up most of the projects to private investors, and some projects have already been awarded. This section provides a brief history of geothermal development and legislation in Indonesia to-date, and describes certain obstacles that discourage developers from investment.

### Abundant resources but limited development

The Ministry of Energy and Mineral Resources (EDSM) has estimated that Indonesia has the geothermal resources to develop more than 27,000MW of installed generating capacity.<sup>5</sup> As of July 2009, however, just 1,057MW of geothermal-based capacity had been developed.<sup>6</sup> Currently, government representatives estimate that renewable energy represents roughly 4.5% of Indonesia's generation mix (roughly 3% being hydro and 1.5% being geothermal based).<sup>7</sup>

### Regulatory structure

In Indonesia, EDSM is charged with formulating energy policy. PT Perusahaan Listrik Negara (PLN) is the state power transmission, generation and distribution enterprise. Geothermal resource development and electricity production may be undertaken by the public or private sector. PT Pertamina (Pertamina), the state-owned oil and gas company, has previously acted as the regulator, as well as a developer, for geothermal exploitation and remains a key player in the industry.

### Renewable energy plans

Indonesia has passed several laws intended to facilitate the development of renewable energy technologies. A recent piece of legislation, Presidential Decree No. 5/2006 (the Energy Plan), demonstrates Indonesia's commitment to develop renewable energy-based power generation. The Energy Plan sets out targets for the energy sector in 2025, namely setting the goal that renewables account for 17% of Indonesia's installed generating capacity (with 5% to come from biofuel; 5% from geothermal; 5% from a combination of biomass, hydro, solar, wind and nuclear; and finally 2% from liquefied coal).

### Previous geothermal programme

The government has recognised the country's tremendous geothermal potential for quite some time. In 1991, the first geothermal programme was introduced by which public and private enterprises would be allowed to participate in the development of geothermal-based resource exploitation and electricity generation. At that time Pertamina was the entity responsible for managing geothermal resources for the government.

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The implementing regulation for the campaign was Presidential Decree No. 45/1991, by which 11 joint operating contracts were granted to private developers to exploit as much as 3,000MW of geothermal power. Other fields with estimated capacity of 1,500MW were allotted to Pertamina for development. Most projects were derailed by the 1997 Asian financial crisis, and as a result, only a small fraction of Indonesia's geothermal potential has been developed to-date.

Each of the projects that was completed operates under one of two different schemes. The first is that Pertamina or its joint operation contractor operates the steam production facility and sells steam to PLN or others that generate electricity using their own plants. The alternative is that Pertamina or its joint operation contractors operate both the steam facility and the power facility, with electricity being sold off to PLN or others.

Private developers participate by operating the steam production fields, and in some cases the power generation facilities, under joint operation contracts with Pertamina as resource holder. Power is purchased by PLN under dollar-denominated energy sales contracts on a take-or-pay basis for 30 years or more. Electricity tariffs offered for the 1991 programme were between 7 and 8 US cents/kWh (most later renegotiated).

The government receives compensation for the exploitation of the steam resource through royalties calculated at 34% of net operating income under the power offtake agreement.<sup>8</sup> During the economic turmoil in the years following the financial crisis, geothermal contracts for private developers were suspended and later renegotiated or cancelled. Those projects that were already producing power eventually renegotiated lower tariffs under the existing contracts. Others that had not yet developed the steamfields opted to transfer the assets back to the government by arbitration or cancellation of contract.

After several years of no geothermal development, the government sought to reignite the geothermal programme with the passage of Law No. 27/2003 (the Geothermal Law) on October 22 2003. The Geothermal Law shifts regulatory authority from Pertamina to EDSM, requires that future steamfields (not awarded under the 1991 programme) must be competitively bid out and also provides that provincial governments (not the central government) are responsible for confirming the existence of geothermal resources by surveying and drilling. The Geothermal Law allows developers that were awarded fields in the 1991 programme to retain control of the development rights. It should be noted that the Geothermal Law provides high-level policies, and few implementing rules and regulations have been implemented to date.<sup>9</sup>

Two recent regulations, Government Regulation No 59/2007 and Ministerial Regulation No 14/2008 (Geot-

hermal Price Regulations), have further detailed that the electricity tariff for geothermal power plants will vary based on capacity: plants greater than 55MW will receive 85% of PLN's production cost, plants greater than 10MW but less than 55MW will receive 80%, and the tariff for smaller plants will be provided for under separate regulations.

## The second 10GW crash programme

Faced with a dangerously low power reserve capacity, in 2007 Indonesia announced plans for a "crash programme" to construct installed coal-fired generating capacity of 10GW by 2010. The government has now announced that a second crash programme will be carried out with a further 10GW to be added to the grid from 2009 to 2014. Of this new capacity, 4,733MW will be geothermal.<sup>10</sup>

In June 2008, EDSM tendered bids for three West Java geothermal projects: the 220MW Tangkuban Perahu, 45MW Cisolok Sukarame and 50MW Tampomas. Bids from 17 companies, including Chevron and Medco Energi International, were received.<sup>11</sup> American firm Raser Technologies Inc was awarded the Tangkuban Perahu project.<sup>12</sup> The winners of the other two projects have not yet been publicly identified.

EDSM announced in August 2009 that PLN would soon set a ceiling on rates it would pay privately owned geothermal power plants in order to encourage investment by resolving tariff uncertainties. PLN plans to determine an appropriate ceiling price without the help of an independent adviser and the price will vary based on project capacity and location.<sup>13</sup> Recently, the Indonesian press has reported that the ceiling price may be between 6.5 and 7 US cents/kWh.<sup>14</sup>

## Barriers to geothermal development

Even with some legislation in place for the development of geothermal-based power generation and the announcement of the second crash programme, there are still several obstacles for developers and PLN alike. First, there are some fundamental deficiencies in the bid tender process for geothermal projects that some companies may exploit. Bidders are not required to post a bid bond or agree to a power purchase agreement (PPA) prior to bid submission, so winning bidders have limited contractual obligations and financial stakes in developing a geothermal project awarded to them. The lack of a standard, published PPA also can lead to lengthy contract negotiations.

Second, the Geothermal Law shifted the onus of confirming geothermal resource areas on to provincial governments, which may not possess the funding and expertise to carry this out, often leading to poor resource data.<sup>15</sup> Third, the high up-front costs required to develop the steam resource can represent a major risk, because it is usually difficult to determine if a particular field will generate sufficient steam to power a generating plant for

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the 30-plus years necessary to recoup the initial investment.<sup>16</sup> The guarantee of a set power offtake price should mitigate this somewhat. Finally, as noted above, a robust set of implementing rules and regulations for the Geothermal Law has not yet been put in place, so there is still some uncertainty in respect to bid processes, the role of central and provincial governments, and other issues.

## Conclusion

It is clear that Indonesia has a massive potential to develop renewable energy, particularly geothermal-based energy. The government recognises this and has set lofty goals for geothermal-based power generation. With the expected setting of a rate ceiling for private geothermal projects, the price uncertainty standing in the way of investor involvement may soon be removed and investors have shown significant interest, but it remains to be seen whether the projects are now "bankable" under existing legislation.

## THAILAND

Thailand has had legislation and policy in place to support renewable energy development for some time, but has yet to utilise renewable resources for a significant portion of its power generation. In July 2007 Thailand had an installed generating capacity of roughly 28.5GW.<sup>17</sup> Approximately 13.2% of that capacity was hydropower (mostly large-scale, which is generally excluded when discussing renewable energy sources under Thailand's energy policy) and 1% was based on renewable sources.<sup>18</sup>

## SPP and VSPP programme background

Although renewable energies currently represent a small portion of Thailand's generation mix, the Kingdom has indicated that it would like to scale back its reliance on natural gas (currently over 60% of generation capacity is gas-based) and address climate change by encouraging the development of renewable energy-based power generation. To serve this end, Thailand's Small Power Producer (SPP) Program was introduced in 1992. It currently covers power developers wishing to sell power to the grid in a range of 10MW to 90MW.

The regulations governing the SPP Program were modelled after the Public Utility Regulatory Policies Act (PURPA) implemented in the US in 1978.<sup>19</sup> The SPP Program was re-launched in 2007 with the passage of regulations for cogeneration, renewables and "non-firm" projects (the SPP Regulations). In January 2009, the National Energy Policy Council (the NEPC) announced the approval of the revised Power Development Plan, which provides for the SPP bidding of roughly 2,000MW, with construction to begin in 2010 and finish in 2013.

Generally, SPPs can be classified as "firm" or "non-firm" based on their obligations under PPAs to deliver power

to the Electricity Generating Authority of Thailand (EGAT), the national utility. By regulation, firm SPPs are required to meet capacity, reliability, availability and delivery obligations and are rewarded, therefore, with capacity payments in addition to energy payments. In contrast, non-firm SPPs are not required to meet these obligations and are paid only for power actually delivered to the off-taker.

Building on the success of the SPP Program, the Very Small Power Producer (VSPP) programme was introduced in 2002 to provide procedures for small self-sustaining business operations in rural and remote areas to sell power of 1MW or less to the grid to offset their power consumption costs. The programme was re-launched in 2006 to increase the capacity for eligible VSPPs to above 1MW, but not exceeding 10MW. VSPP PPAs are non-firm, and VSPPs receive payment for power actually delivered under a "net-metering" mechanism. VSPP regulations consist of regulations for cogeneration projects, regulations for renewables projects and synchronisation regulations (the VSPP Regulations), and are based on net-metering laws in the US and other countries.<sup>20</sup>

When first introduced in 1992, the SPP Program allowed for generation by combined heat and power (cogeneration) methods or the utilisation of renewable-based energy sources. During the first six years or so, the programme saw applications mainly for cogeneration projects. When the Asian financial crisis crippled Thailand's power demand and precipitated an excess reserve capacity, the Thai Cabinet granted a 1998 ruling providing that EGAT no longer needed to accept new cogeneration projects.

After a rush to sign up cogeneration projects before the ruling took effect, EGAT has since almost exclusively accepted renewable projects, mainly large biomass-based plants. One impetus for this shift in policy was a common complaint from EGAT and SPPs alike that steam use efficiency requirements were too lax, resulting in little to no gain in efficiency over traditional combined cycle gas turbine projects.<sup>21</sup>

From the launch of the VSPP programme in 2002, a much wider range of energy sources was incorporated than under the SPP Program. Whereas under the SPP Program the majority of projects utilised gas or coal-fired cogeneration rather than renewable sources, the majority of applicants for the VSPP programme were pig farms, food processing plants and other small-scale rural businesses producing organic waste that could be used to fuel power generation.<sup>22</sup>

Under the VSPP regulations as originally issued in 2002, VSPPs could generate electricity from renewable sources, such as solar, wind, micro-hydro, biogas, and biomass. Part of the 2006 re-launch was an expansion of the VSPP program to include clean fossil-fired cogeneration

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plants, with efficiency requirements based on Germany's cogeneration programme, which are more stringent than those of the SPP Program.<sup>23</sup>

As of April 2008, there were 61 SPPs in operation, supplying 2,286MW of power to EGAT. Taking into account power offtake by industrial customers located near the SPP plants, the total installed capacity of the SPPs was 3,877MW. As of June 2008, there were 100 VSPPs supplying 215MW to the grid, with total installed capacity of 540MW.<sup>24</sup>

## Regulatory provisions

From time to time, the Energy Policy and Planning Office makes publicly available model standard form PPAs to be used for SPP and VSPP projects. These, together with the SPP and VSPP Regulations, form the legislative basis for the programmes. SPP PPAs are made between the SPP and EGAT. Conversely, VSPPs contract directly with one of two national distribution companies, Metropolitan Electricity Authority (MEA) for projects situating in Bangkok or Provincial Electricity Authority (PEA) for projects located in other provinces.

SPPs may also execute bilateral PPAs with industrial customers located in the vicinity of the power plant. This practice is common within Thailand's industrial estates.

The SPP regulations for firm SPPs reference contract terms of 20 to 25 years. The term for non-firm SPPs under the SPP regulations is one year from commercial operations, and may be renewed for an indefinite number of additional periods of one year each by notice from one party to the other party.

The initial term of the VSPP PPAs commences on the signing date and continues for one-year periods up to five years. The term automatically renews on a continuing basis, each time for an additional period equal to the duration of the initial term. The number of renewals is indefinite, and only the VSPP may unilaterally terminate the PPA where there is no breach of the agreement. SPP PPAs and VSPP PPAs are governed by Thai law.

## Tariff subsidies for renewable projects

In May 2001, as encouragement for developers to build and operate costly renewable energy-based generation facilities, an incentive programme was introduced whereby certain SPPs supplying renewable-based energy in Thailand enjoy a per kWh incentive or "addition" based on the actual amount of energy supplied to the grid. In mid-2002 MEA and PEA announced similar adder schemes for the VSPP programme. Several modifications to the adder programmes for both SPPs and VSPPs have since been introduced (almost all being positive for the developer).

Eligibility for the adder is based on location, size and type of fuel or energy source. Wind and solar projects receive the highest adders, followed by hydro (micro and mini), biomass, biogas and waste. To compensate developers for

a higher degree of risk in Thailand's three southernmost provinces, Yala, Pattani and Narathivath, due to political unrest, special adder rates are offered for renewable energy SPPs and VSPPs developed in these provinces.

On March 9 2009, the NEPC approved a proposal to further increase adder rates for certain types of projects and offer a new special adder for renewable energy projects located in the vicinity of diesel-fired plants (which are considered undesirable due to high fuel cost and emissions).

Adder rate changes for SPPs took effect on August 4 2009 under an EGAT Declaration and for VSPPs on August 19 2009 under separate notifications from MEA and PEA.

## Looking forward

Thailand's renewables future is bright and interest from developers in the latest SPP bidding round has been high. In response to the announcement and enactment of the new adders, plans for Thailand's first privately developed industrial scale solar and wind projects have been announced. No doubt this interest will be further bolstered by the announcement in July 2009 that the World Bank and International Finance Corporation will make available US\$700m in low-interest loans to develop clean energy projects. Thailand was the first of 10 countries selected to receive the support, partly due to its clear policy on renewable energy.<sup>26</sup>

## Footnotes

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Interest from developers in the latest SPP bidding round has been high.

## CURRENT ADDERS AND ADDERS PROPOSED AT NEPC MEETING

Project type and size	Current adder (Baht/kWh)	New adder (Baht/kWh)	Special adder* (Baht/kWh)	Special southern adder** (Baht/kWh)
<b>1 Wind</b>				
<= 50 kW	3.50	4.50	1.50	1.50
> 50 kW	3.50	3.50	1.50	1.50
<b>2 Solar</b>				
	8.0	8.0	1.50	1.50
<b>3 Biomass</b>				
<= 1 <W	0.30	0.50	1.00	1.00
> 1 MW	0.30	0.30	1.00	1.00
<b>4 Biogas</b>				
<= 1 MW	0.30	0.50	1.00	1.00
> 1 MW	0.30	0.30	1.00	1.00
<b>5 Municipal waste</b>				
Landfill/gasification	2.50	2.50	1.00	1.00
Thermal process	2.50	3.50	1.00	1.00
<b>6 Mini/micro hydro power</b>				
50 kW - 200 kW	0.40	0.80	1.00	1.00
< 50 kW	0.80	1.50	1.00	1.00

\*For projects located in an area generating electricity from diesel.

\*\* For projects located in one of three southern border provinces.

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14 – Reva Sasistiya. "Star Energy to Push PLN for Big Hike in Price of Geothermal Energy". Jakarta Globe. September 15 2009.

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16 – Andrew Symon. "Indonesia Gets into Hot Water". Asia Times. May 15 2008: 3.

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