



Clean Energy Market Intelligence & Project Access

Country Report Update

Indonesia 2012 Update



ACRONYMS & ABBREVIATIONS



ADB	Asian Development Bank
B	billion
BAKOREN	National Energy Coordinating Board
BAPPENAS	National Development Planning Agency
BAU	Business as Usual
BEE	Bureau of Energy Efficiency
BPPT	Agency for Assessment and Application of Technology
CDM	Clean Development Mechanism
CECEP	China Energy
CECIC	China Energy Conservation Investment Corporation
CER	Certified Emission Reduction
CFL	Compact Fluorescent Lamps
CFO	Carbon Finance Operation
CSP	Concentrated Solar Power
CTF	Clean Technology Fund
DAE	Department of Atomic Energy
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DNA	Designated National Authority for CDM
DOE	Department of Energy
DOST	Department of Science, Technology and Environment
DPL	Development Policy Loan
EE	Energy Efficiency
EE&C	Energy Efficiency and Conservation
ERAV	Electricity Regulatory Authority of Vietnam
ESCO	Energy Service Company
EVN	Vietnam Electricity
FI	Financial Institution
GCM	Generation Competitive Market
GHG	Green House Gas
GOI	Government of Indonesia
GoI	Government of India
GOP	Government of the Philippines
GW	Gigawatt
IFO	International Funding Organization
IGCC	Integrated Gasification Combined Cycle
IIFCL	India Infrastructure Finance Company Limited

Acronyms & Abbreviations

IPP	Independent Power Producers
IREDA	Indian Renewable Energy Development Agency
IRES	Indonesian Renewable Energy Society
IT	Information Technology
kWh	Kilowatt Hours
LBP	Land Bank of the Philippines
LFG	Landfill Gas
M	million
MARD	Ministry of Agriculture and Rural Development
MDB	Multilateral Development Banks
MEMR	Ministry of Energy and Mineral Resources
MHA	Ministry of Home Affairs
MNRE	Ministry of New and Renewable Energy
MOE	Ministry of Environment
MOF	Ministry of Finance
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MoP	Ministry of Power
MPI	Ministry of Planning and Investment
MW	Megawatt
NAPCC	National Action Plan on Climate Change
NAPOCOR	National Power Corporation
NDRC	National Development and Reform Commission
NEA	National Energy Administration
NEC	National Energy Commission
NEECP	National Energy Efficiency and Conservation Program
NEP	National Electrification Policy
NHPC	National Hydroelectric Power Corporation
NPCI	Nuclear Power Corporation of India
NTPC	National Thermal Power Corporation
ODA	Official Development Assistance
PD	Presidential Decree
PFC	Power Finance Corporation
PIU	Project Implementation Unit
PLN	Indonesian State Electricity Company
PPA	Power Purchase Agreement
PPC	Provincial Peoples Committees
PPP	Public Private Partnership
PRC	People's Republic of China
PSU	Power Sector Undertaking
PV	Photovoltaic
RA	Republic Act
RE	Renewable Energy
REAP	Renewable Energy Association of the Philippines
REMB	Renewable Energy Management Bureau
RPO	Renewable Purchase Obligations
RPS	Renewable Portfolio Standard
SBV	State Bank of Vietnam
SERC	State Energy Regulatory Commission
SOE	State-Owned Enterprises

Acronyms & Abbreviations

SPV	Solar Photovoltaic
TA	Technical Assistance
TCE	Ton Coal Equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
VIP	Vietnam, Indonesia, Philippines
VNEEP	Vietnam National Energy Efficiency Program
WB	World Bank
WBG	World Bank Group
WESM	Wholesale Electricity Spot Market

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REGIONAL UPDATE

REPUBLIC OF INDONESIA



Renewable Energy & Energy Efficiency Highlights

- The government of Indonesia is hoping to move away from a monopoly of fossil fuel generation to include a larger share of renewable energy (RE) in the electricity market. At present, Indonesia's RE share is around 5-6%. Vision 25/25 proposes a 25% renewable energy share by 2025.
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- By 2050, Indonesia's projected required RE capacity will be the fourth largest in the world. Geothermal is the most crucial renewable energy in Indonesia as the country has about 40% of the world's known geothermal resource.
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- Geothermal and biomass are huge focus areas for the development of RE in Indonesia. Indonesia has plans to add 4,800 MW in geothermal capacity by 2025 and 180 MW in biomass capacity by 2025.
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- The two main objectives of Indonesia are to slow growth in energy consumption and to reduce industrial energy intensity by about 1% per year until 2025. In 2009, the government of Indonesia announced that it would craft a policy that would reduce GHG emissions by 26% by 2020.
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- Indonesia invested \$247 million in their RE industry in 2011. With ADB, WB, and CDM, there was an additional investment of more than \$3billion in the RE sector.
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- In the domain of energy efficiency (EE), the government of Indonesia plans to achieve demand side emissions reductions of 30% from business as usual in 2025.
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- International companies have been active in Indonesia for many years, especially in the energy sector. Indonesian firms are willing to cooperate and form joint ventures or partnerships. Currently, the US is one of the top foreign investors in Indonesia.

Energy Sector Background

The following report highlights the current stance of the energy industry in Indonesia, stressing the government's measures and action plans in the renewable energy (RE) and energy efficiency (EE) sectors.

Indonesia is both rich in fossil fuel resources and RE sources. So far, Indonesia relies heavily on fossil fuels for electricity, as opposed to RE. However, with increasing fossil fuel prices and the government's commitment to reducing GHGs, Indonesia will have to turn to RE sources.

At present, Indonesia's total power generation capacity is just above 21,000 MW. Of this, 47.60% comes from oil, 26.30% from coal, 21.4% from gas, 3.2% from geothermal and 1.5% from biofuels. Indonesia's total RE (including hydropower) generation capacity is around 6,049 MW. Without hydropower, RE contributes about 1,190 MW to the total generation capacity. Of this, almost 70% comes from geothermal sources, and the rest from biomass and other renewable resources.

In 2025, Indonesia hopes to have an additional 6.8 GW of new RE installed. This would increase the proportion of renewables from the current 4.2%-7% to 15-17%. A 2006 government decree stated that the contribution of RE in the 2025 energy mix will be 17%, consisting of 5% biofuel, 5% geothermal power and 7% biomass, nuclear, hydro, wind and coal liquefaction.

Indonesia's target for RE was around 15-17%. However, with the positive growth, the Energy Ministry has since revised the national target to 25%. Indonesia's projected RE capacity is expected to be the fourth largest in the world in 2050.

The table below presents a portrayal of Indonesia's current installed capacity along with its resource potential. This table shows how much potential renewable energy there is in Indonesia. There is still much room for growth in the RE domain.

Table 3.1: Potential of Renewable Energy in Indonesia

Type	Installed Capacity	Resource Potential	Undeveloped potential (%)
Hydropower	4,264.0 MW	75,670 MW	94%
Geothermal	1,052.0 MW	27, 510 MW	96%
Mini/micro hydropower	86.1 MW	500 MW	83%
Biomass	455.0 MW	49,810 MW	99%
Solar Power	12.1 MW	N/A	N/A
Wind	1.1 MW	9,190 MW	99%
Ocean	0 MW	35 MW	100%

Source: PLN presentation to the US Energy Association

Currently, the largest consumer of energy in Indonesia is the industrial sector with 44% of total consumption, followed by the transportation and household sectors. The table below identifies the percentages of contribution in respected sectors from the most recent data.

Table 3.2: Energy Consumption by sector in 2010

Sector	2010
Industrial	44%
Households	11.51%
Commercial	4.41%
Transportation	36.03%
Other	4.05%

Source: www.energyefficiencyindonesia.info/energy/industries

The greatest challenge for Indonesia is controlling its growing energy demand with its domestic and imported energy. Since 2000, Indonesia has shifted from being an oil exporter to an importing nation. Although it still has large supplies of oil, Indonesia is no longer a major oil exporter. Therefore, the government of Indonesia is cognizant that for the security of the future, it has to secure its domestic energy demands. The government has asserted its commitment to RE and domestic production; however, fossil fuels still remain potently present in the energy mix.

Power Sector Structure and Regulation

Perusahaan Listrik Negara (PLN), a government-owned corporation, holds the monopoly for electricity in Indonesia. PLN supplies almost all of the electricity to Indonesia's most populous areas.

- Some independent power producers are involved in the generation, but PLN remains the sole buyer and seller of electricity on the grid.
- Many of the PLN projects have been large-scale power plants in the realm of coal and oil.
- The government heavily subsidizes electricity prices to the public. They therefore do not reflect current market prices.
- In 2011, 24% of PLN's energy output was from oil-based products. However, the government has pledged that the company will reduce this number to 3% by 2013 and 1.7% by 2014.
- In 2009, Indonesia's new Electricity Law opened up an opportunity for local governments and private entities to generate and sell power to PLN; however, this opportunity is met with many regulations and constraints.
- In an effort to increase RE, PLN has recently been required to use electricity from small-scale renewable energy power plants developed by independent power producers.

State-owned enterprises are expected to continue to dominate the large-scale power generation sector for several more years as PLN retains a first priority in the market.

International companies have been active in Indonesia for many years, especially in the energy sector. Indonesian firms are willing to cooperate and form joint ventures or partnerships; however, Indonesia lacks capacity and capital required to develop large-scale RE energy projects. Thus, most of the funding and capital must come from the international players.

- The U.S. Department of Commerce does expect significant opportunities for foreign equipment and services for large renewable energy projects in Indonesia.
- Indonesia does not oppose foreign investment; rather, they see foreign direct investment as critical to energy demand and supply growth. The government of Indonesia has created an open market for foreign investors. However, Indonesia still has import restrictions, insufficient infrastructure and regulatory uncertainty that could pose a challenge to potential international companies.
- The government of Indonesia offers tax incentives for foreign investment, especially in the renewable energy sector, such as a 30% net income tax reduction for six years.
- Domestic production still remains much stronger than foreign manufacturing.

Energy Sector Highlights and Challenges

- Currently, Indonesia's electrification rate is about 70.4%. Although 91% of Indonesia's 70,000 villages have access to electricity, only 67% of the residences can actually tap into this supply. The government of Indonesia has set a 95% electrification target for 2020, with a campaign coined "Electricity for All."
- Total energy demand has been increasing faster than economic development and population growth.

- At present, Indonesia's current energy elasticity is estimated at about 2. For every 1% increase in GDP, electricity demand increases by 2%. This worrisome ratio forces Indonesia to come up with solutions for energy security –either by containing energy demand growths or increasing domestic energy supply, particularly in the RE sector. Due to this increasing energy demand, the goal for 2025 is to achieve energy elasticity less than 1.
- Instead of fully utilizing its already installed renewable energy capacity, Indonesia continues to import fossil fuels. At present, fossil fuels account for 93% of the economy's total energy capacity. However, the government of Indonesia hopes to cut the share of energy from oil by more than 60%.
- The transportation and industrial sectors are the ones with the largest growth rates. The industrial energy consumption has been soaring for the last years.
- GHG emissions from the electricity sector are expected to increase from 100 million tons of CO₂ in 2005 to 369 million tons of CO₂ in 2020, and finally, 810 million tons of CO₂ by 2030.
- In 2011, out of the \$22 billion dollars in energy subsidies, less than 2% of them were targeted at promoting renewable energies.

Renewable Energy and Energy Efficiency

Renewable Energy

In absolute numbers, Indonesia's projected required RE capacity will be the fourth largest in the world in 2050. Geothermal resource is the crucial renewable energy in Indonesia. The country has about 40% of the world's known geothermal resource.

Indonesia's Presidential Decree No.5 mandates an increase in RE production from current levels of 7% to 15% of total generating capacity by 2025. The Minister of Energy expects this target to be raised to 25% by 2025. This can only be accomplished with an additional 6.7 GW from the renewable energy sector. Geothermal and biomass are expected to be the RE sources that have the most potential in growth terms, but other RE sources are expected to generate high opportunities too.

Table 3.3: Government measures to add RE by 2025

Type	Additional
Micro Hydropower	2,846 MW
Biomass	180 MW
Wind power	0.97 GW
Solar power	0.87 GW

Source: AlternativeEnergy Database

Below are a few programs the government has installed to encourage the growth of the RE sector:

- Feed-In-Tariffs for biomass, biogas and municipal solid waste to purchase up to 10 MW of RE; new incentive varies between \$.067/kWh to \$1/kWh.
- Fast-track Crash Program: two-phase program to stimulate the expansion of electricity generating capacity, hoping to generate a 56% increase in overall energy investments by 2014.
 - First track program (2006-2013): low-efficient coal and natural gas power plant development; coal-fired plants contradict Indonesia’s commitment to tackle climate change.
 - Second track program (2009-2014): emphasis on geothermal and hydropower projects
 - 60% of the 10,147 MW of allocated projects will be renewable energy projects
 - Geothermal accounting for 3,977 MW
 - Hydropower accounting for 1,198 MW
- Desa Mandiri Energie (Energy Self-Sustainable Village): program launched to enhance energy security in rural areas using energy of biofuel
 - Village is “self-sustaining” when 60% of the total energy consumption comes from renewable energy, in particular biofuel.
 - As of 2009, there were 2,000 self-sustainable villages.

Specific Renewable Energies

- Most of Indonesia’s growth comes from geothermal and hydropower

Geothermal

- Current generation capacity for geothermal: 1,200 MW
- Potential generation capacity for geothermal: 27,510 MW

- Indonesia is home to about 40% of the world's geothermal resources and operates the third largest fleet of geothermal power plants in the world; however, they have only tapped into 3% of Indonesia's full potential.
- There are still many potential geothermal wells untapped in the west part of Indonesia, even though the west has more advanced infrastructure.
- In 2010, World Bank announced that it would channel \$400 million from its Climate Investment Funds to support geothermal energy development in Indonesia.
- By 2025, the government mandated that geothermal energy provide at least 9,500 MW or 5% of the nation's electricity.
- The government ordered PLN to purchase power from geothermal producers.
- Although there is positive speech on development, geothermal in Indonesia is still prone to policy inconsistencies and unsure feasibility rates.
- In 2010, Indonesia's Ministry for Energy and Mineral Resources revised the country's geothermal potential to 28.1 GW from 27 GW. However, as of 2010, Indonesia had installed 1.2GW of geothermal capacity, leaving it with an undeveloped potential of 96%.

Hydropower

- Current generation capacity as of 2010: 4,264 MW.
- Potential generation capacity for large-hydropower: 75,670 MW.
- Potential generation capacity for micro-hydropower: 500 MW.
- Well suited for hydropower from conventional hydro and emerging ocean energy technologies.
- Many programs to accelerate the hydropower development, such as removing investment barriers and fostering technical capacity.
 - Only developed 17% of the nation's mini-hydropower potential.
 - Future growth in the sector is likely.

Ocean energy

- Since Indonesia is an archipelago, it has thousands of miles of coastline.
- There is a potential to generate between 10-35 MW per kilometer of coastline.

Solar power

- Current generation capacity for solar power: 12.1 MW (mostly from solar PV in urban areas).
- Not a strong market set up.
- Lack of installation mechanisms and little incentives to develop infrastructure.
- Open to foreign solar cell manufacturers installing themselves in Indonesia.

Wind power

- Current generation capacity for wind power: 1.1 MW.

- Potential for wind energy is limited.
 - Eastern islands have more wind but due to the lack of population, there is little transmission infrastructure capable of sustaining large wind farms.
- Offshore wind is more likely to develop.

Biomass

- Current generation capacity for biomass: 443 MW.
- Potential generation capacity for biomass: 49,810 MW.
- For 2025, the country's target is 810 MW; an increase of 83%.
- Market in Indonesia is substantial but currently underdeveloped.
- Biomass products in Indonesia with high potential:
 - Rice residues, sugar, rubber and palm oil.
- With palm oil, Indonesia also has a large potential in the biofuel domain.
 - Rarely used in local biofuel development, but is exported.
- Ministry of Agriculture is preparing additional land for growing high-yield domestic crops such as cassava, jatropha and sweet sorghum to enhance the country's biofuel production goals.
- 88% of Indonesia's billion dollars of clean energy investment went to biofuels in 2010.

Energy Efficiency

The two main objectives of Indonesia is to have the growth in energy consumption be slower than the GDP growth by 2025 and to reduce industrial energy intensity by about 1% per year until 2025. In 2009, the government of Indonesia announced that it would craft a policy that would reduce GHG emissions by 26% in 2020. Indonesia also has a goal to reduce GHG emissions from the energy sector by 10% from business-as-usual levels by 2020.

Overall, energy efficiency initiatives are very important in Indonesia but have no yet taken off. The largest initiative from the government of Indonesia is to reduce total carbon emission by 33.85% by 2025.

Opportunities for Singaporean firms in Indonesia

Indonesia offers significant opportunities to Singaporean firms in the RE and EE sectors. Firstly, Indonesia is home to almost 40% of the world's geothermal resources and other renewable energies. In addition, Indonesia is very keen on having private and foreign investors; however, it is mandatory to have a local partner with at least 5% share.

Energy Efficiency

- There is strong government focus on EE with a reduction target of 33.85% by 2025.
- Indonesia also wants to reduce industrial energy intensity by about 1% per year until 2025.

Geothermal

- The undeveloped potential of geothermal is around 96% in Indonesia.
- Indonesia is home to about 40% of the world's geothermal capacity.
- The World Bank has allocated a \$400 million fund for the development of this resource in Indonesia.
- The government seeks that by 2025, 5% of Indonesia's electricity will come from geothermal energy.

Hydropower

- The undeveloped potential of conventional hydropower is 94% and 83% for mini hydropower.
- Indonesia sees hydropower as a conventional source to develop.
- It is also looking at ocean energy, as experts estimate that Indonesia has a capacity of 10-35 MW.

Biomass

- The undeveloped potential of biomass is 99% in Indonesia.
- In 2010, 88% of Indonesia's total investment in renewable energy was in biofuels.
- There is strong potential for rice residues, sugar and palm oil.

Solar

- Solar power is not a strong renewable energy as Indonesia lacks proper installation and infrastructure mechanisms.

Wind

- Offshore wind is vital for Indonesia and they are beginning to explore more opportunities for projects in this area.

Overall there are opportunities for Singaporean firms in Indonesia, especially in the geothermal and biomass sectors. The CDM, WB and ADB projects are testimony to the opportunities in the sector in Indonesia. It is important for Singaporean firms to engage

with these organizations as currently, projects are being designed and innovative models sought out.

FUND MAPPING

Partnerships and Funds for Renewable Energy and Energy Efficiency Development

GLOBAL

- World Bank
- International Finance Corporation
- Asian Development Bank
- Climate Technology Initiative
- Global Environment Facility
- Seed Capital Assistance Facility
- Global Energy Efficiency and Renewable Energy Fund
- Renewable Energy and Energy Efficiency Partnership
- Global Climate Partnership Fund
- Sustainable Energy Market Development Program
- Asia Sustainability and Alternative Energy Program
- Global Energy Program
- Clinton Climate Initiative
- Clean Development Mechanism
- Clean Investment Funds
- Armstrong Asset Management (ASEACE)
- Deutsche Investitions (DEG)
- Norwegian Investment Fund for Developing Countries (Norfund)
- *No longer:* Asia-Pacific Partnership on Clean Development and Climate (APP)

PROJECT MATRICES



INDONESIA

Description of Matrices:

Update of active projects from August 2010 in Indonesia region (projects still active are marked with **)

Addition of new active projects since August 2010 in Indonesia region. Only CDM.

CDM projects from Aug '10 onwards			
Number	Registered	Title	Annex I Parties
1	09 Nov 10	Methane Recovery and Utilisation at PT Pinago Utama Sugihwaras Palm Oil Mill, Sumatera, Indonesia	Denmark
2	02 Dec 10	Wayang Windu Phase 2 Geothermal Power Project	UK and Northern Ireland
3	10 Dec 10	Ranteballa Small-Scale Hydroelectric Power Project	Japan
4	16 Dec 10	Kamojang Geothermal	UK and Northern Ireland
5	16 Dec 10	Belitung Energy Biomass Power Plant	
6	26 Jan 11	10 MW Tangka/Manipi Hydro Electric Power Plant	
7	12 Feb 11	Parluasan Hydro Electric Power Plant	Germany
8	01 Mar 11	Asahan 1 Hydroelectric Power Plant 2 X 90 MW	UK and Northern Ireland
9	31 Oct 11	Wampu Hydro Electric Power Project	

<i>10</i>	26 Mar 12	PT Dalle Energy Batam CCGT conversion project, Indonesia	UK and Northern Ireland
<i>11</i>	15 May 12	Project Ulubelu Unit 3 – 4 PT. Pertamina Geothermal Energy	Switzerland
<i>12</i>	22 May 12	Project Lumut Balai Unit 1 – 2 PT. Pertamina Geothermal Energy	Switzerland