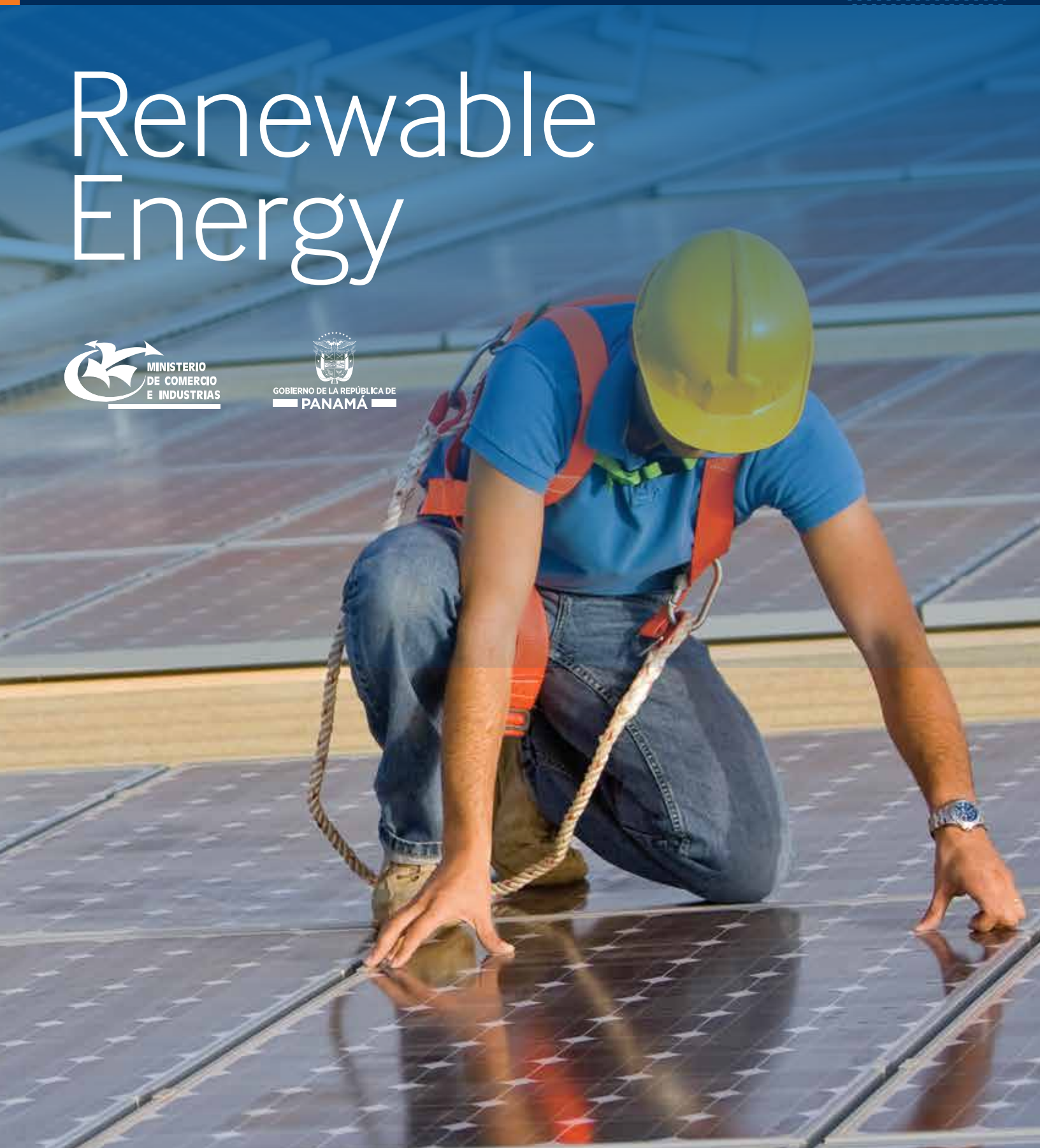
PROINVEX PANAMA

# Renewable Energy



MINISTERIO DE COMERCIO E INDUSTRIAS

GOBIERNO DE LA REPÚBLICA DE PANAMÁ

# 1 Panama's Energy Sector: A New Era

### Growing Domestic Demand

Due to its rapidly expanding economy, energy demand in Panama is forecasted to grow by 5.2% per annum between 2014 and 2050. The country is open for external investment to meet this additional demand

### Abundance Of Natural Resources

Panama has abundant water resources with large rivers and experiences average annual rainfall up to 7000mm across its provinces that can be exploited for hydroelectric power plant projects

With approximately 5.5 hours of sunlight daily, Panama's climate offers considerable solar power potential with average daily global horizontal irradiance for the Central Region around 5-5.5kWh per m²

There is significant potential for generating electricity using wind power, particularly in the provinces of Veraguas, Chiriquí and Los Santos where average wind speeds reach 4.51m/s, 3.89m/s and 2.82m/s respectively

### Interconnectivity

Due to its strategic location, Panama is key to plans to connect the electricity grids of North and South America

The country is part of the Central American Electrical Interconnection System (SIEPAC) which consists of a high voltage transmission line that allows the exchange of electricity between six countries in Central America. SIEPAC's network serves over 30 million people. Its objectives include:

- Improving energy efficiency
- Providing power to a broader population base
- Improving reliability and efficiency of energy sources
- Reducing the cost of electricity and telecommunications
- Promoting economic development

Panama is set to complete the Colombia-Panama Interconnection Project by 2019 — a 600km electrical interconnection between Panama and Colombia with a capacity of 600MW

The Trans-Panama Pipeline is an oil transit route that reduces transportation times and costs between the Atlantic and Pacific basins. It has a daily capacity of 860 thousand barrels

### Energy Cluster

A dynamic cluster of companies with regional headquarters operations currently exists in Panama including AES Corporation, Gas Natural Fenosa, Halliburton, SkyPower, ABB, Celsia, Enel Green Power, Union Eolica, ENGIE and LS Energia, among others

Companies registered under the Multinational Headquarters Law (MHQ) can take advantage of unique tax, labor and immigration incentives

### Dynamic Growth Sector

Panama's electricity, gas and water sector has grown on average by 10.36% per annum between 2006 and 2016

### Central American Leader For Clean Energy Investment

2nd in Central America for investment in clean energy with a total investment of US$1.76 bn in 2015

Foreign direct investment in Panama's water, gas and electricity supply sector totaled US$1.3 bn in 2015, accounting for 3.4% of the country's total FDI stock

[1]Compound annual growth

### Financial And Political Stability

Panama is rated by the World Bank as one of the most politically stable countries in Latin America. Other advantages include:

- A dollarized economy
- A history of low inflation — currently 0.8%
- The best credit rating in Central America

### Panama Canal

The expanded Panama Canal is central to Panama's ambitions for the power sector with the Canal forecasted to transit 12 million metric tons of liquefied natural gas annually

The Costa Norte LNG Terminal will be the first LNG facility to be built in Panama in 2018, and it is designed to receive LNG vessels in the range of 30,000 – 180,000m³

Almost the entire global fleet of LNG tankers can pass through the Isthmus, and the US Energy Information Administration (EIA) estimates that as many as 550 tankers will transit the Canal each year by 2021

Panama's cluster of bunker suppliers has been growing recently due to continual investment in modern installations and high-tech terminals that has led to increased storage capacity for the provision of fuel bunkering

There are terminals on both the Atlantic and Pacific Oceans — Taboguilla Island Terminal in the Pacific Ocean has a capacity of over 350,000m³, supplying gas oil, marine diesel oil and various fuel oils. While Bahia Las Minas Terminal, located in the Atlantic Ocean, has a capacity of over 500,000m3 and supplies a variety of petroleum products

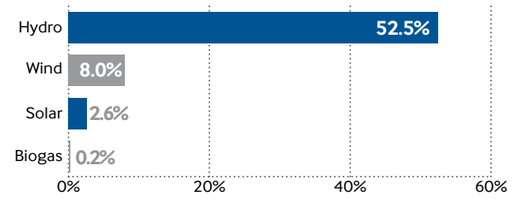
# 2 Key Features of the Panamanian Energy Sector

## Installed Capacity

**3371mw**

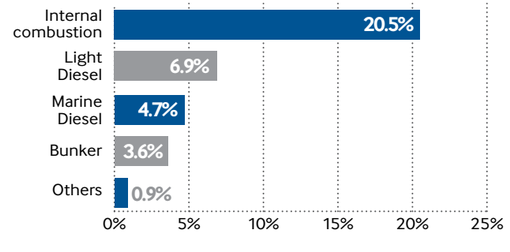
In 2016, total electricity installed capacity in Panama was 3371MW, growing by 8.7% per annum since 2006 with over 63% of installed capacity derived from renewable sources

### Electricity produced (%) by renewable sources in 2016




Source: National Secretary of Energy

### Electricity produced (%) by non-renewable sources in 2016




Source: National Secretary of Energy

## Clients

Over

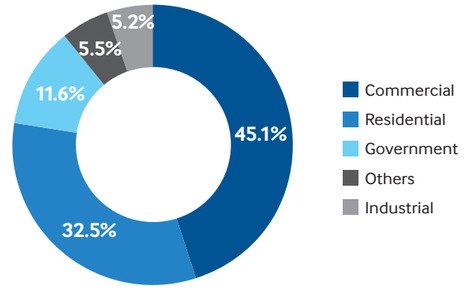
**1million**

clients

The Panamanian electricity market registered over 1 million clients in 2016 — a 4% annual increase

In 2016, electricity demand was over 8500GWh — growing on average by 5.5% per annum over the last ten years. The top three subsectors by electricity demand were: commercial (45.1%), residential (32.5%) and Government (11.6%)

### Electricity demand (%) by industry in 2016



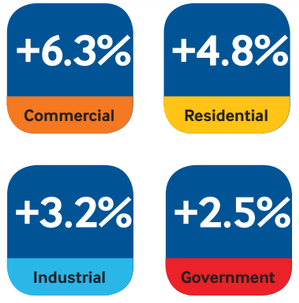

Source: National Secretary of Energy

In April 2017, three new solar power plants were created. Each plant will have a capacity of almost 10MW

## Energy Demand And Projections

The increased demand for energy is in tandem with the national economy's growth. In 2016, the average monthly peak national electricity consumption was 1569MW — the highest demand of any year.

Annual energy demand growth by industry, Panama, 2014-2050:




According to the National Secretary of Energy in Panama, energy production is forecast to grow by almost 6% per annum between 2016 and 2030

**14,000mw**

Total electricity installed capacity is forecast to reach approximately 14,000MW by 2050. Natural gas, coal and hydroelectricity will be the top three subsectors with capacities of 6612MW, 2700MW and 788MW respectively. Followed by wind (613MW), solar (248MW), bunker (179MW), diesel (92MW) and biomass (8MW)

## Benefits/Projects Of Renewable Energy

**30%**

Panama's National Energy Plan 2015-2050 determines that 30% of the country's energy supply must come from renewable sources by 2050. Solar, wind and biomass sources will represent 15% of the country's electricity generation capacity by 2030 and 30% by 2050

Panama has established tax incentives for the construction, operation and maintenance of clean energy projects including:

- Transmission and distribution tax exemption
- Import duty exoneration
- Income tax credit
- Goods and services tax exemption
- Wind energy tax incentives
- Solar energy tax incentives

**5%**

Electricity regulations mandate a 5% premium on the price paid for electricity generated from renewable sources including: biomass, geothermal, small hydro, solar and wind

**0% tax**

Panama offers value added and import tax exemptions for renewable energy projects up to 0.5MW, as well as exemption from transmission and distribution taxes for projects up to 10MW. Projects of 10MW to 20MW receive exemption on their first 10MW capacity

# 3 Benefits, Incentives and Return on Investment

## Gas

### Fiscal benefits applying to gas based power generation facilities:

- Tax credit of up to 5% of the total direct investment value is applicable on income tax for civil works that become public infrastructure
- Custom duties exemption for equipment, machinery, materials, spare parts and others imports necessary for plants proper functioning
- Possibility to use an accelerated amortization method to depreciate tangible assets
- Natural gas generation equipment manufacturers within Panama are exempted from paying all national taxes for 20 years. The equipment includes: mechanical, electronic, electromechanical, metallurgical and electrical equipment

### Projects

- Gas Natural Atlantico and Costa Norte are undertaking the construction of a combined cycle plant — with 380MW capacity — and LNG terminal — with a storage capacity of 180,000$m^3$ — in Colon Province that will start supplying natural gas by 2018. The plant will produce power to supply 15 million homes. This new gas cycle along with the hydroelectric power sector will guarantee country's power security for a further 20 years
- BAM ICONSA joint venture has started to build an LNG import jetty and an intake/outfall structure for the Costa Norte LNG Terminal that will be completed by 2018. The jetty is designed to receive LNG vessels in the range of 30,000–180,000$m^3$
- A joint-venture formed by ENGIE and AES Corporation will use Costa Norte's LNG Terminal to sell LNG to third parties in Central America

## Wind

### Fiscal benefits applying to wind based power generation facilities:

- Tax credit of up to 5% of the total direct investment value is applicable on income tax for civil works that become public infrastructure
- Exemption from all import taxes for equipment and materials used for the installation and maintenance of wind powered generation plants
- Possibility to use an accelerated amortization method for equipment used for wind powered generation
- Wind power generation equipment manufacturers/ installers within Panama are exempted from paying all national taxes for 15 years

### Laudato Si project

**215mw**

capacity

InterEnergy developed Laudato Si, the largest wind farm project in Latin America, located in Penonome with an installed capacity of 215MW

**400,000**

tons of $CO_2$

Laudato Si has contributed to the elimination over 400,000 tons of $CO_2$ emissions and saved 900,000 barrels of oil per year

## Biomass

### Fiscal benefits applying to biomass based power generation

- Full income tax exemption
- VAT exemption on imports
- Payment exemption from commercial and industrial license taxes
- Full exemption from custom duties for equipment and materials used for developing power generation projects
- Exemption on taxes, fees, contributions and other local charges

### Aguaseo project

Aguaseo, a private sanitation company in Colon, presented a proposal to build a biomass plant in 2015 that will process 450 tons per day of waste, and will generate 15mWh

## Solar

**>5**

KWh/day/$m^2$

of solar insolation received in both the south of Chiriquí and Veraguas. Chiriquí province has a growing activity in the solar energy sector

The government acquires solar energy supply through reverse auctions where developers bid their price to secure up to 20-year power purchase agreements

### Fiscal benefits applying to solar based power generation facilities:

- Tax credit of up to 5% of the total direct investment value is applicable on income tax for civil works that become public infrastructure
- Exemption from all import taxes for equipment and material used for the installation and maintenance of solar based generation plants
- Possibility to use an accelerated amortization method for tangible assets

### Projects

- Enel Green Power Panama operates the largest solar plant in Chiriquí province with a capacity of 12MW
- Celsolar has been granted a license to build a photovoltaic plant with an installed capacity of 20MW in Chiriquí

## Potential Return On Investment

Panama's business-friendly government policy allows for generous fiscal incentives and spot market energy prices that can generate a sizeable return on investment
Large investment, falling installation costs, and advancing technologies are producing dividends in renewable energy, especially solar power — which is now cheaper than fossil fuels. In the next decade, the price of solar energy is expected to fall to about half of what it costs to generate electricity from coal.

## Market Regulation: Laws 6 And 45

ETESA, the sole transmission company and electricity buyer in Panama, conducts auctions to contract renewable capacity through ASEP, the public services regulator in Panama that sets tender guidelines

The Laws No. 6 and 45 established a system of incentives for renewable energy projects including:

- Exemption from import taxes for equipment, machinery, materials, spare parts and others imports necessary for the installation and maintenance of renewable energy plants up to an installed capacity of 500KW
- A fiscal incentive up to 25% on the direct investment for companies developing new projects or increasing production capacity of renewable energy systems up to 10MW
- A fiscal credit applicable to the income tax up to 5% on the direct investment for renewable energy projects that become public infrastructure
- Removal of import taxes, duties and taxes on imported materials/ equipment for the construction of plants
- Tax benefits granted to plants depending on their level of carbon reduction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