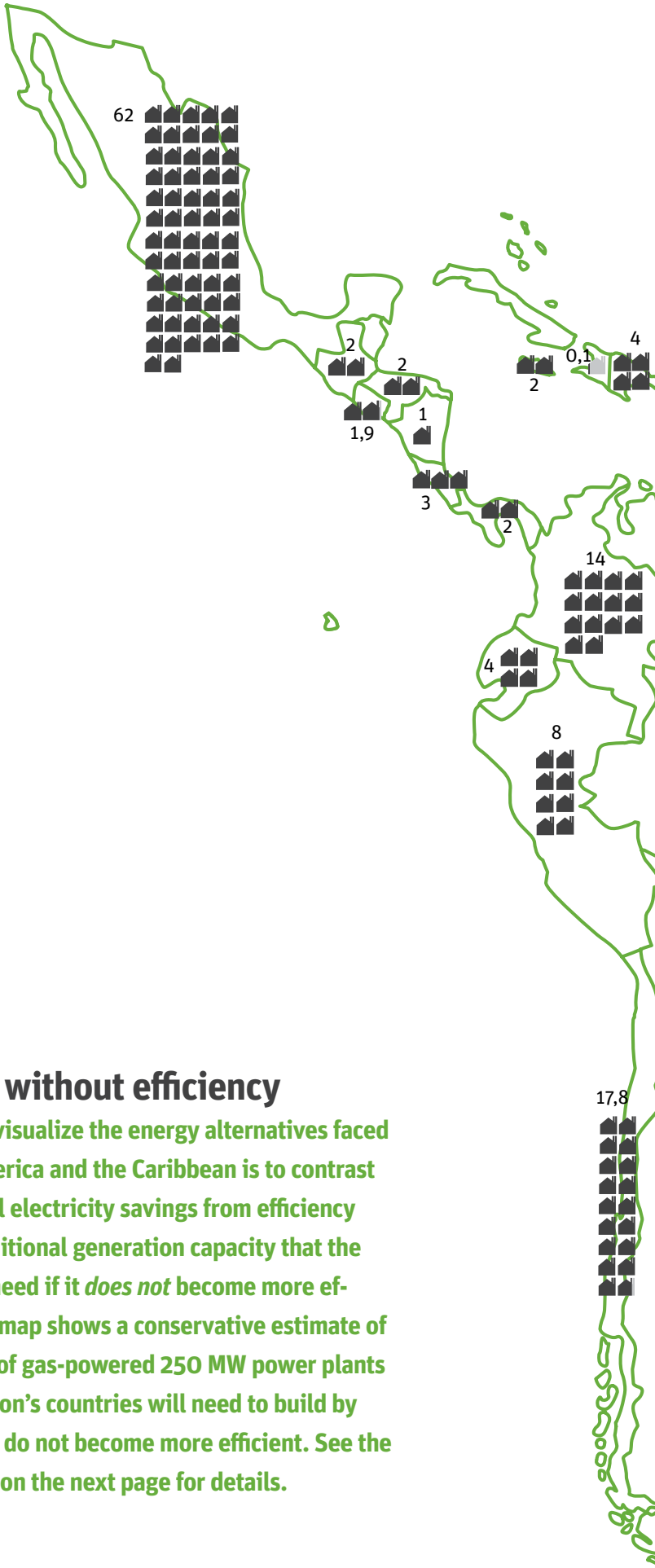
# How to save US$36 billion worth of electricity

## (without turning off the lights)

A SURVEY OF ENERGY PRODUCTIVITY IN THE AMERICAS

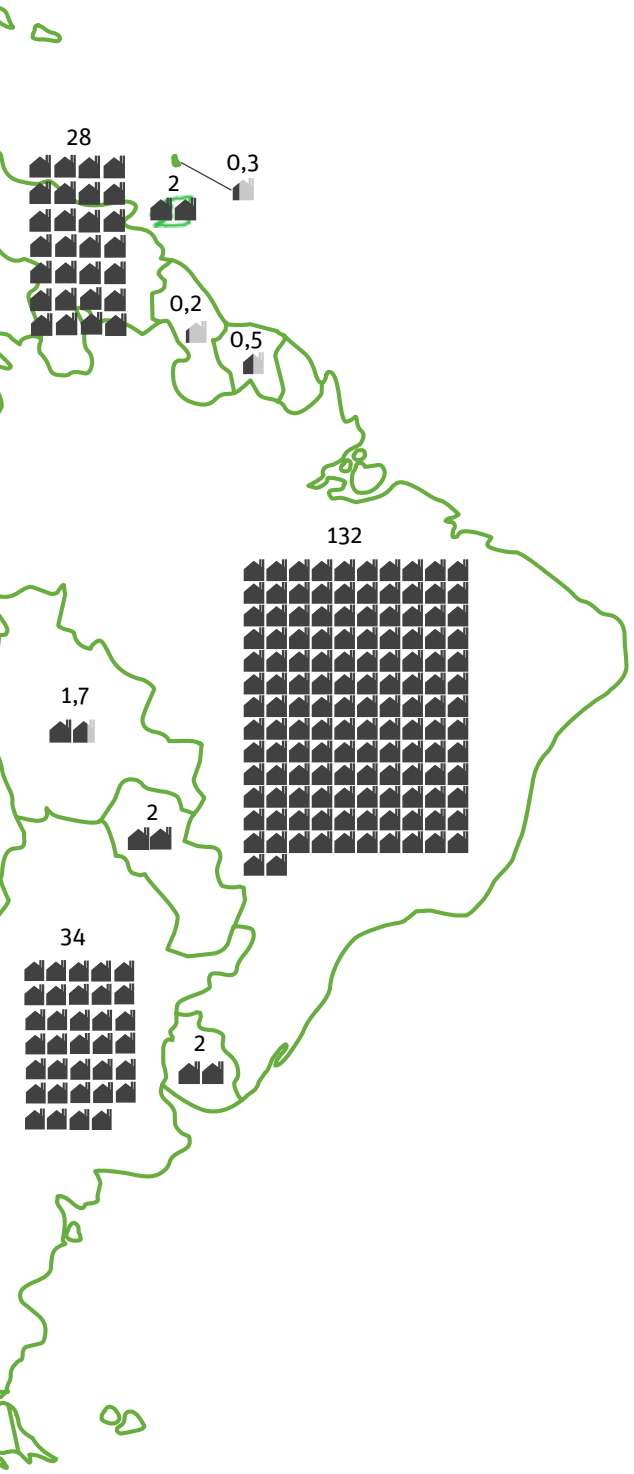
THIS WAY, PLEASE




## A future without efficiency

**One way to visualize the energy alternatives faced by Latin America and the Caribbean is to contrast the potential electricity savings from efficiency with the additional generation capacity that the region will need if it *does not* become more efficient. This map shows a conservative estimate of the number of gas-powered 250 MW power plants that the region's countries will need to build by 2018 if they do not become more efficient. See the explanation on the next page for details.**

1 gas-powered open cycle generation plants




KEEP GOING

**There are two ways for Latin America to generate 143,000 GWh of electricity in 2018. One option would cost around US$16 billion; the other, US$53 billion.**

# Introduction

When Brazil announced the discovery of massive new offshore oil reserves earlier this year, the news provoked celebration in Brasilia—and envy across the Americas.

Pessimism about the goal of achieving energy security has become pervasive in Latin America and the Caribbean. A 2007 poll by Latinobarómetro asked citizens across the region whether they thought they would have to endure energy rationing in the near future. An astonishing 80 percent of respondents said they were "very worried" or "somewhat worried" that this would be the case.

This anxiety is justified. News reports focus continually on rising fuel prices, declining petroleum production, and shortages of natural gas. But the region's appetite for energy continues to grow. According to the International Energy Agency (IEA), Latin America will need 75% more energy by 2030 than it needed in 2004, if current growth trends continue. Electricity production will have to expand by an estimated 50% within the next 10 years. The region's transportation fuel use will soar 70% by 2030.

In many countries, investment in new sources of energy is struggling to keep pace with demand. Opposition to new hydroelectric complexes (which have historically provided the bulk of the region's electricity) is forcing governments to build expensive gas, diesel and coal-powered plants. This in turn is feeding the global rise in fossil fuel prices, while increasing emissions linked to global warming.

## A new source of energy

Yet despite widespread concern about these trends, few people are aware of a clean source of energy that could solve a large part of the problem for a fraction of the cost of building new power plants or drilling new oil wells.

That source is energy efficiency and conservation. New research by the Inter-American Development Bank indicates that Latin America and the Caribbean as a whole could reduce energy consumption by 10% over the next decade by investing in widely available technology and equipment. It would cost approximately US$16 billion to reach that target, which would reduce total energy consumption by some 143,000 GWh in 2018. And contrary to popular perception, such efficiency measures would not compromise people's comfort or compromise the region's economic competitiveness.

And what if the region does not improve its energy efficiency? In that case, Latin America and the Caribbean will need to spend around US$53 billion to build the equivalent of 328 gas-powered open cycle generators (250 MW each) necessary to produce the same 143,000 GWh of power.

In other words, the are two ways for Latin America to generate 143,000 GWh of electricity in 2018. One costs around US$16 billion; the other, US$53 billion.

Energy efficiency and conservation are usually not considered a "source" of energy, of course. But from a cost standpoint, they most certainly are. The IEA recently reported that between 1990 and 2005, a group of 16 industrialized countries met ***around half*** of their increased energy demand through improved efficiency. The IEA estimates that in 2005 these countries saved at least US$180 billion in fuel and electricity costs. That figure is not an abstraction: it is the amount these countries would have had to spend on new power plants if they hadn't improved efficiency.

## Latin America's choice

The good news, for Latin America, is that the region has rich energy efficiency "reserves," and it has barely begun to exploit them. Though some countries—notably Mexico and Brazil—are already reaping substantial savings from energy efficiency programs begun in the 1980s and 1990s, most of their neighbors have yet to look seriously at conservation.

The opportunities are everywhere, because Latin America's energy productivity is uniformly low. The region is still overwhelmingly reliant on incandescent light bulbs, for example, even though these consume 70% more power than newer "compact fluorescent" alternatives. The region's factories and water systems use millions of old, energy-wasting electric motors and pumps. In many countries the transportation infrastructure—which consumes more than 30% of the region's energy—is grossly inefficient. Commercial and residential buildings are full of outdated air conditioning systems, refrigerators, washing machines and water heaters.

This report offers a snapshot of energy productivity in each of the region's countries, including prices consumers pay for transportation fuel and electricity. It also offers some initial estimates of the savings each country could reap from energy efficiency over the next 10 years.

Will Latin America begin to exploit this potential? That will largely depend on whether governments provide the right incentives. These can take many forms, from tax rebates and subsidies to regulations requiring specific efficiency standards for vehicles and appliances.

Today Latin America's governments are spending billions of dollars to subsidize fuel prices. The Financial Times recently reported that Latin America and the Caribbean will spend at least US$50 billion in subsidies for transportation fuel during 2008. This is more than five times what the IDB will lend to the region during 2009.

These subsidies have the laudable goal of protecting consumers from high fuel prices and keeping inflation in check. But they also tend to discourage investments in efficiency. What if even part of that US$50 billion were spent on incentives for consumers or companies that purchase energy-efficient lighting or machinery?

We hope this report will help generate a broader and more ambitious debate about Latin America's energy future.

# Some definitions

## Energy intensity

Energy intensity is a measure of the energy efficiency of a nation's economy. It is calculated as units of energy per unit of GDP. High energy intensity indicates that a country needs more energy consumption to generate one dolar of GDP, and low energy intensity indicates that the country needs less energy consumption to generate one dolar of GDP.

Many factors, such as climate, structure of sectoral energy consumption and the technology used by predominant industries, can influence an economy's overall energy intensity.

## Gasoline, diesel and electricity prices

Prices for transport fuels and electricity play a crucial role in either encouraging or discouraging energy efficiency. These prices vary widely across Latin America and the Caribbean, because governments apply different price policies, subsidies and/or taxes. Generally speaking, consumers and companies in countries with higher than average fuel and electricity prices are more likely to invest in efficiency, while those in countries with lower than average prices will have little incentive to conserve.

## ktoe (kilotons of oil equivalent)

The tonne of oil equivalent (toe) is a unit of energy equivalent to the amount of energy released by burning one tonne of crude oil.

## GWh (gigawatt hours)

A unit of electrical energy equal to 1 billion watt hours.

## Assumptions regarding energy savings

The estimates included in "The Efficiency Opportunity" section of these country profiles are based on the following assumptions.

- That the country's energy demand will grow at an average of 3.5% for the next 10 years for the "business as usual" scenario.
- That the displaced (avoided) power plants in the more efficient scenario are 250 MW open cycle gas turbine units operating at 20% capacity factor with an estimated construction cost of US$650/kW (these costs include building the plant and transmitting and distributing electricity). This is an extremely conservative cost assumption; the actual cost could be much higher for plants using different generation technologies.
- The energy efficiency scenario assumes a substantial increase in the load factor of electricity generating plants, which would make it possible to significantly reduce the installed electricity generation capacity.

*All the data in this report are from the Organización Latinoamericana de Energía (OLADE) 2006 and the International Energy Agency, 2006-2007. Please note that The Bahamas and Belize are not included in the OLADE database, so these two countries have not been included in this report.*

# Argentina

| | |
|---|---|
| Population: | 39,124,000 |
| $ GDP: | US$340 billion |
| Total Energy Consumption: | 46,034 ktoe |

## Energy productivity

Argentina's energy intensity index of 1.06 is one of the lowest in the region, meaning that the country makes relatively efficient use of its energy. However, Argentina is heavily dependent on fossil fuels: around 88 percent of its total energy consumption is generated from this source. Prices for gasoline and diesel in Argentina are much lower than in most of the region's larger economies. Electricity prices for industrial and residential consumers in Argentina are also among the lowest in the region.

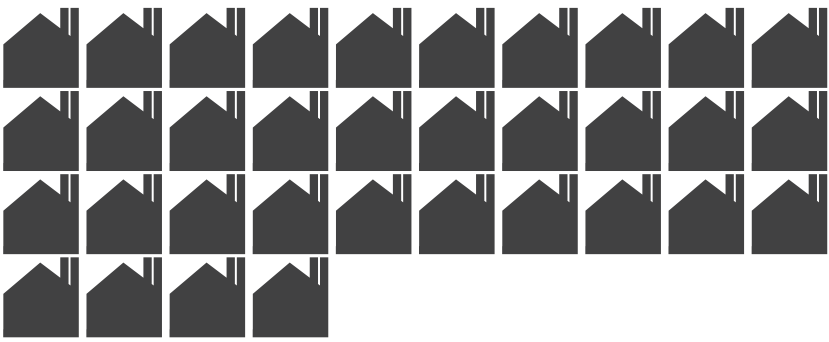
## The efficiency opportunity

If Argentina were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 15,100 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$1.8 billion over this period (in 2008 dollars).

If Argentina's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 34 gas-powered open cycle generation plants to produce the same 15,100 GWh of electricity per year.

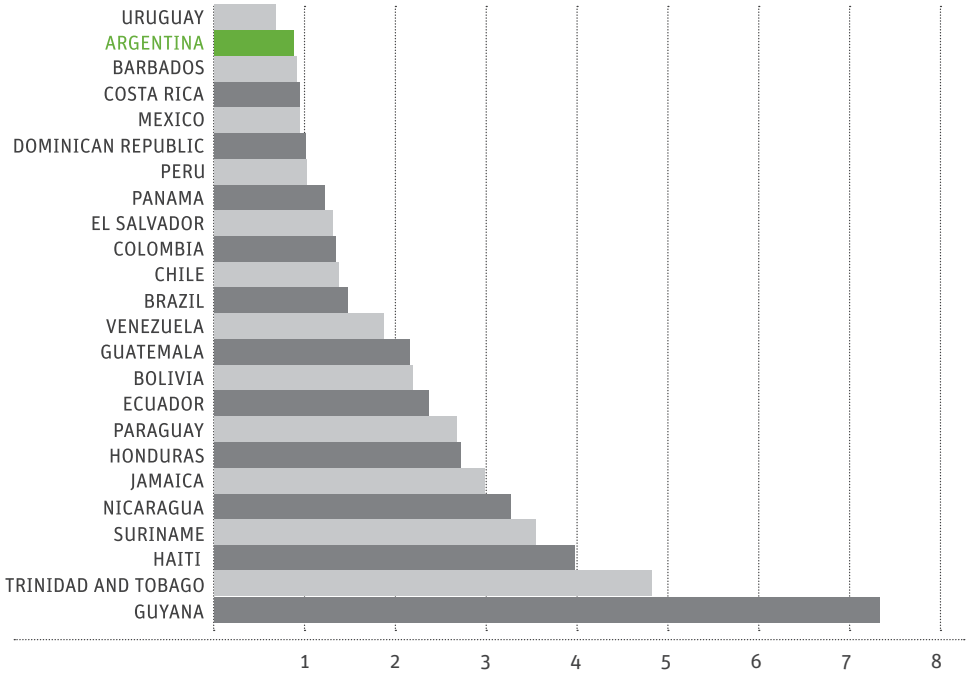
At today's prices, it would cost approximately US$5.6 billion just to build these plants, not counting operational and fuel costs.

Put another way, Argentina has two alternatives for generating 15,100 GWh of electricity in 2018: one costs US$1.8 billion, and the other US$5.6 billion.



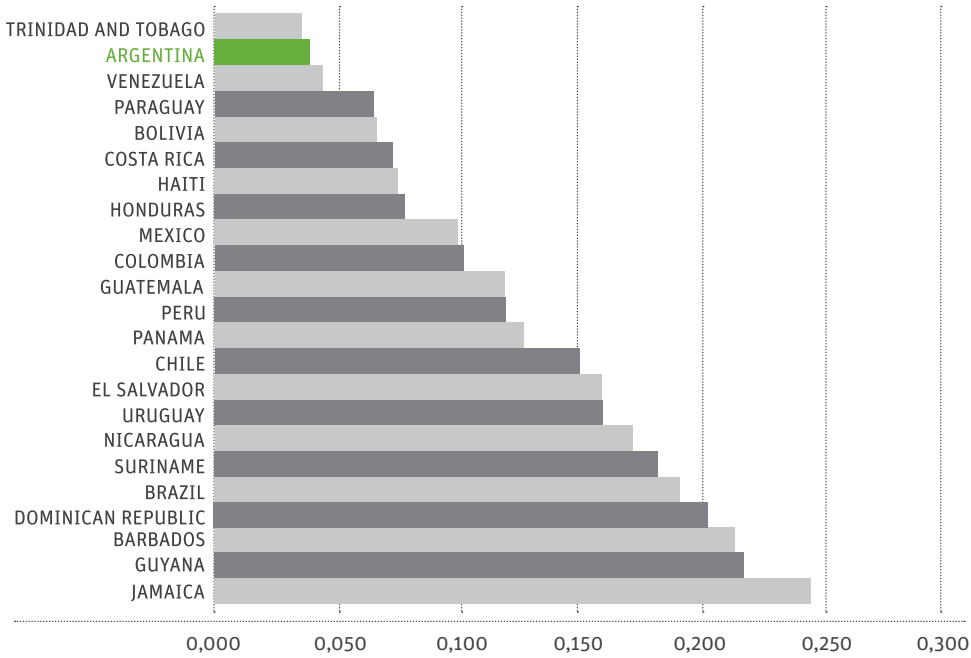
34 gas-powered open cycle generation plants

## Energy Intensity



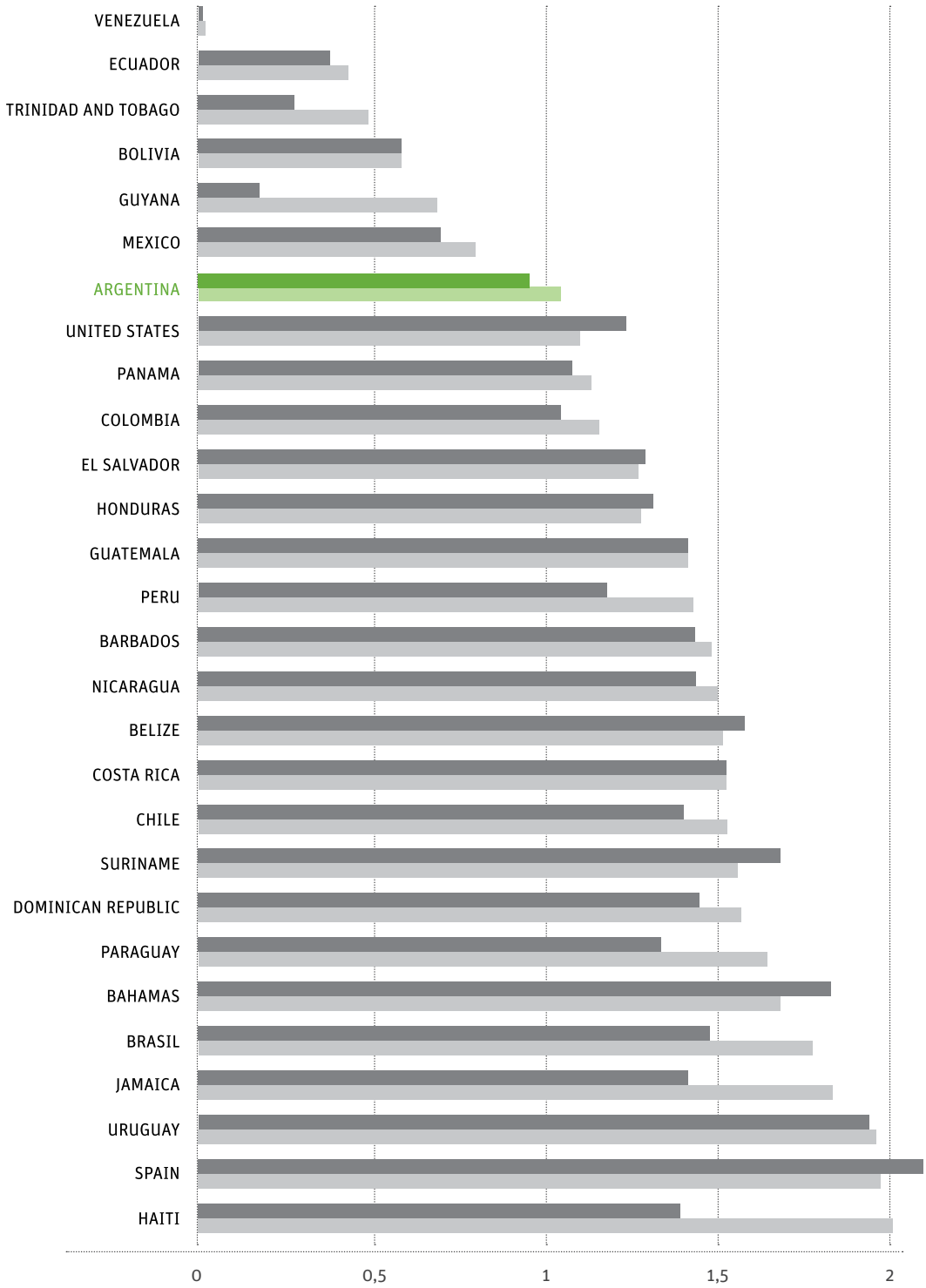

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Barbados

| | |
|---|---|
| Population: | 292,930 |
| $ GDP: | US$2.4 billion |
| Total Energy Consumption: | 277 ktoe |

## Energy productivity

Barbados' energy intensity index of 1.08 is one of the lowest in the region, meaning that the country makes relatively efficient use of its energy. Gasoline and diesel prices in Barbados are in the middle range, while electricity prices are among the highest in Latin America and the Caribbean.

## The efficiency opportunity

If Barbados were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 130 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$15 million over this period (in 2008 dollars).

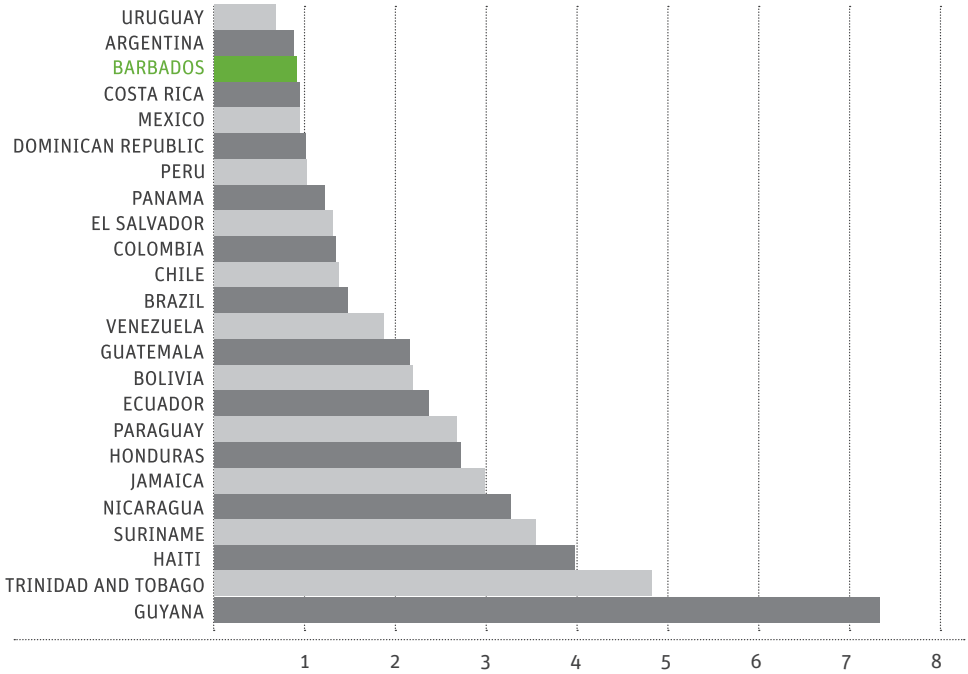
If Barbados' energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 0.3 gas-powered open cycle generation plants to produce the same 130 GWh of electricity per year.

At today's prices, it would cost approximately US$49 million just to build this additional capacity, not counting operational and fuel costs.

Put another way, Barbados has two alternatives for generating 130 GWh of electricity in 2018: one costs US$15 million, and the other US$49 million.

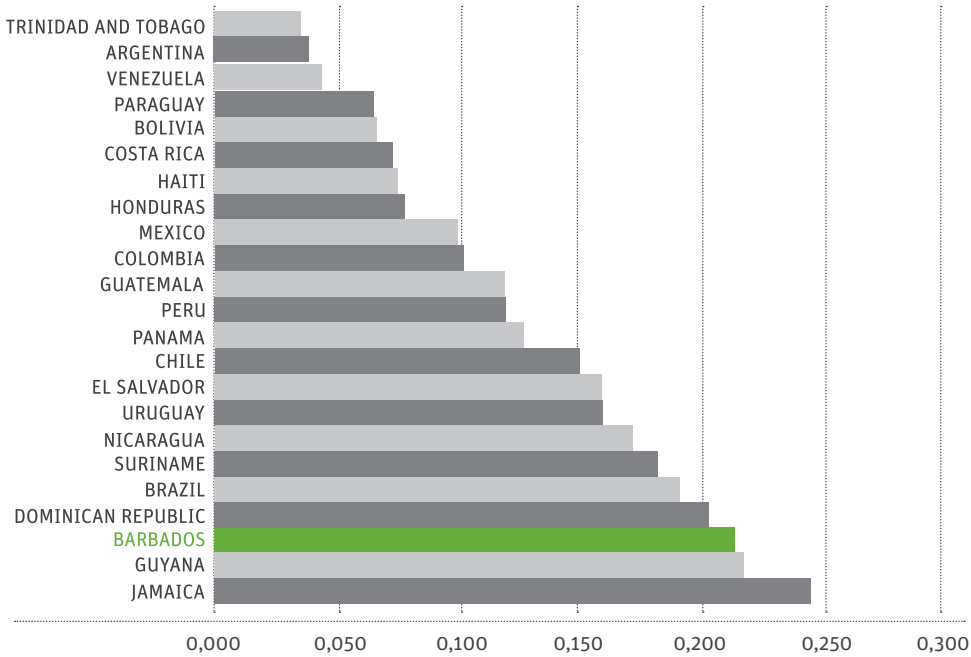
0.3 gas-powered open cycle generation plants

## Energy Intensity



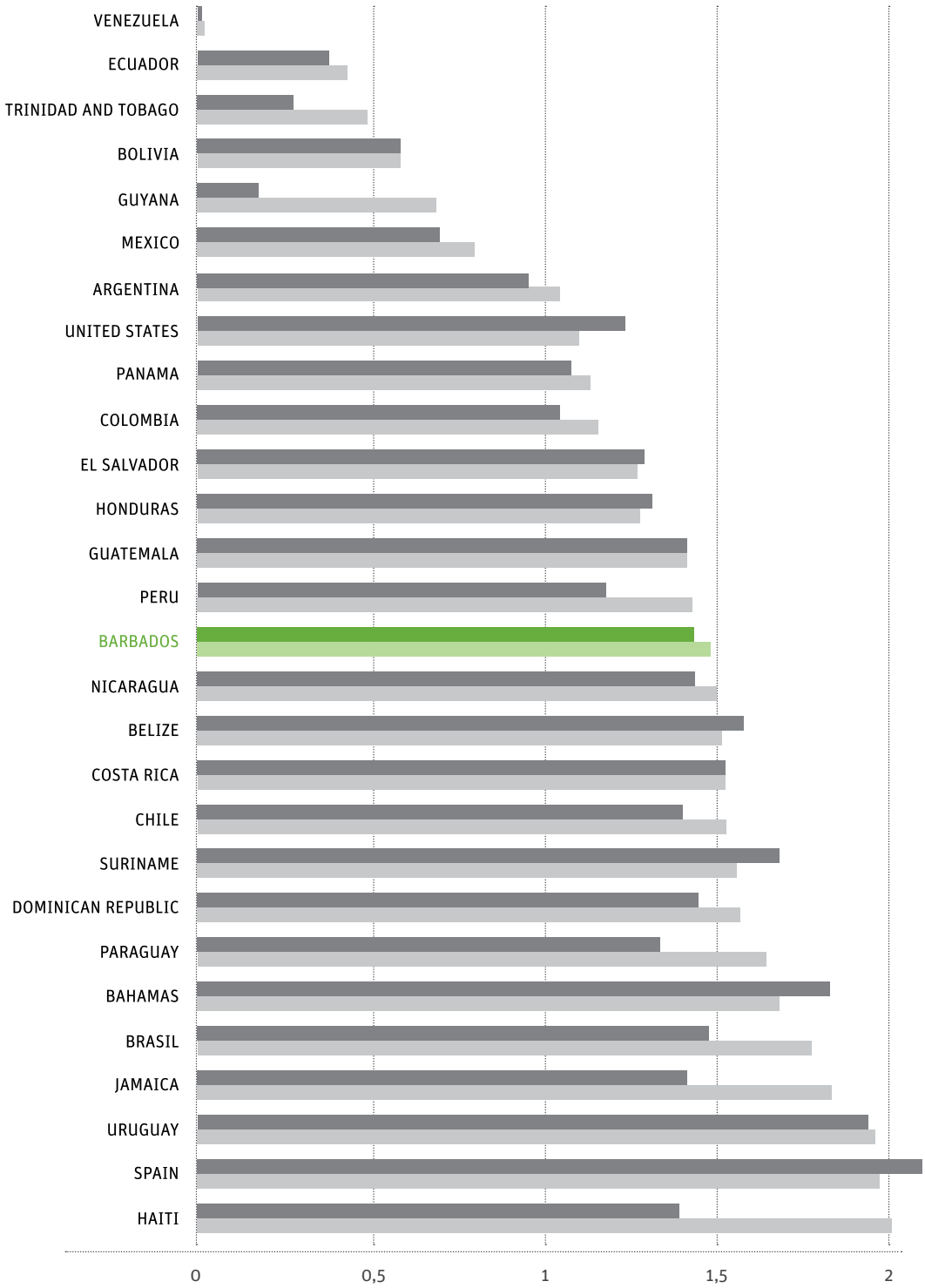

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Bolivia

| | |
|---|---|
| Population: | 9,353,800 |
| $ GDP: | US$10.2 billion |
| Total Energy Consumption: | 3,677 ktoe |

## Energy productivity

Bolivia's energy intensity index of 2.61 is in the middle range the region, meaning that the country makes moderately efficient use of its energy. However, Bolivia is heavily dependent on fossil fuels: around 82 percent of its total energy consumption is generated from this source. Prices for diesel, gasoline and electricity in Bolivia are among the lowest in the region.

## The efficiency opportunity

If Bolivia were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 723 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$84 million over this period (in 2008 dollars).

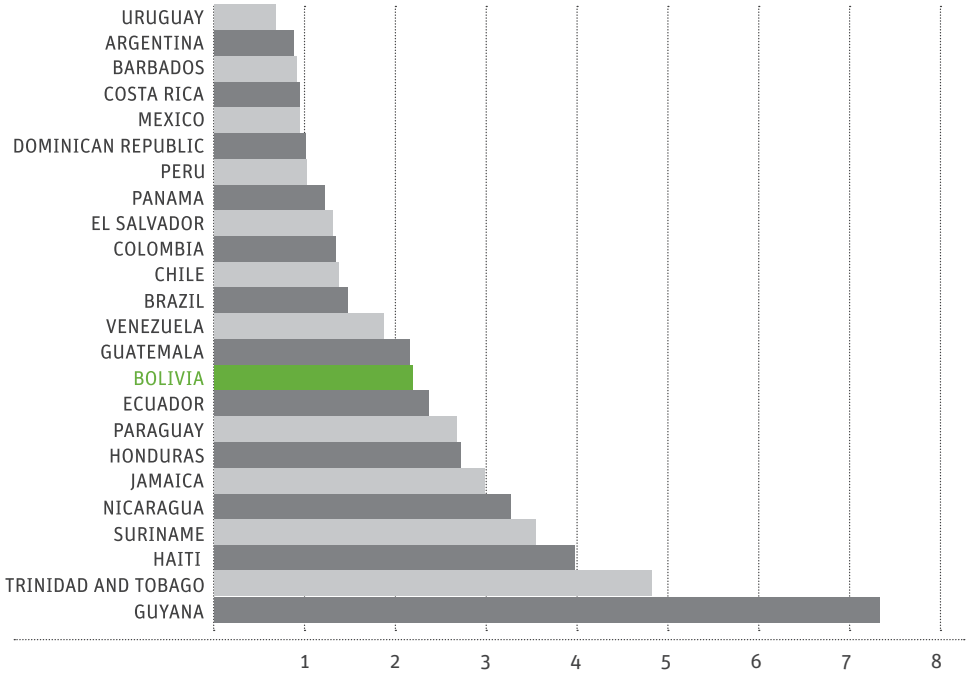
If Bolivia's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 1.7 gas-powered open cycle generation plants to produce the same 723 GWh of electricity per year.

At today's prices, it would cost approximately US$268 million just to build these plants, not counting operational and fuel costs.

Put another way, Bolivia has two alternatives for producing 723 GWh of electricity in 2018: one costs US$84 million, and the other US$268 million.

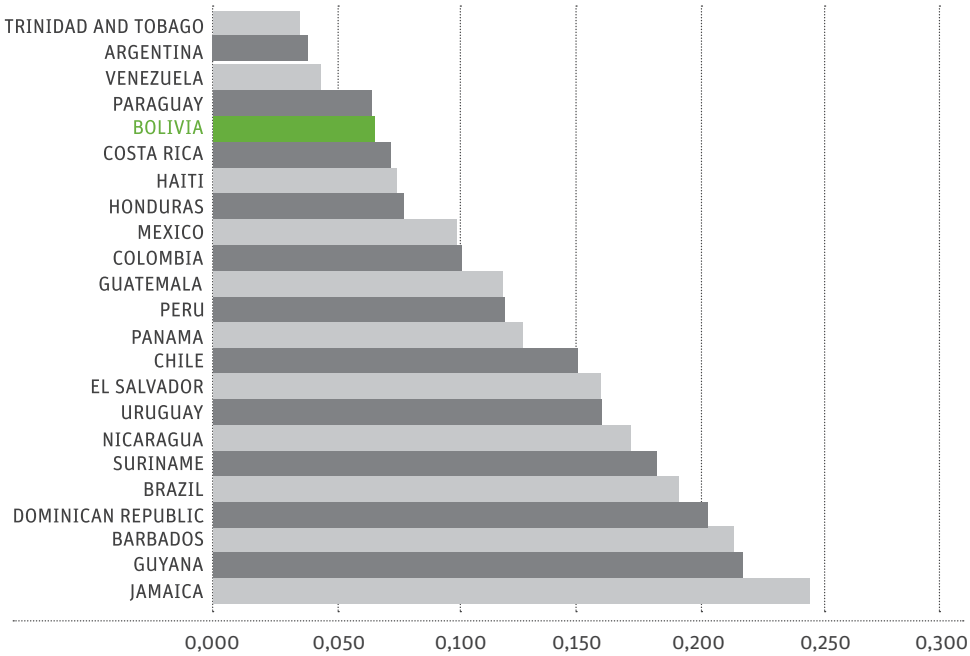
1.7 gas-powered open cycle generation plants

## Energy Intensity



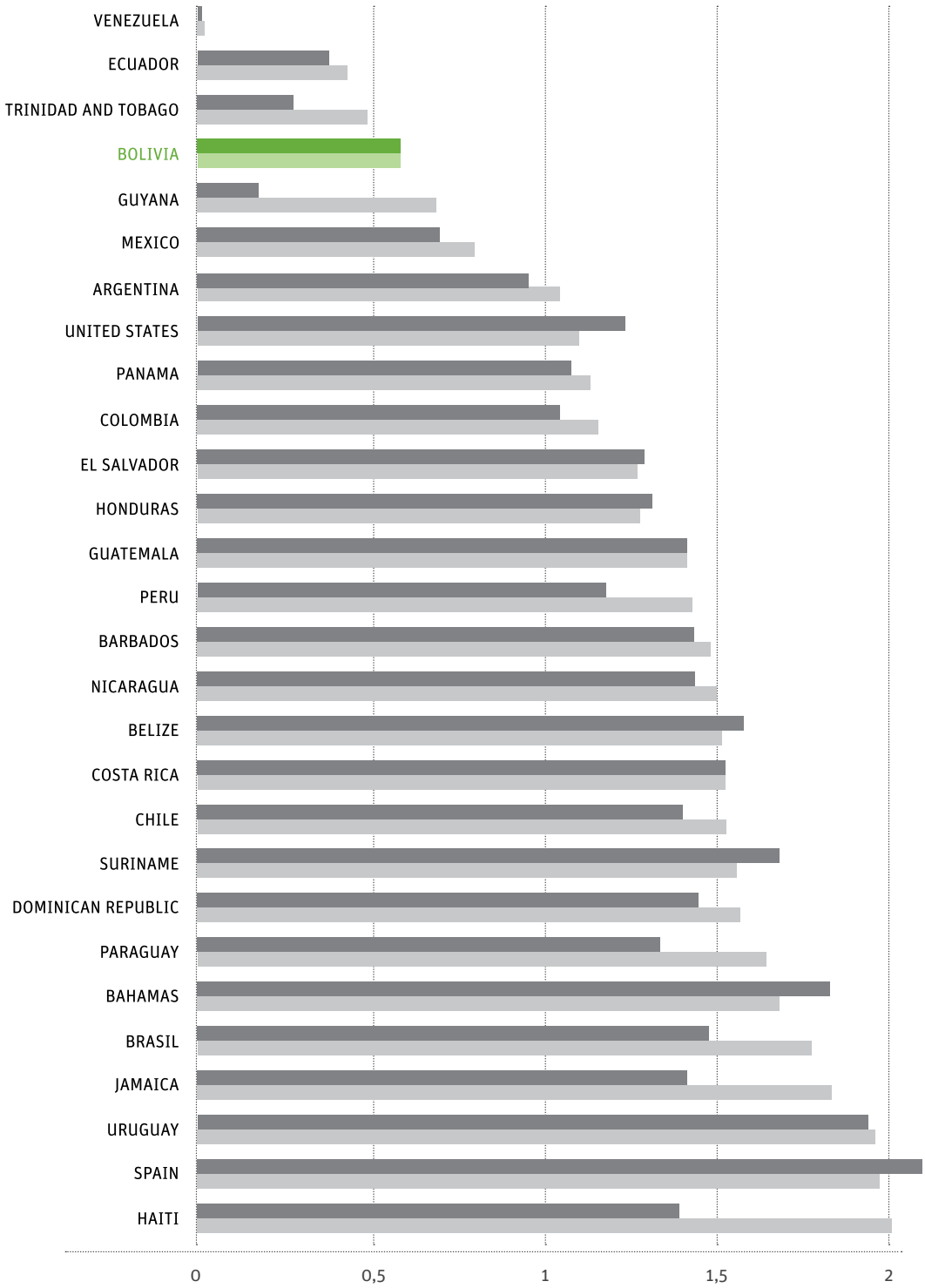

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Brazil

| | |
|---|---|
| Population: | 189,320,000 |
| $ GDP: | US$766 billion |
| Total Energy Consumption: | 173,881 ktoe |

## Energy productivity

Brazil's energy intensity index of 1.77 is near the average for Latin America and the Caribbean, meaning that the country makes moderately efficient use of its energy. In contrast to other regional countries, Brazil is not heavily dependent on fossil fuels: just 50% of its total energy consumption is generated from this source. Prices for diesel and gasoline are at the high end for Latin America, while electricity prices are near the middle range.

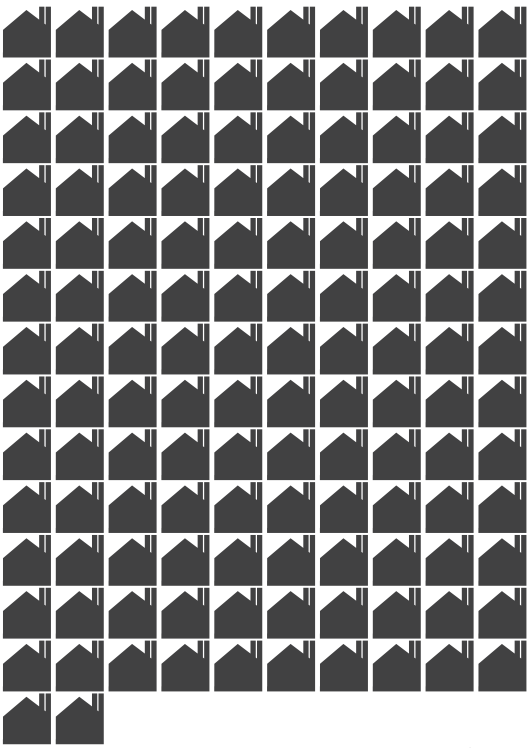
## The efficiency opportunity

If Brazil were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 57,800 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$6.7 billion over this period (in 2008 dollars).

If Brazil's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 132 gas-powered open cycle generation plants to produce the same 57,800 GWh of electricity per year.

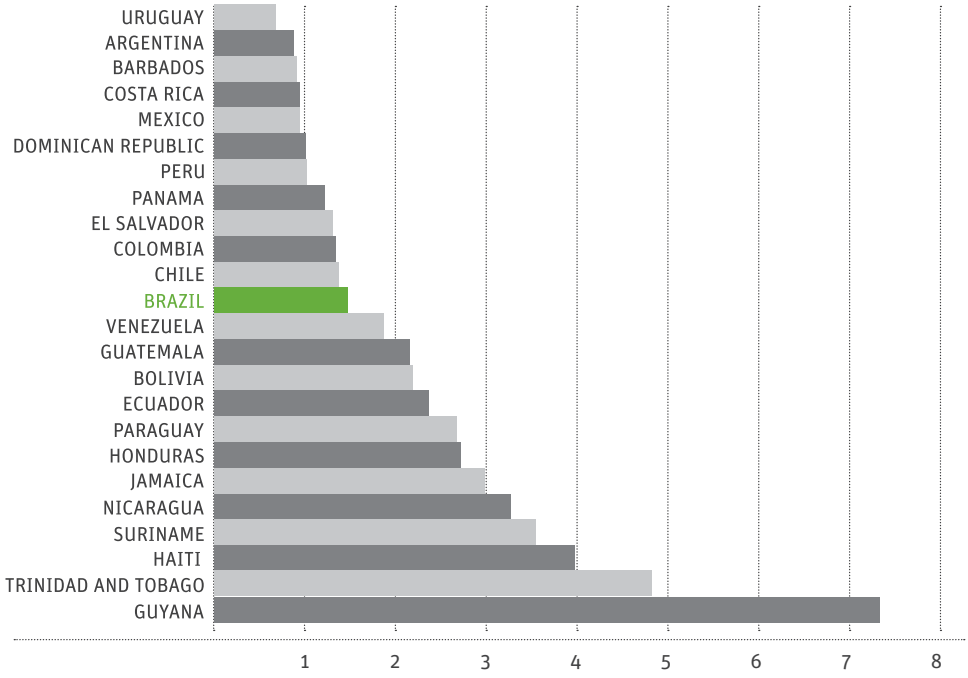
At today's prices, it would cost approximately US$21.5 billion just to build these plants, not counting operational and fuel costs.

Put another way, Brazil has two alternatives for producing 57,800 GWh of electricity in 2018: one costs US$6.7 billion, and the other US$21.5 billion.



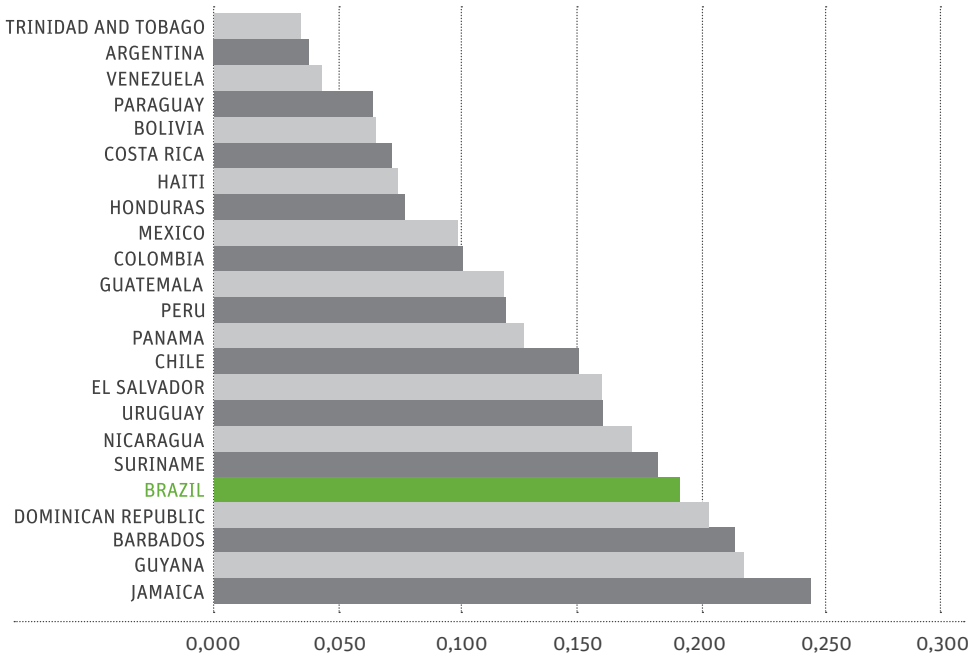
132 gas-powered open cycle generation plants

## Energy Intensity



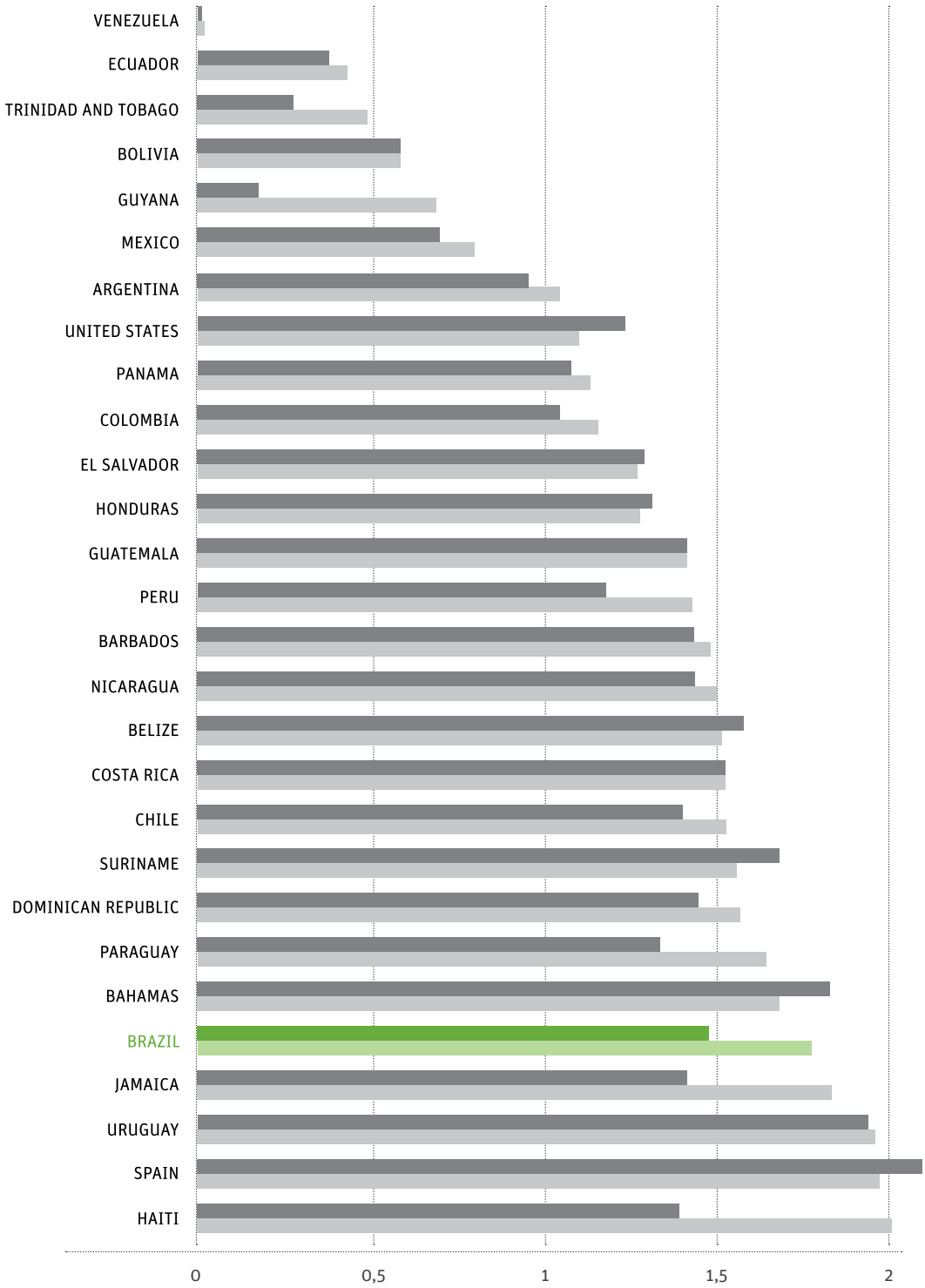

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Chile

| | |
|---|---|
| Population: | 16,433,000 |
| $ GDP: | US$97 billion |
| Total Energy Consumption: | 21,916 ktoe |

## Energy productivity

Chile's energy intensity index of 1.65 is slightly lower than the average for the region, meaning that the country makes relatively efficient use of its energy. However, Chile is heavily dependent on fossil fuels: 75 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are slightly higher than average, while electricity prices are near the middle range for the region.

## The efficiency opportunity

If Chile were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 7,800 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$900 million over this period (in 2008 dollars).

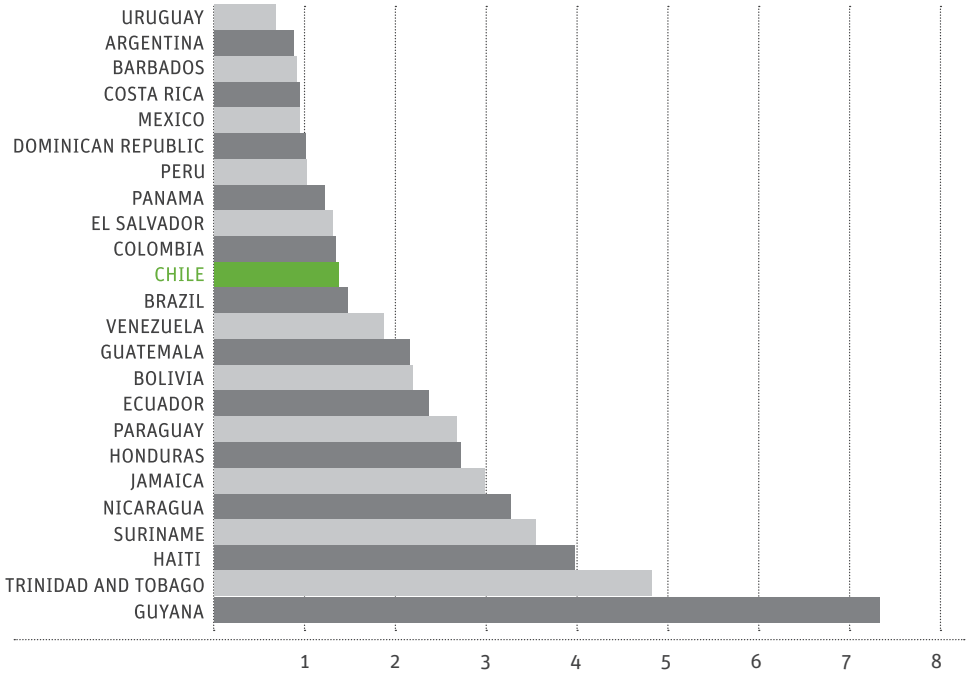
If Chile's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 17.8 gas-powered open cycle generation plants to produce the same 7,800 GWh of electricity per year.

At today's prices, it would cost approximately US$2.9 billion just to build these plants, not counting operational and fuel costs.

Put another way, Chile has two alternatives for producing 7,800 GWh of electricity in 2018: one costs US$900 million, and the other US$2.9 billion.

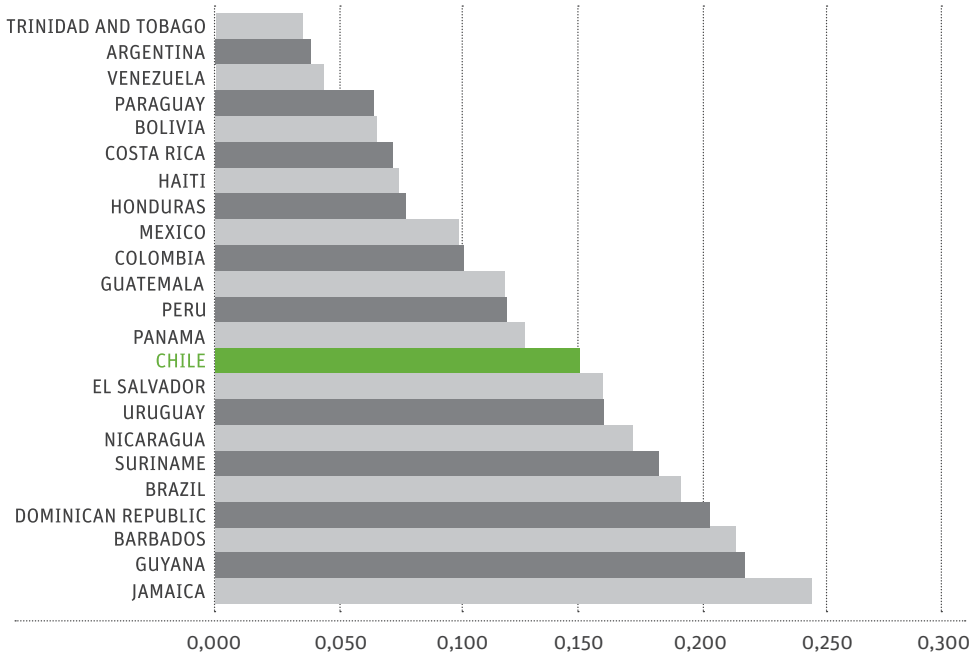
17.8 gas-powered open cycle generation plants

## Energy Intensity



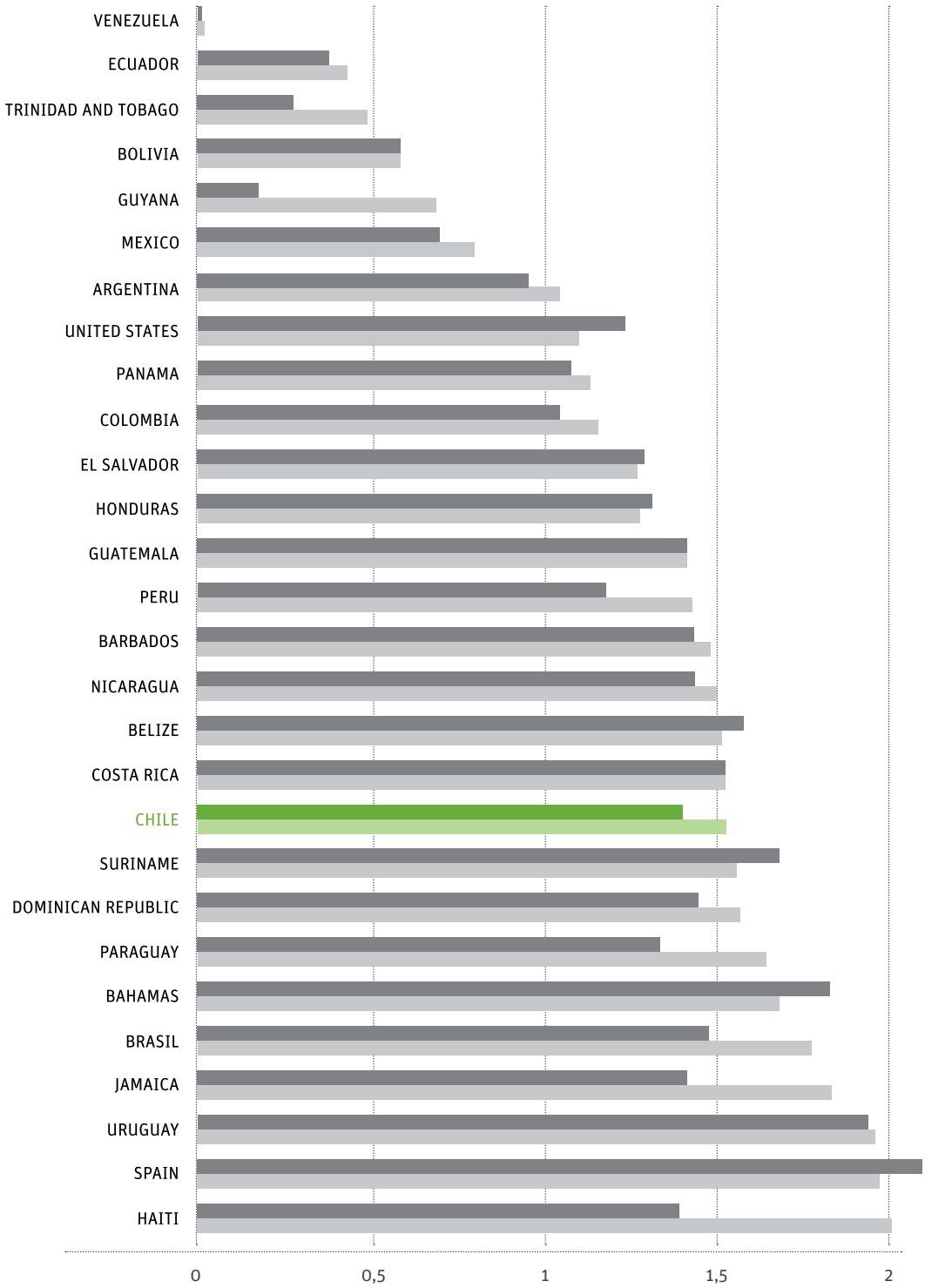

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Colombia

| | |
|---|---|
| **Population:** | **45,558,000** |
| **$ GDP:** | **US$106 billion** |
| **Total Energy Consumption:** | **23,456 ktoe** |

## Energy productivity

Colombia's energy intensity index of 1.6 is around average for the region, meaning that the country makes relatively efficient use of its energy. However, Colombia is heavily dependent on fossil fuels: nearly 75 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are located in the middle range for the region, and electricity prices are a little lower than average.

## The efficiency opportunity

If Colombia were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 6,300 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$ 730 million over this period (in 2008 dollars).

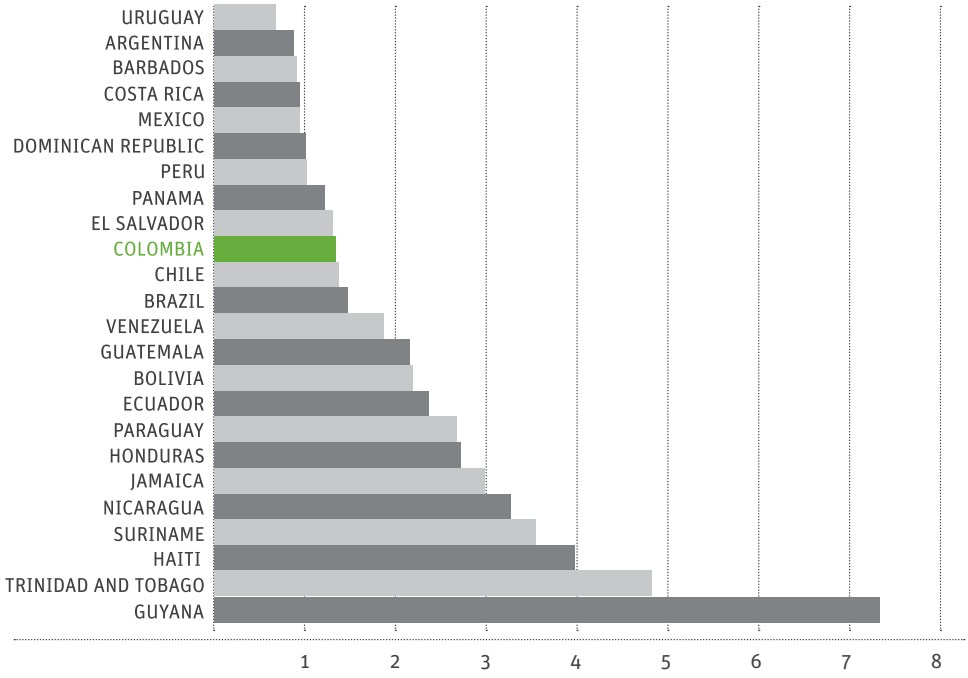
If Colombia's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 14 gas-powered open cycle generation plants to produce the same 6,300 GWh of electricity per year.

At today's prices, it would cost approximately US$2.3 billion just to build these plants, not counting operational and fuel costs.

Put another way, Colombia has two alternatives for producing 6,300 GWh of electricity in 2018: one costs US$730 million, and the other US$2.3 billion.

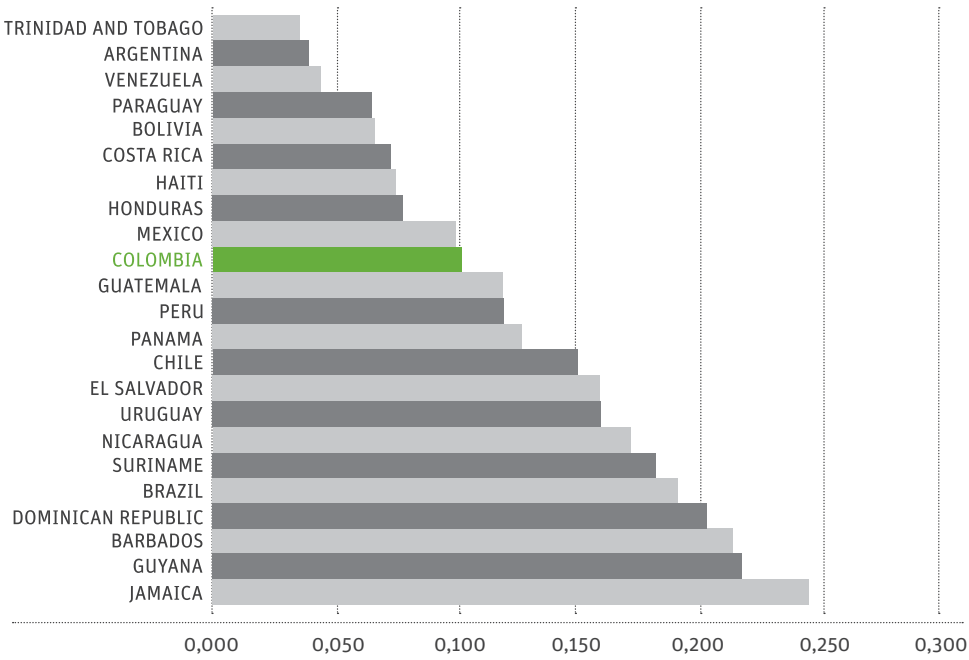
14 gas-powered open cycle generation plants

## Energy Intensity



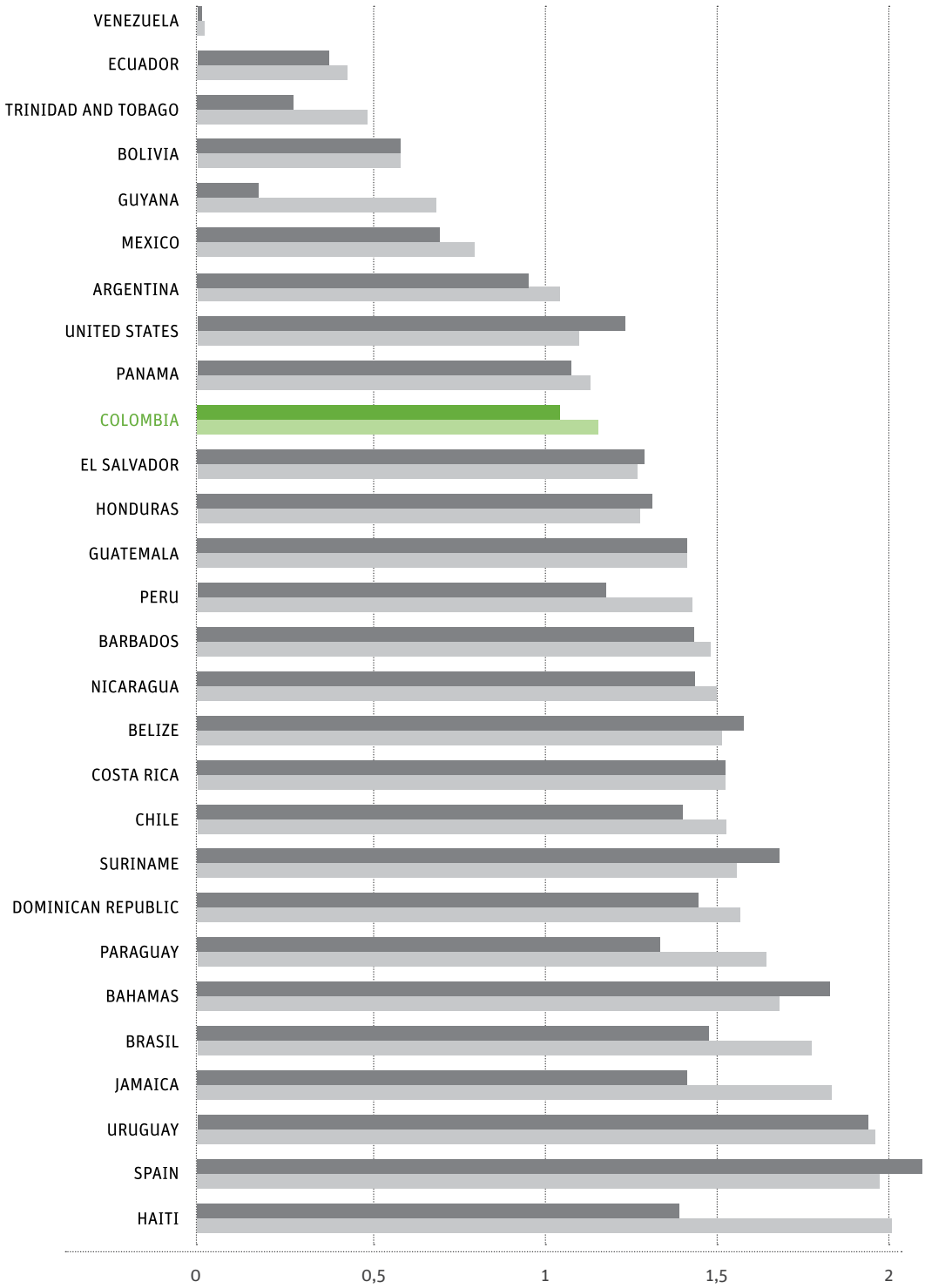

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Costa Rica

| | |
|---|---|
| Population: | 4,398,800 |
| $ GDP: | US$21 billion |
| Total Energy Consumption: | 3,263 ktoe |

## Energy productivity

Costa Rica's energy intensity index of 1.14 is one of the lowest in the region, meaning that the country makes relatively efficient use of its energy. However, Costa Rica is much less reliant on fossil fuels than most Latin American countries: just 50 percent of its total energy consumption is generated from this source. Diesel and gasoline prices in Costa Rica are slightly higher than the regional average, but electricity prices are among the lowest in Latin America.

## The efficiency opportunity

If Costa Rica were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 1,200 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$ 140 million over this period (in 2008 dollars).

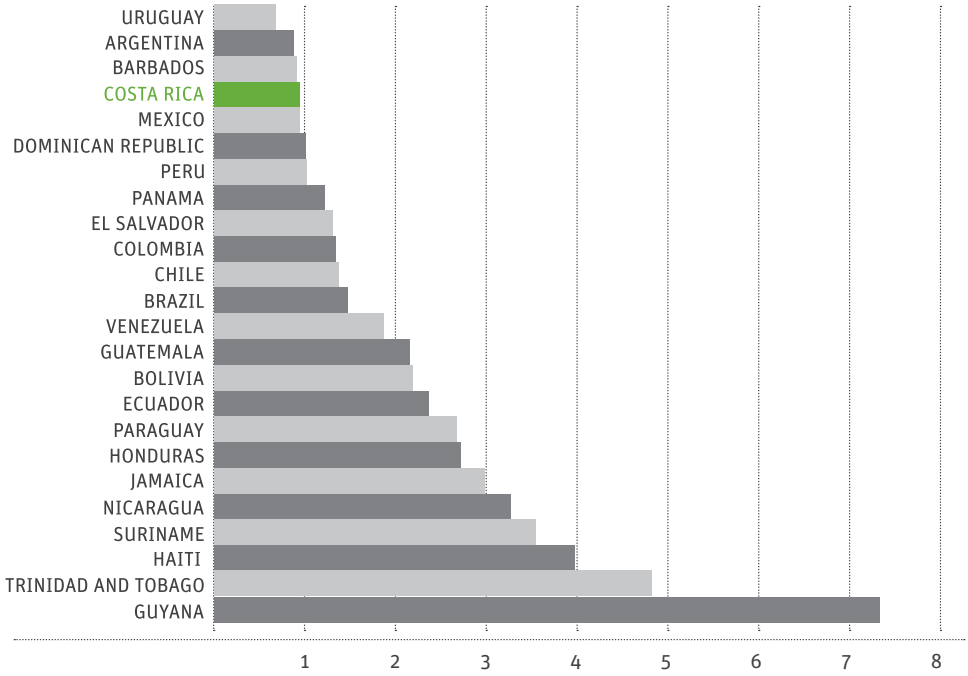
If Costa Rica's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 3 gas-powered open cycle generation plants to produce the same 1,200 GWh of electricity per year.

At today's prices, it would cost approximately US$450 million just to build these plants, not counting operational and fuel costs.

Put another way, Costa Rica has two alternatives for producing 1,200 GWh of electricity in 2018: one costs US$140 million, and the other US$450 million.

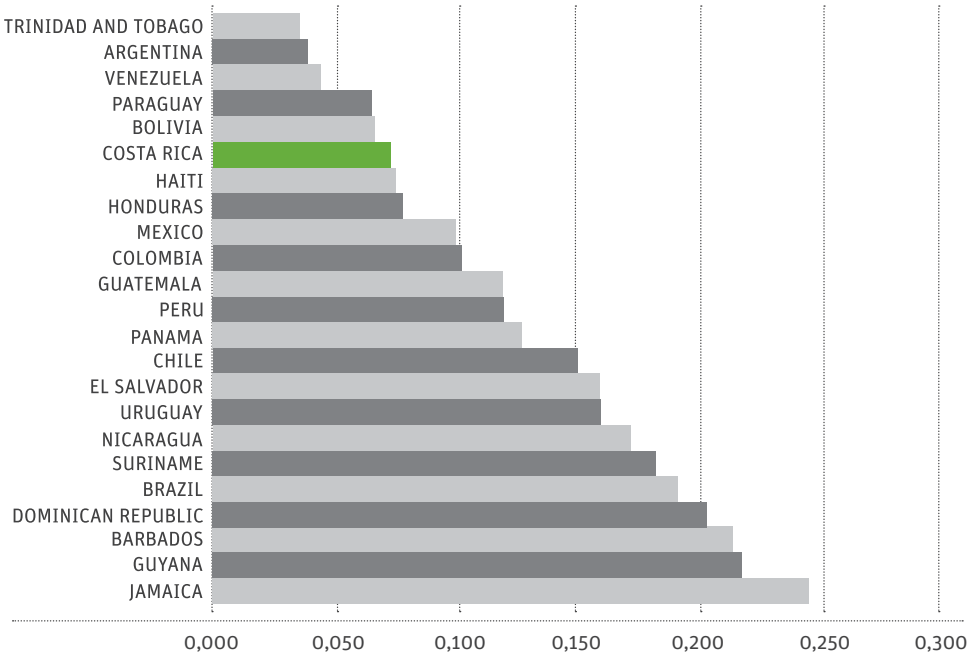
3 gas-powered open cycle generation plants

## Energy Intensity



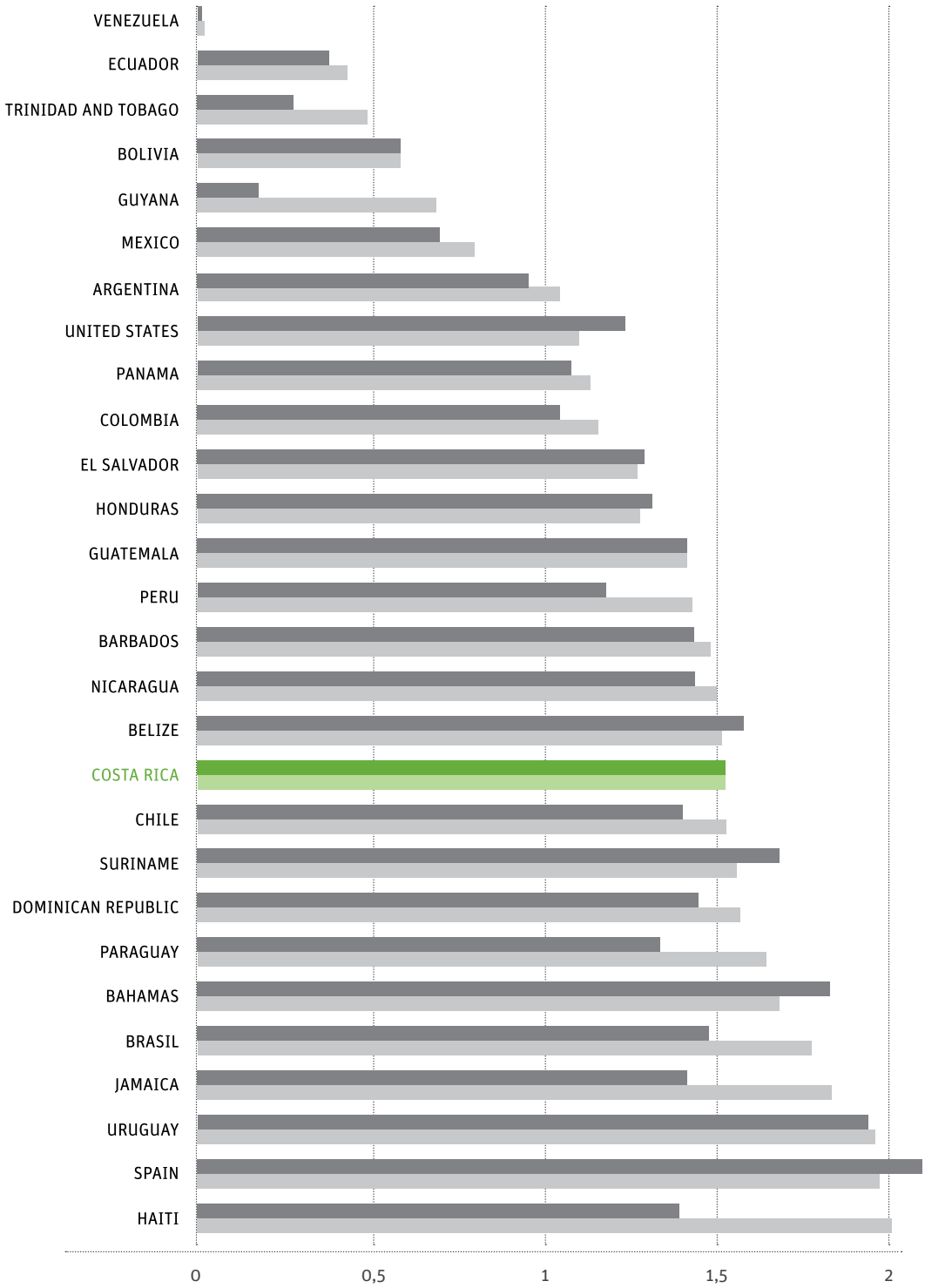

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Dominican Republic

| | |
|---|---|
| Population: | 9,614,700 |
| $ GDP: | US$26 billion |
| Total Energy Consumption: | 4,909 ktoe |

## Energy productivity

The Dominican Republic's energy intensity index of 1.19 is at the low end for the region, meaning that the country makes relatively efficient use of its energy. However, the Dominican Republic is heavily dependent on fossil fuels: nearly 80 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are slightly higher than the regional average, but electricity prices are the lowest in Latin America.

## The efficiency opportunity

If Dominican Republic were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 1,900 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$220 million over this period (in 2008 dollars).

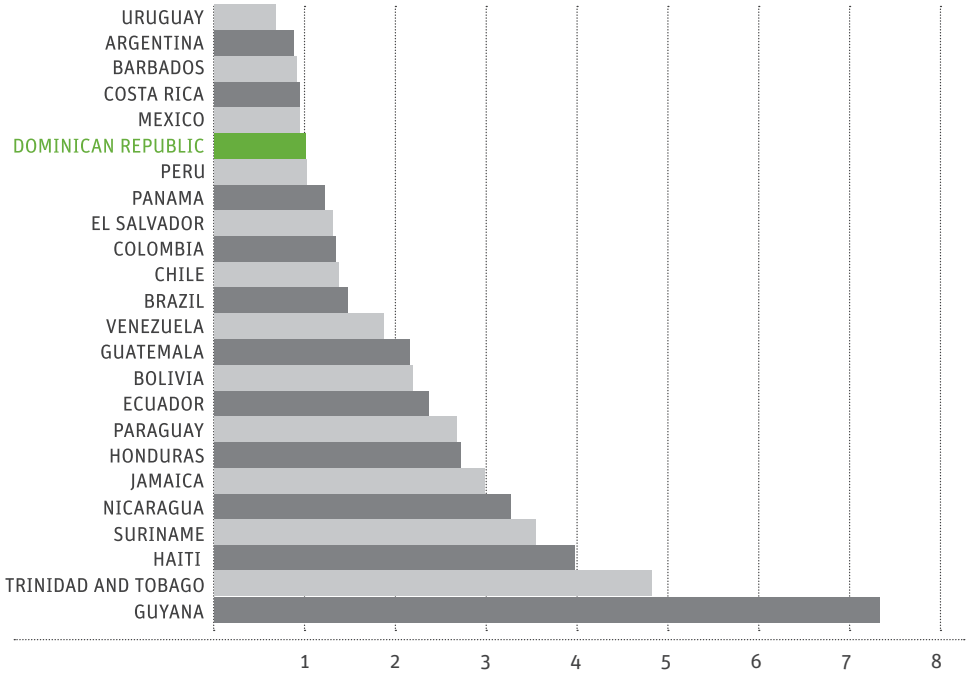
If Dominican Republic's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 4 gas-powered open cycle generation plants to produce the same 1,900 GWh of electricity per year.

At today's prices, it would cost approximately US$700 million just to build these plants, not counting operational and fuel costs.

Put another way, Dominican Republic has two alternatives for producing 1,900 GWh of electricity in 2018: one costs US$220 million, and the other US$700 million.

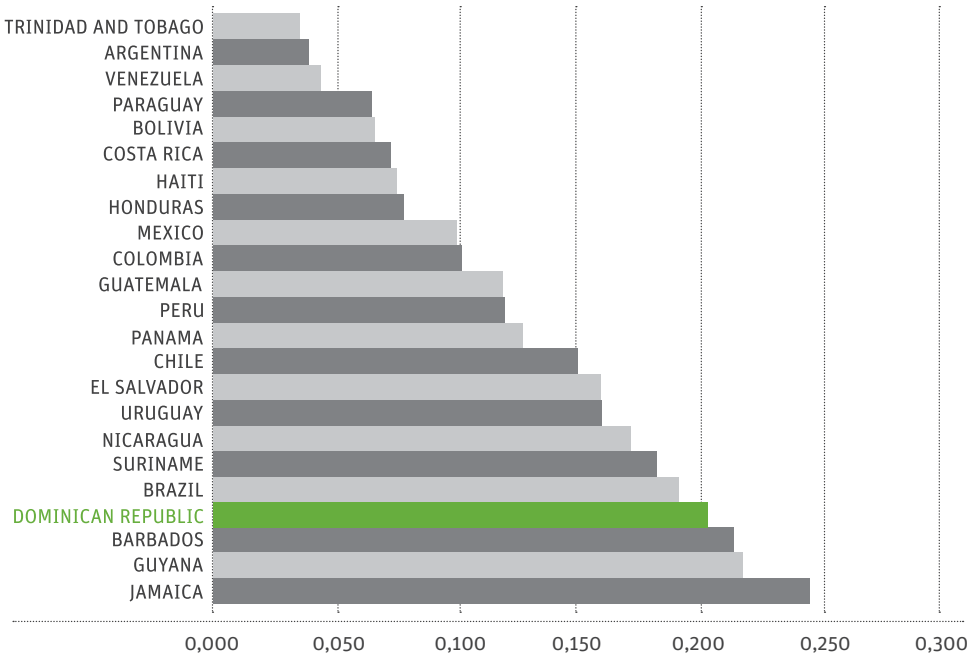
4 gas-powered open cycle generation plants

## Energy Intensity



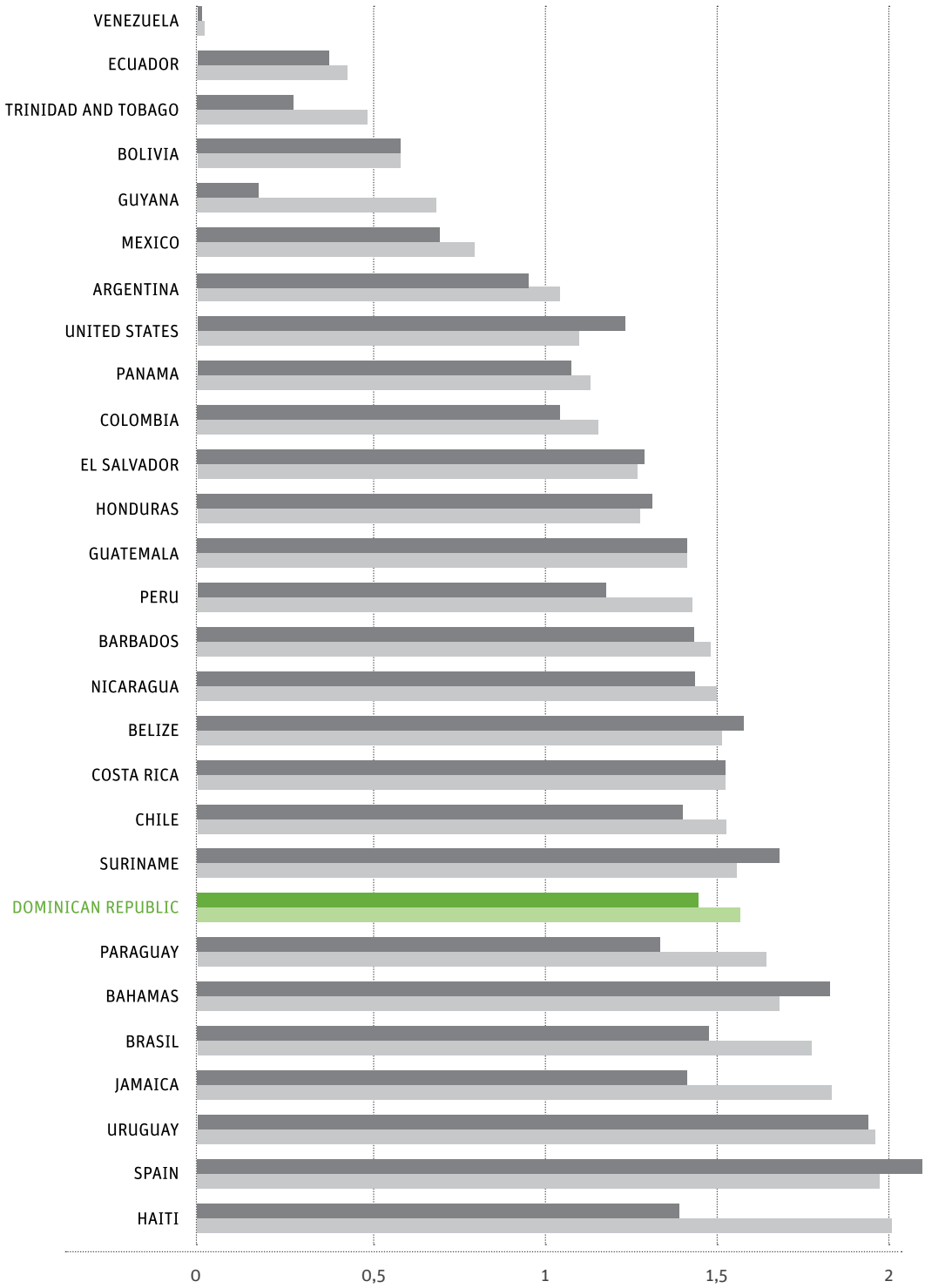

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Ecuador

| | |
|---|---|
| Population: | 39,124,000 |
| $ GDP: | US$340 billion |
| Total Energy Consumption: | 46034 ktoe |

## Energy productivity

Ecuador's energy intensity index of 2.82 is slightly above the regional average, meaning that the country makes somewhat less efficient use of its energy.

Ecuador is also heavily dependent on fossil fuels: nearly 90 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are the second lowest in Latin America, and prices for electricity are not available for Ecuador.

## The efficiency opportunity

If Ecuador were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 1,700 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$200 million over this period (in 2008 dollars).

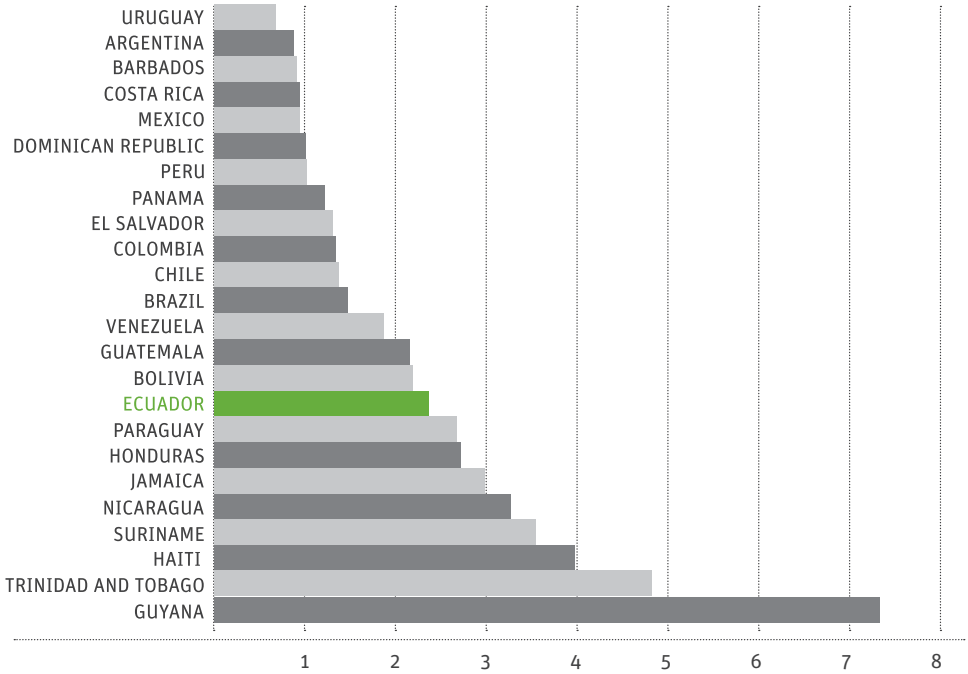
If Ecuador's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 4 gas-powered open cycle generation plants to produce the same 1,700 GWh of electricity per year.

At today's prices, it would cost approximately US$630 million just to build these plants, not counting operational and fuel costs.

Put another way, Ecuador has two alternatives for producing 1,700 GWh of electricity in 2018: one costs US$200 million, and the other US$630 million.

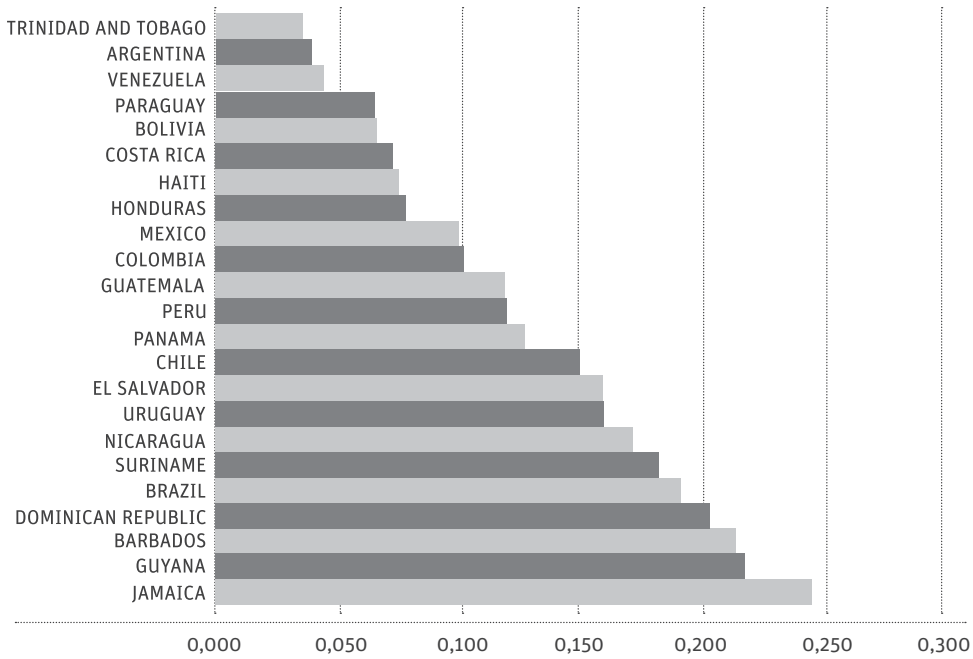
4 gas-powered open cycle generation plants

## Energy Intensity



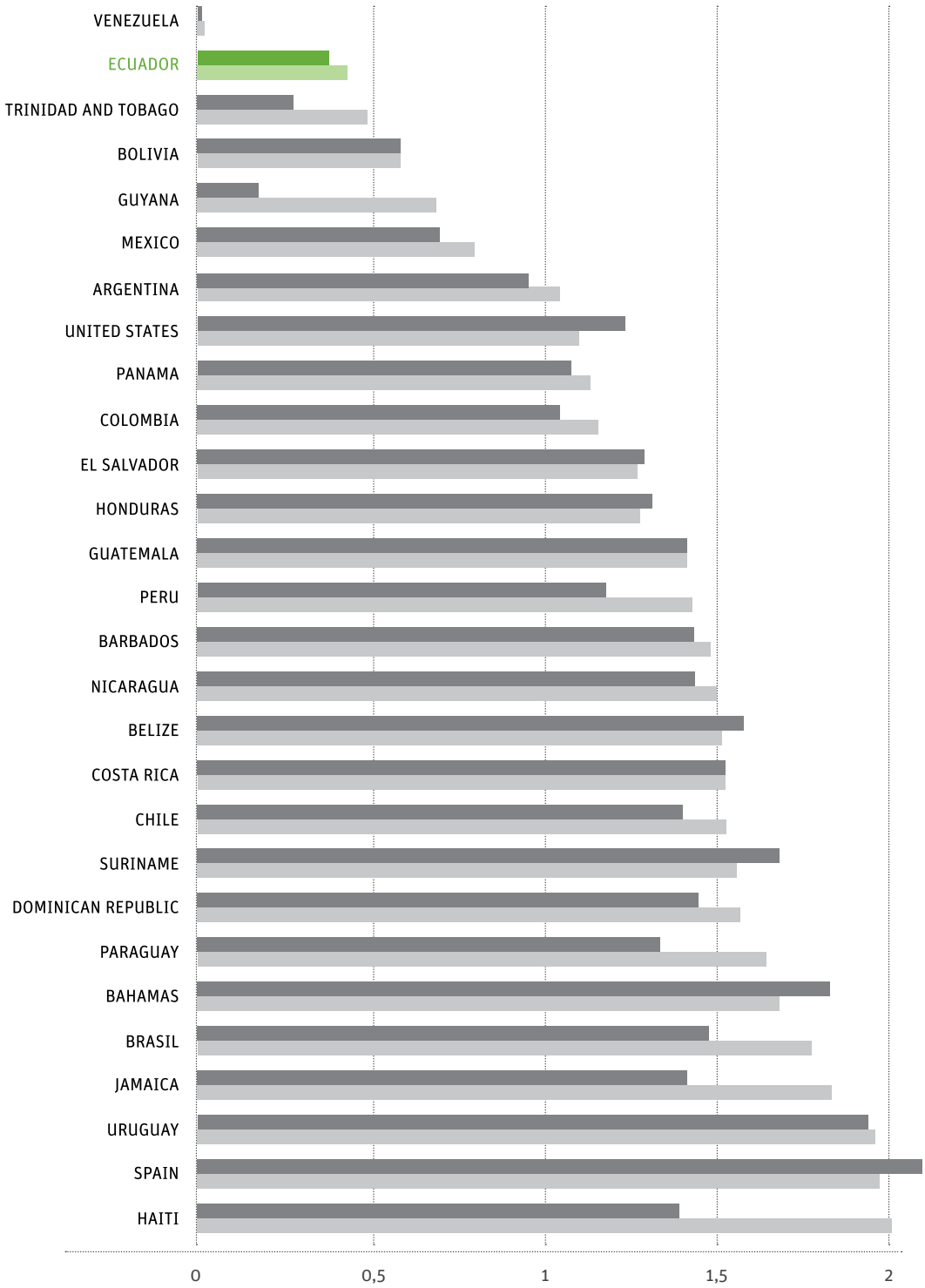

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Electric prices for Ecuador in 2006 were not available in the OLADE database.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# El Salvador

| | |
|---|---|
| Population: | 6,762,300 |
| $ GDP: | US$15 billion |
| Total Energy Consumption: | 3,305 ktoe |

## Energy productivity

El Salvador's energy intensity index of 1.57 is around average for the region, meaning that the country makes relatively efficient use of its energy. El Salvador has a lower than average dependency on fossil fuels: just 45 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are around average in El Salvador, as are electricity prices.

## The efficiency opportunity

If El Salvador were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 660 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$77 million over this period (in 2008 dollars).

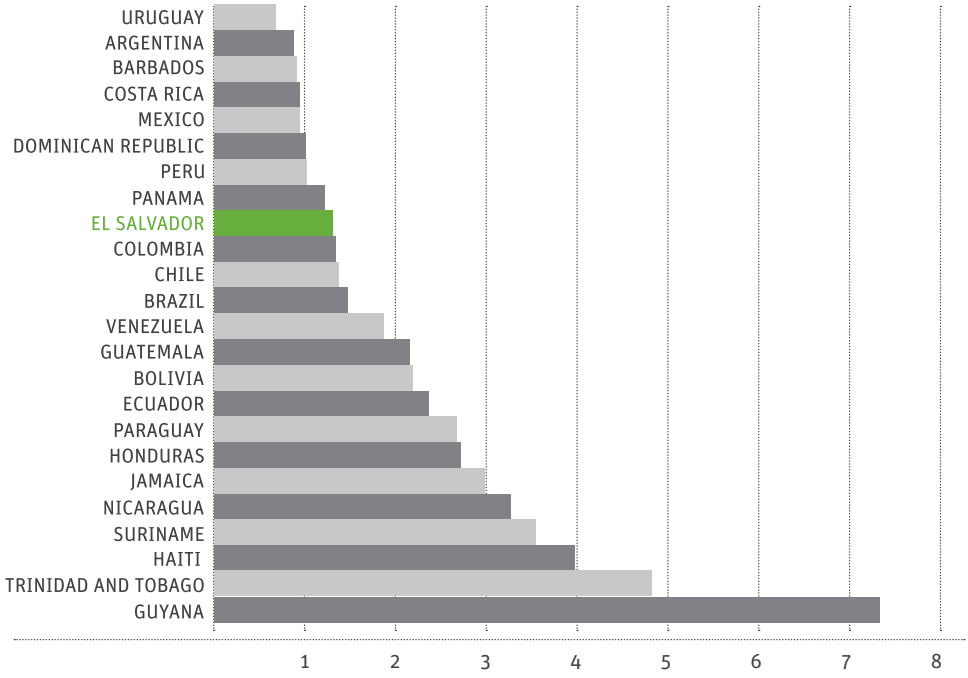
If El Salvador's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 1.9 gas-powered open cycle generation plants to produce the same 660 GWh of electricity per year.

At today's prices, it would cost approximately US$245 million just to build these plants, not counting operational and fuel costs.

Put another way, El Salvador has two alternatives for producing 660 GWh of electricity in 2018: one costs US$77 million, and the other US$245 million.

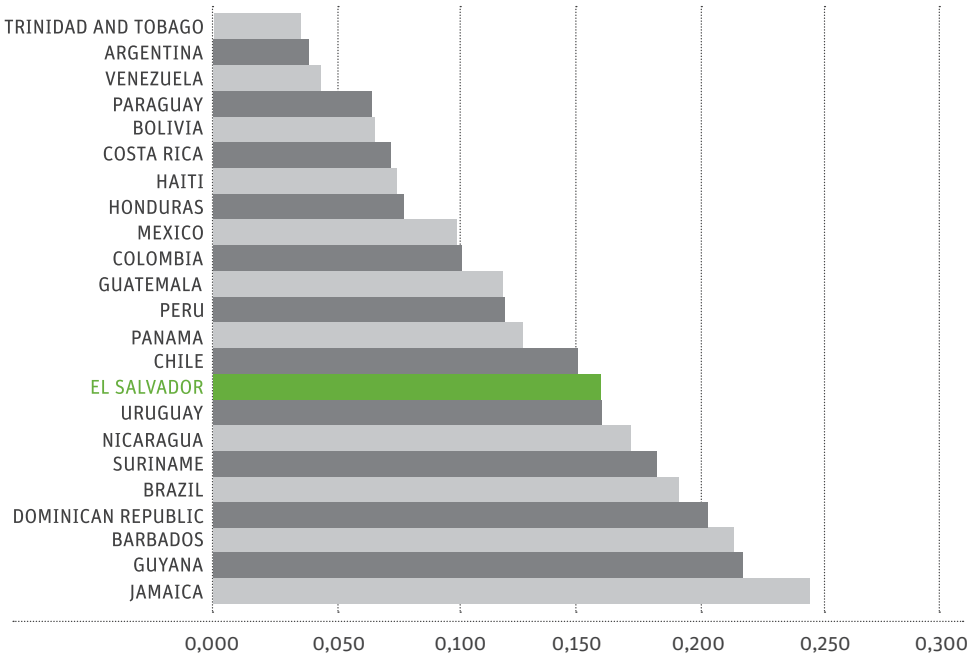
1.9 gas-powered open cycle generation plants

## Energy Intensity



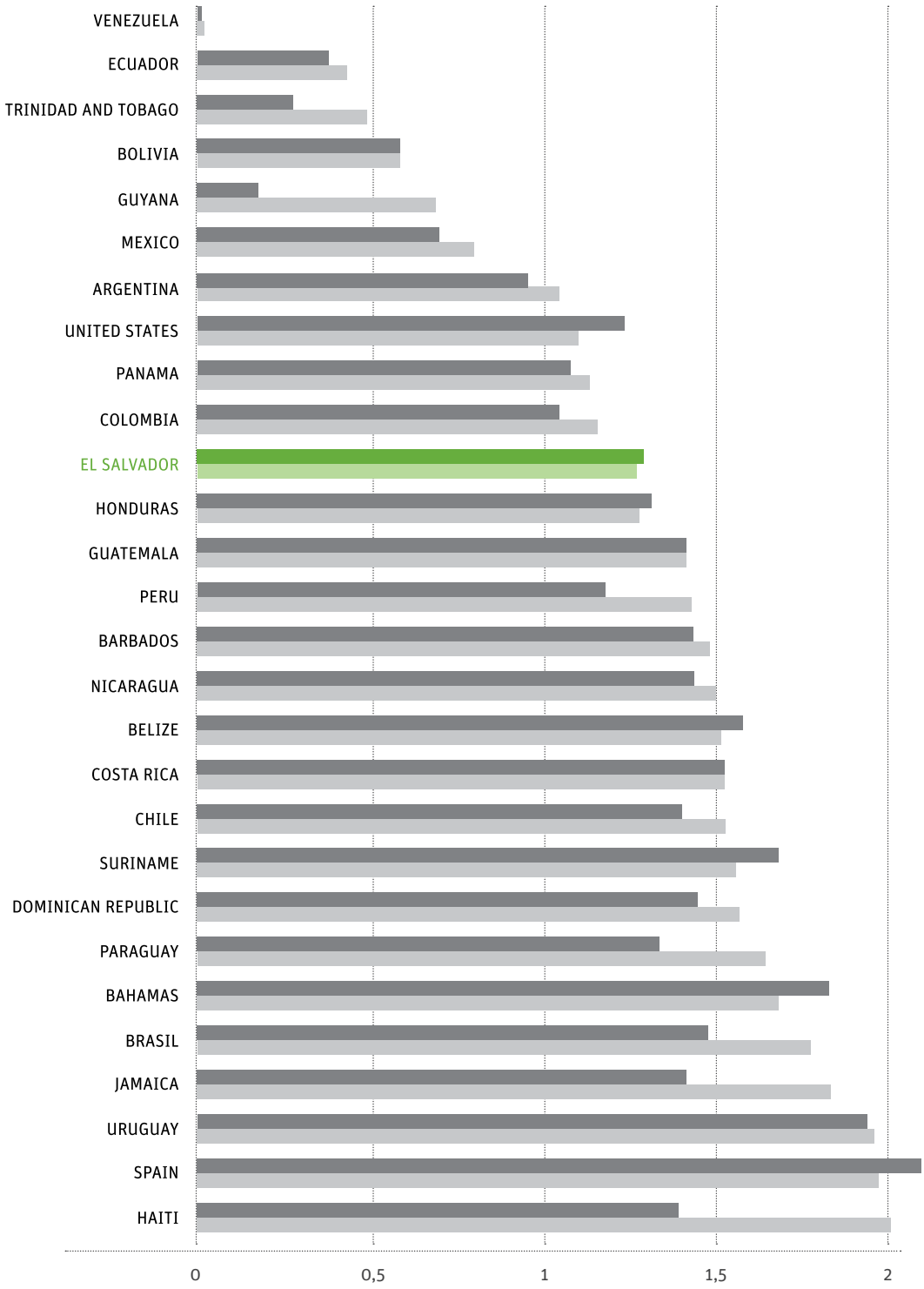

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Guatemala

| | |
|---|---|
| Population: | 13,202,000 |
| $ GDP: | US$23 billion |
| Total Energy Consumption: | 7,235 ktoe |

## Energy productivity

Guatemala's energy intensity index of 2.57 is around average for the region, meaning that the country makes relatively efficient use of its energy. However, Guatemala is much less dependent on fossil fuels than many of its neighbors: just 40 percent of its total energy consumption is generated from this source. Gasoline, diesel and electricity prices in Guatemala are near the regional average.

## The efficiency opportunity

If Guatemala were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 1,100 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$122 million over this period (in 2008 dollars).

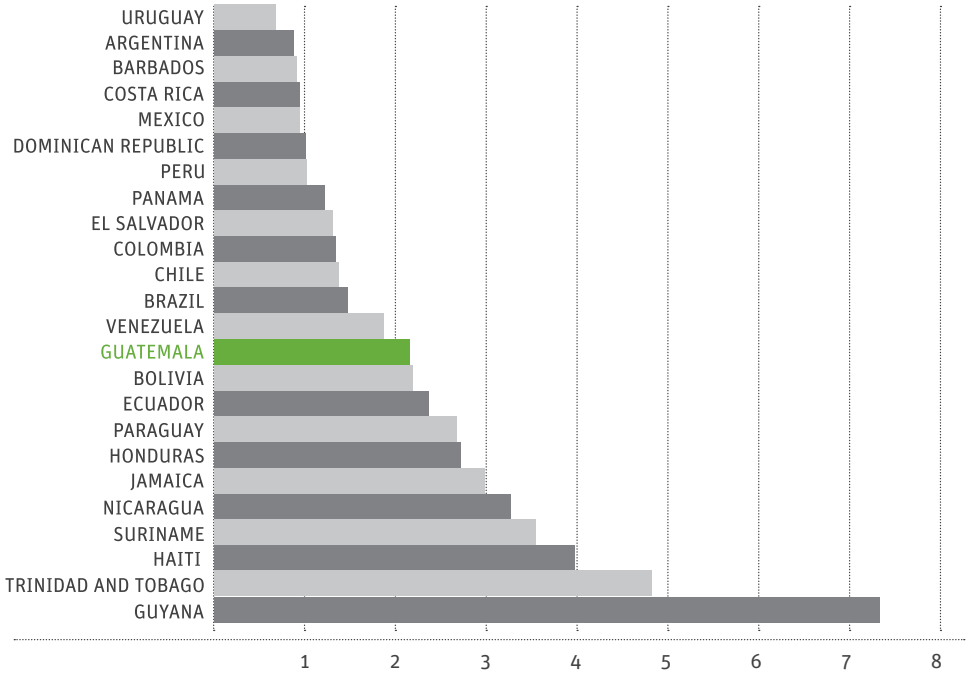
If Guatemala's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 1,100 GWh of electricity per year.

At today's prices, it would cost approximately US$390 million just to build these plants, not counting operational and fuel costs.

Put another way, Guatemala has two alternatives for producing 1,100 GWh of electricity in 2018: one costs US$122 million, and the other US$390 million.

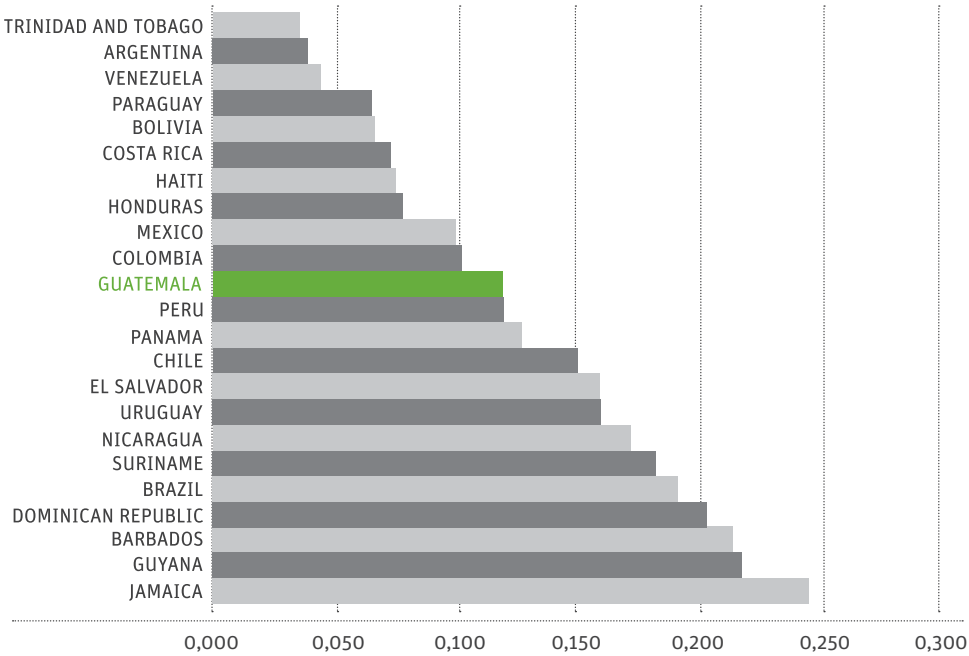
2 gas-powered open cycle generation plants

## Energy Intensity



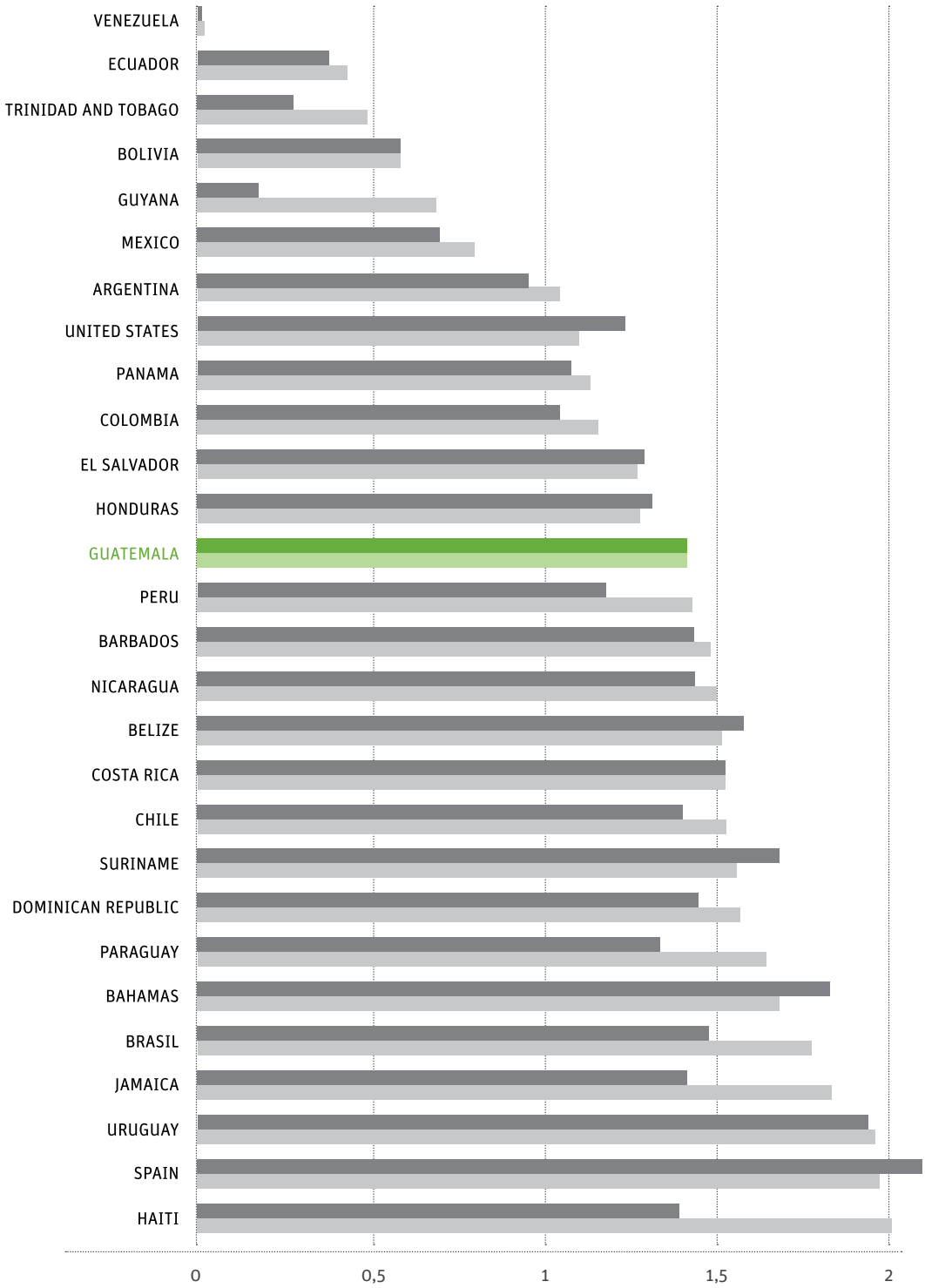

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Guyana

| | |
|---|---|
| Population: | 739,070 |
| $ GDP: | US$771 million |
| Total Energy Consumption: | 765 ktoe |

## Energy productivity

Guyana's energy intensity index of 8.7 is by far the highest in Latin America and the Caribbean, meaning the country does not make efficient use of its energy. There is no data available for Guyana's overall dependency on fossil fuels.

Prices for diesel and gasoline are a little higher than the regional average, whereas prices for electricity are the second highest in the region.

## The efficiency opportunity

If Guyana were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 105 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$12 million over this period (in 2008 dollars).

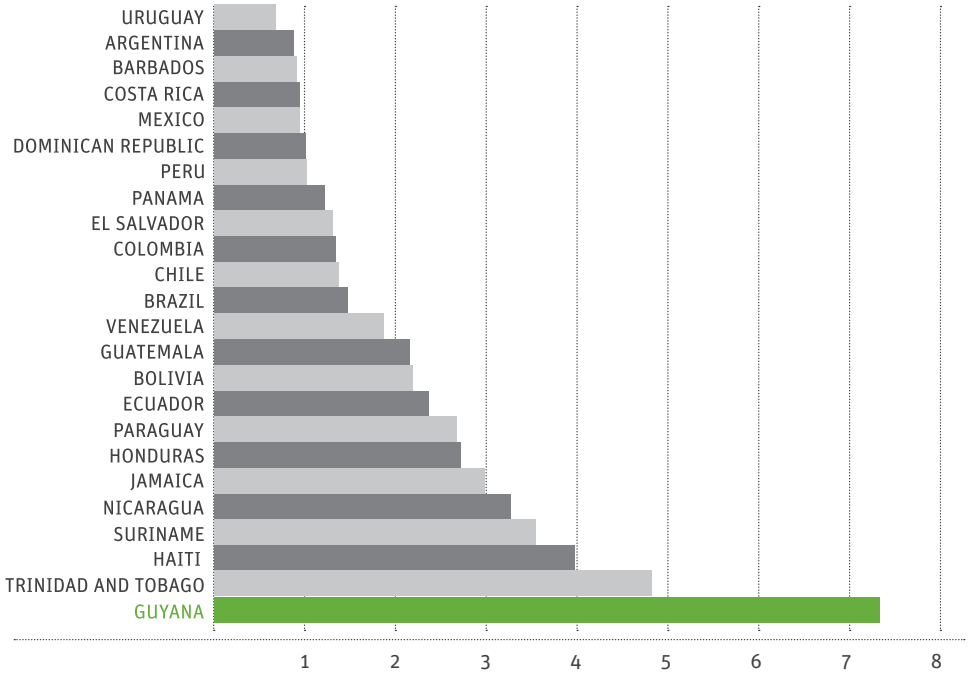
If Guyana's energy demand continues to grow at the nticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 0.2 gas-powered open cycle generation plant to produce the same 105 GWh of electricity per year.

At today's prices, it would cost approximately US$39 million just to build this additional capacity, not counting operational and fuel costs.

Put another way, Guyana has two alternatives for producing 105 GWh of electricity in 2018: one costs US$12 million, and the other US$39 million.

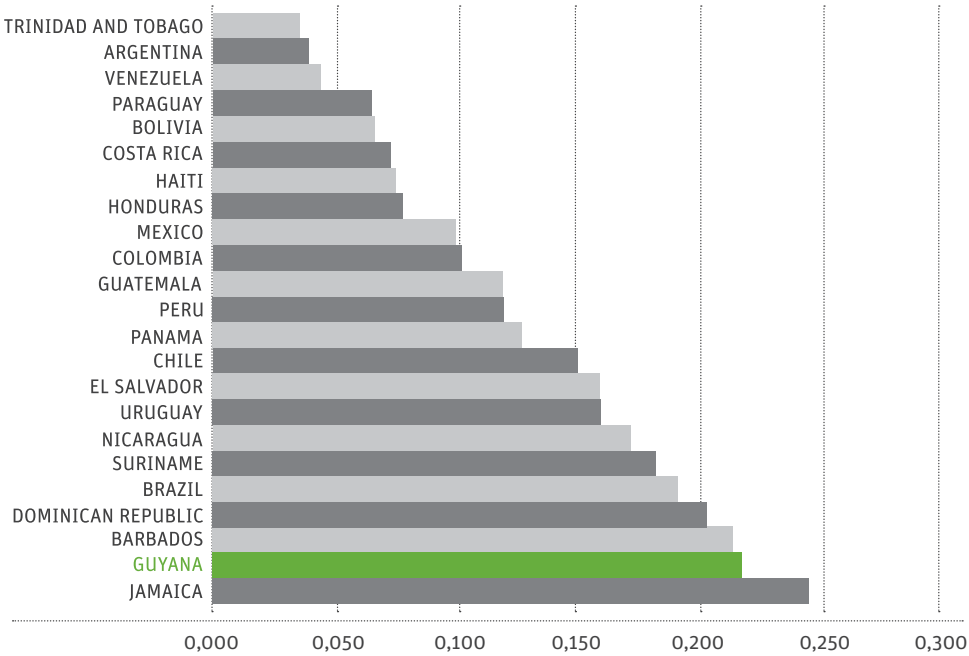
0.2 gas-powered open cycle generation plants

## Energy Intensity



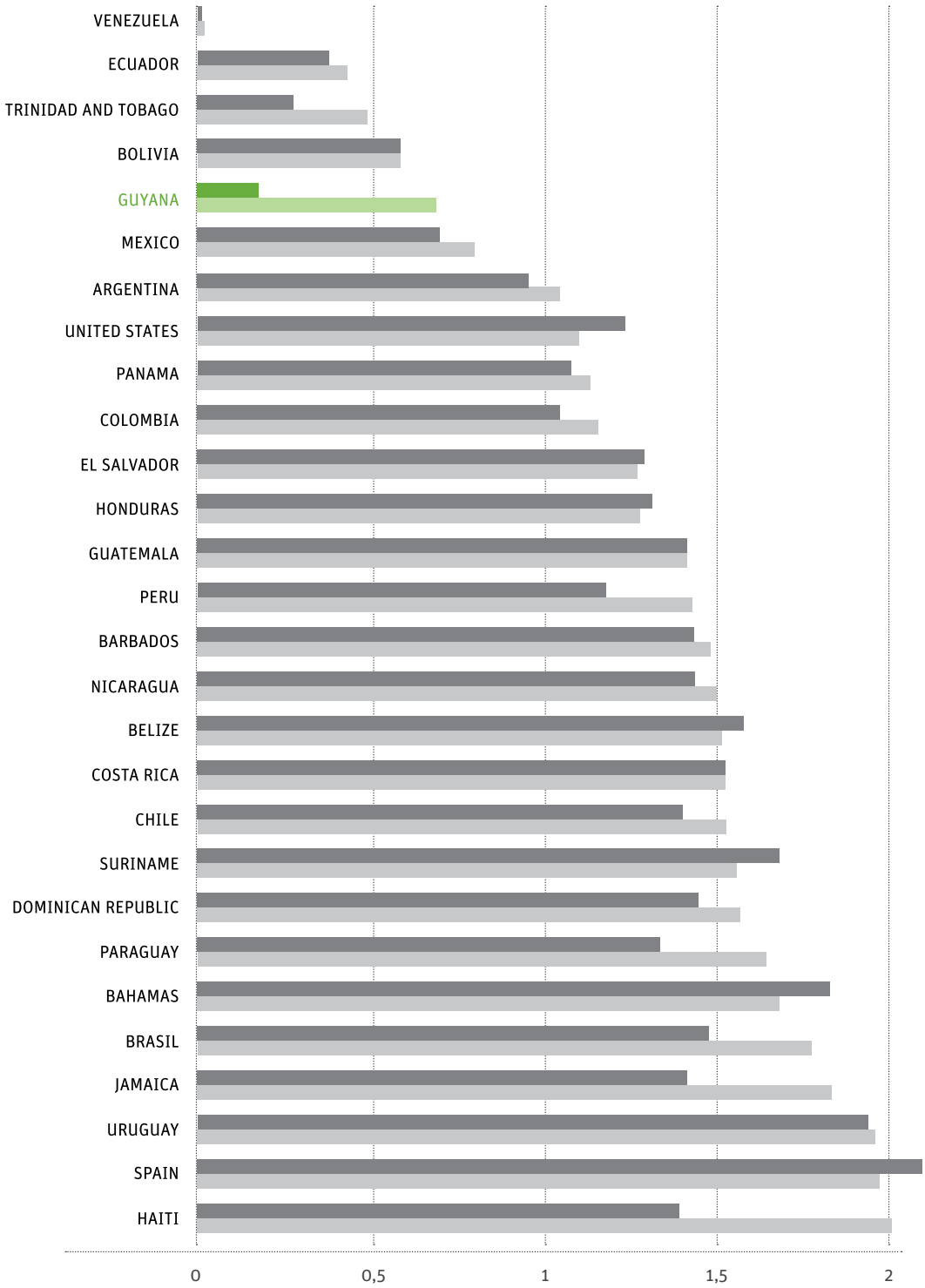

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Haiti

| | |
|---|---|
| Population: | 9,445,900 |
| $ GDP: | $3.8 billion |
| Total Energy Consumption: | 2,385 ktoe |

## Energy productivity

Haiti's energy intensity index of 4.73 is the third highest in Latin America and the Caribbean, meaning that the country does not make efficient use of its energy. However, Haiti has the lowest dependency on fossil fuels in the region: less than 25 percent of its total energy consumption is generated from this source. Haiti has the highest gasoline prices in the region and higher than average diesel prices. Its electricity prices are slightly lower than average.

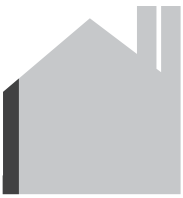
## The efficiency opportunity

If Haiti were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 52 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$6 million over this period (in 2008 dollars).

If Haiti's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 0.1 gas-powered open cycle generation plant to produce the same 52 GWh of electricity per year.

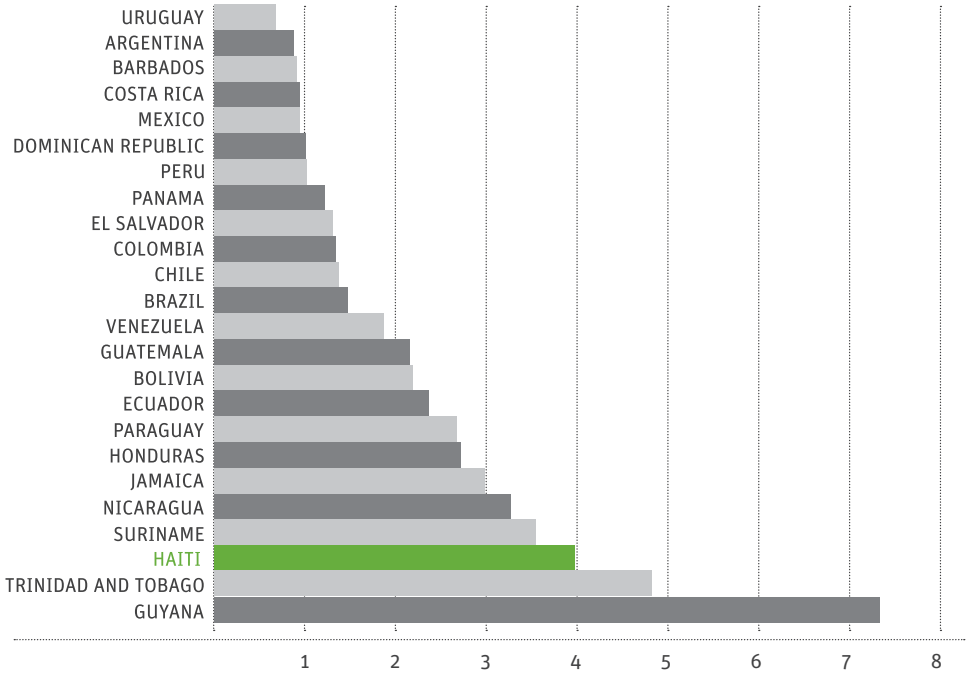
At today's prices, it would cost approximately US$19 million just to build this additional capacity, not counting operational and fuel costs.

Put another way, Haiti has two alternatives for producing 52 GWh of electricity in 2018: one costs US$6 million, and the other US$19 million.



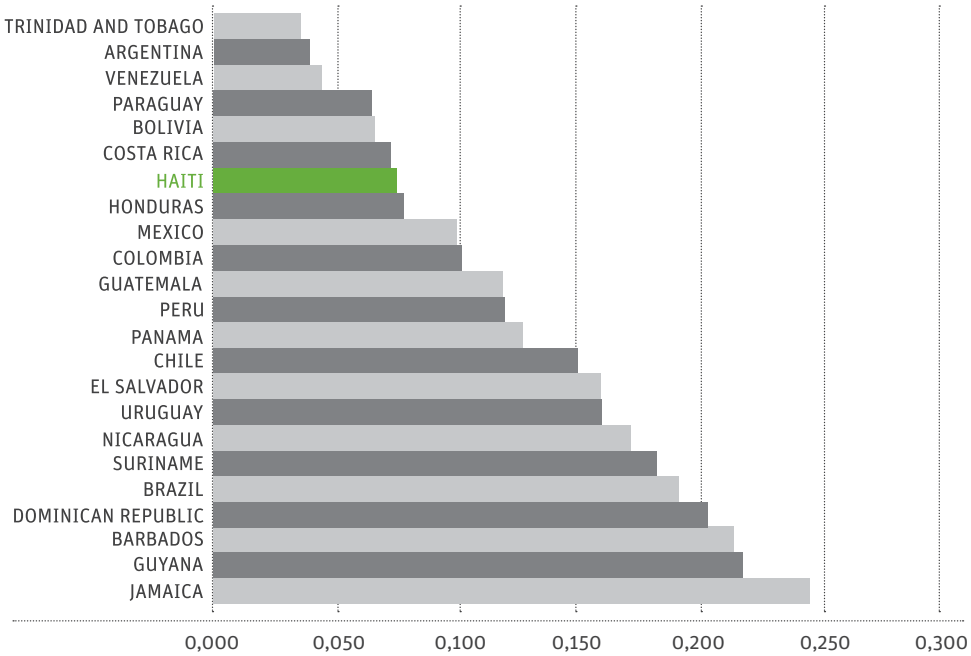
0.1 gas-powered open cycle generation plants

## Energy Intensity



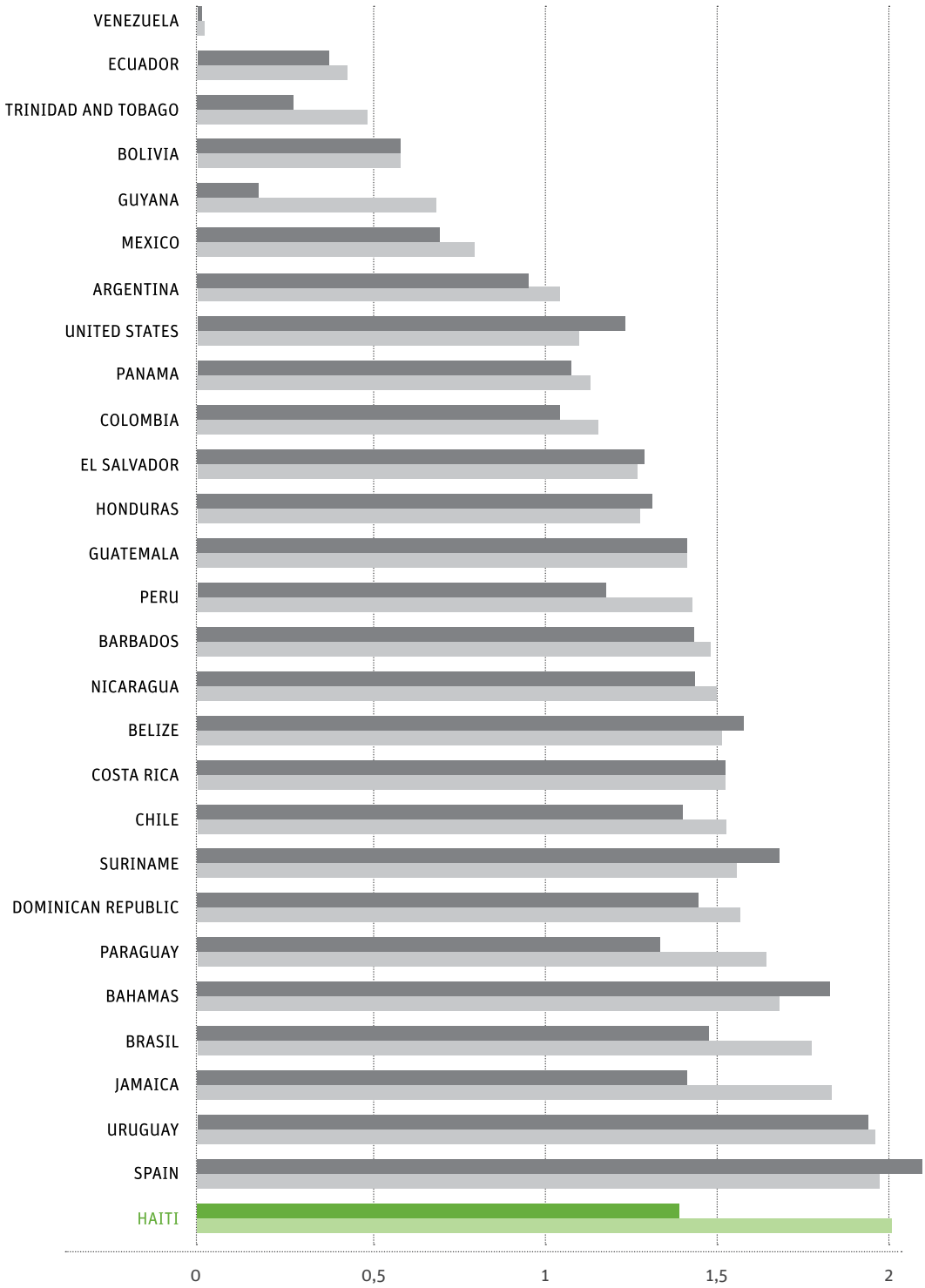

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Honduras

| | |
|---|---|
| Population: | 6,968,700 |
| $ GDP: | $8 billion |
| Total Energy Consumption: | 3,414 ktoe |

## Energy productivity

Honduras' energy intensity index of 3.24 is a little higher than the average in the region, meaning that the country makes relatively inefficient use of its energy. Compared to other countries in the region, Honduras is not too dependent on fossil fuels: just 50 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are slightly lower than average in Honduras, as are electricity prices.

## The efficiency opportunity

If Honduras were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 682 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$80 million over this period (in 2008 dollars).

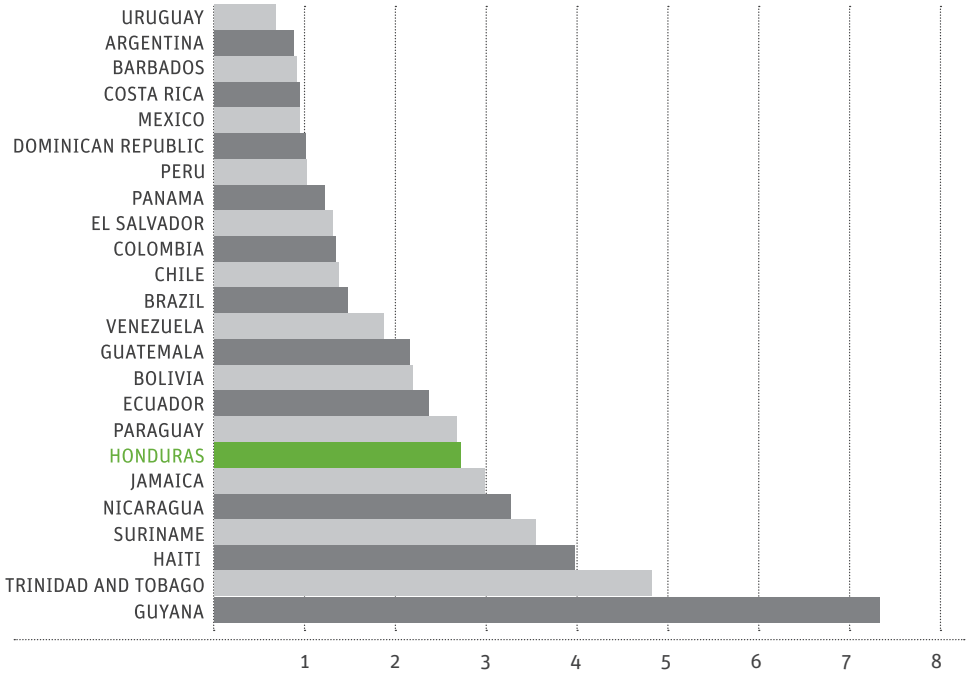
If Honduras's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 682 GWh of electricity per year.

At today's prices, it would cost approximately US$253 million just to build these plants, not counting operational and fuel costs.

Put another way, Honduras has two alternatives for producing 682 GWh of electricity in 2018: one costs US$80 million, and the other US$253 million.

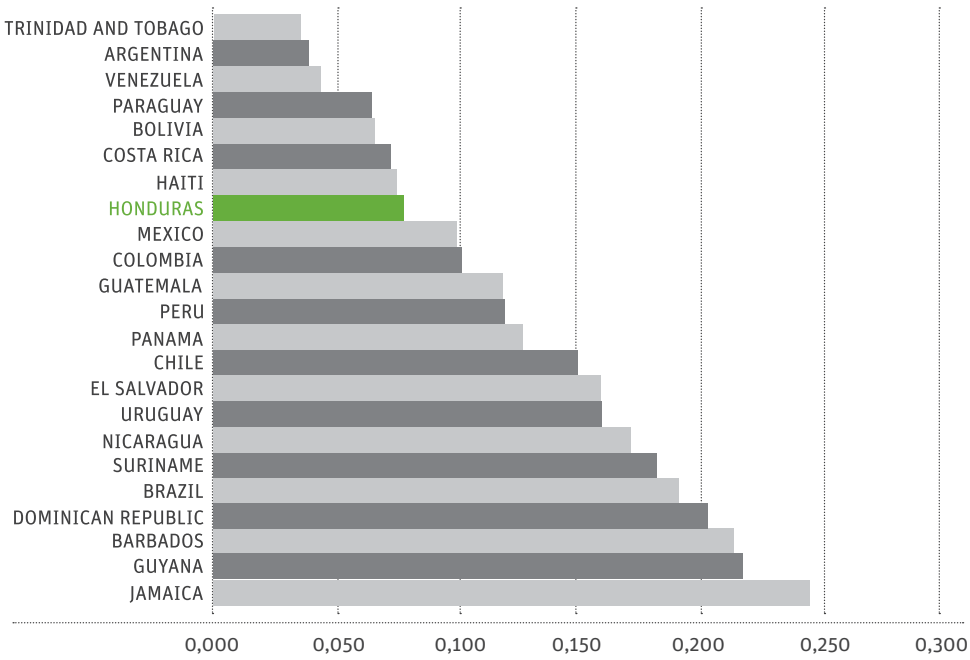
2 gas-powered open cycle generation plants

## Energy Intensity



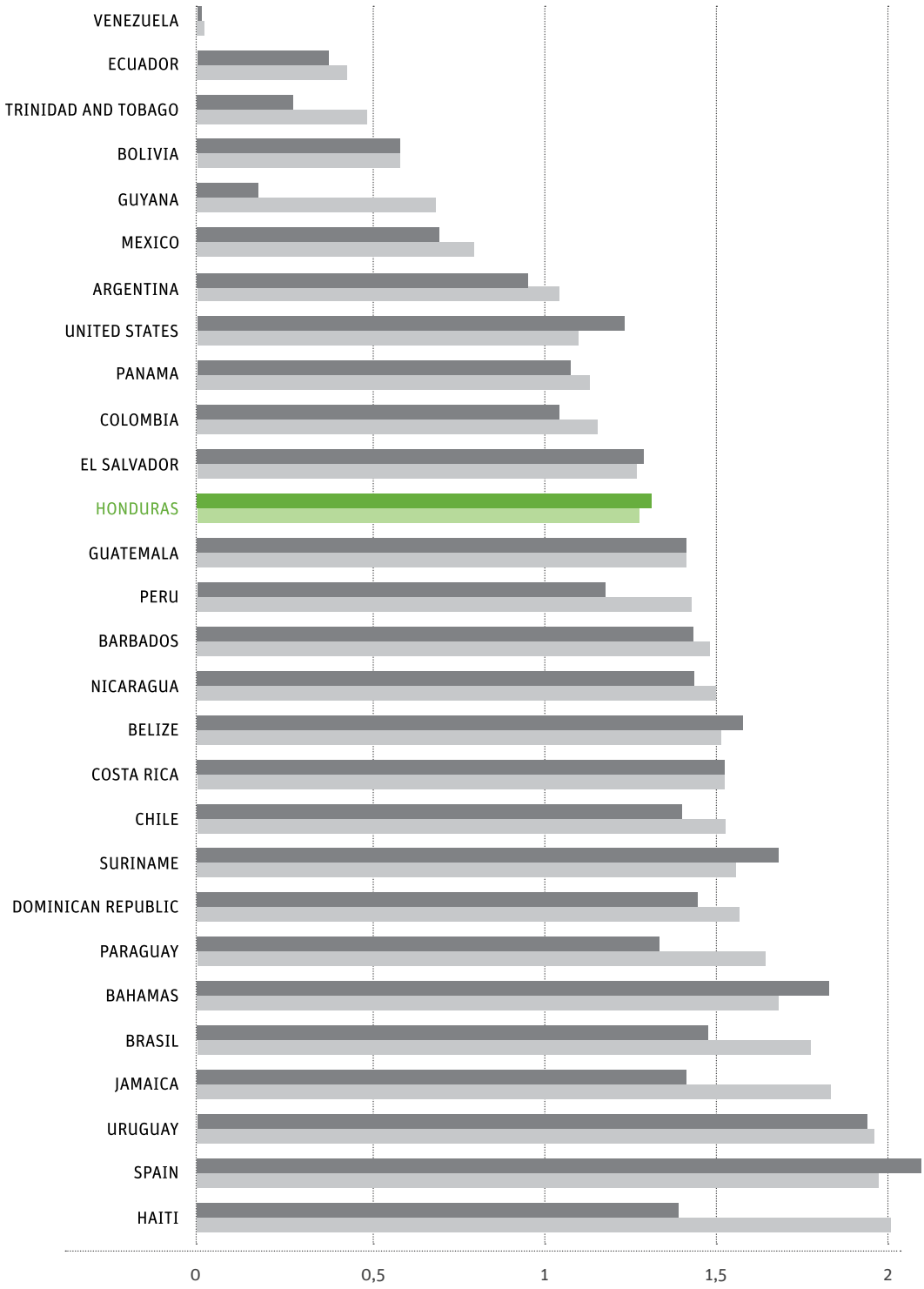

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Jamaica

| | |
|---|---|
| Population: | 2,667,300 |
| $ GDP: | $9 billion |
| Total Energy Consumption: | 3,997 ktoe |

## Energy productivity

Jamaica's energy intensity index of 3.55 range a higher than the average in the region, meaning that the country makes relatively inefficient use of its energy. Jamaica is also heavily dependent on fossil fuels: nearly 90 percent of its total energy consumption is generated from this source. Prices for diesel, gasoline and electricity are among the highest in the region.

## The efficiency opportunity

If Jamaica were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 1,000 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$116 million over this period (in 2008 dollars).

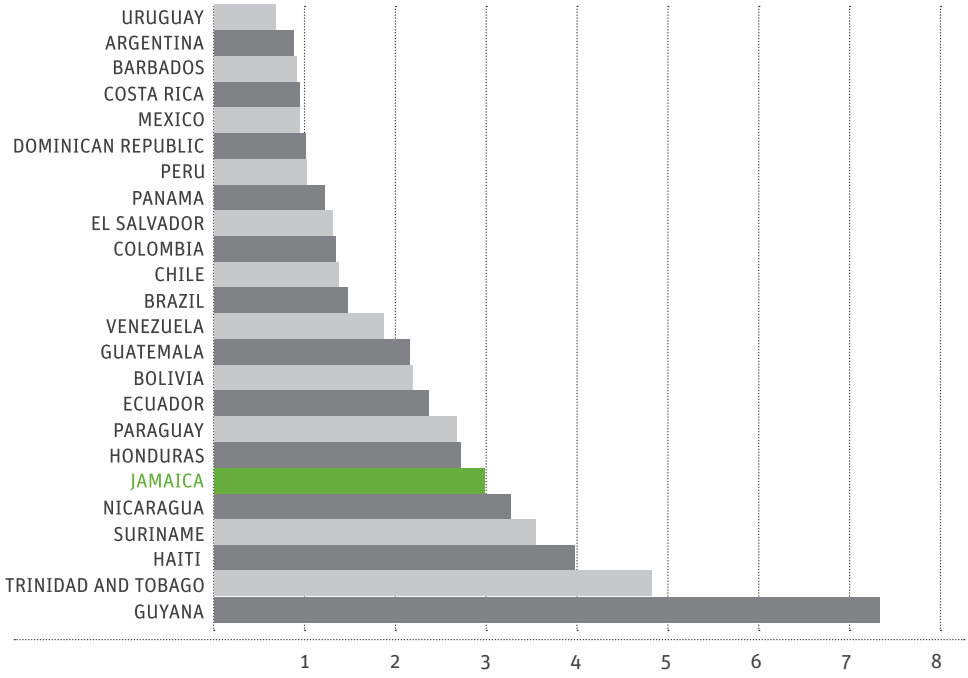
However, if Jamaica's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 1,000 GWh of electricity per year.

At today's prices, it would cost approximately US$373 million just to build these plants, not counting operational and fuel costs.

Put another way, Jamaica has two alternatives for producing 1,000 GWh of electricity in 2018: one costs US$116 million, and the other US$373 million.

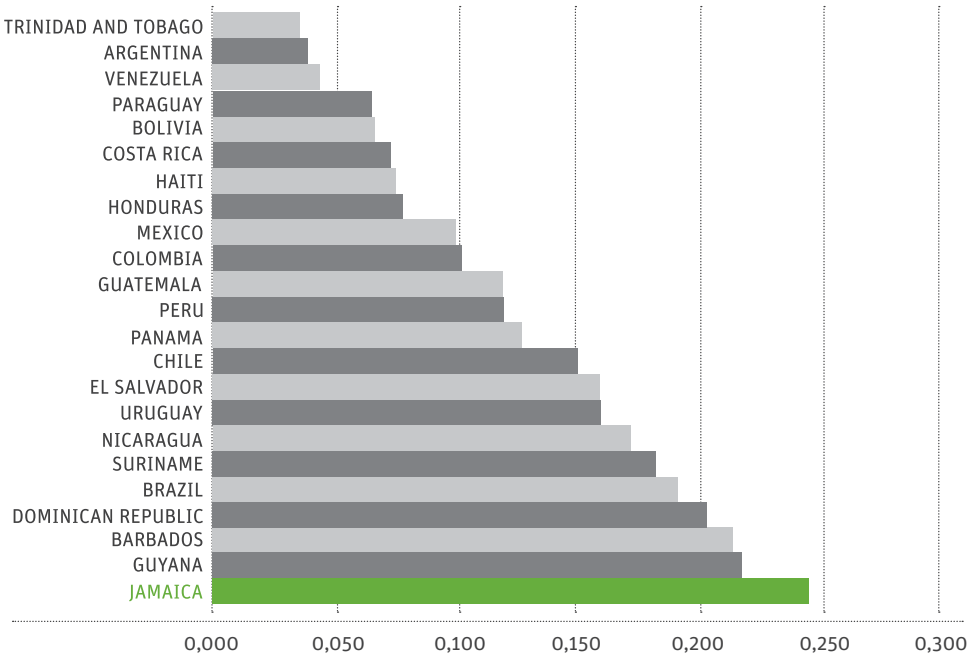
2 gas-powered open cycle generation plants

## Energy Intensity



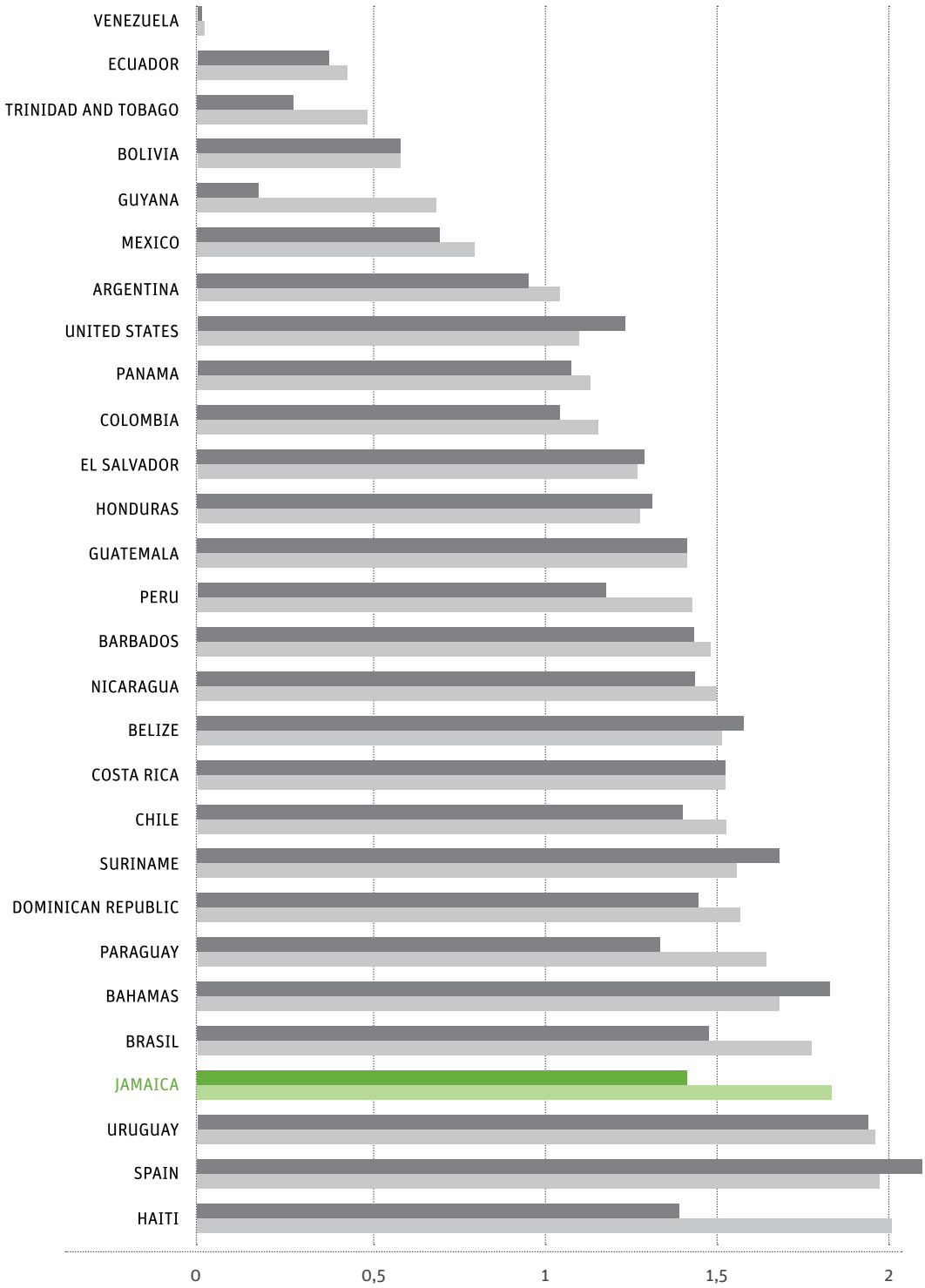

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Mexico

| | |
|---|---|
| Population: | 104,220,000 |
| $ GDP: | US$665 billion |
| Total Energy Consumption: | 99,017 ktoe |

## Energy productivity

Mexico's energy intensity index of 1.15 is one of the lowest in the region, meaning that the country makes relatively efficient use of its energy. However, Mexico is heavily dependent on fossil fuels: nearly 90 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are significantly lower than the regional average. Prices for electricity are close to average in the average for the industrial and residential sector, but are among the highest in the region for the commercial sector.

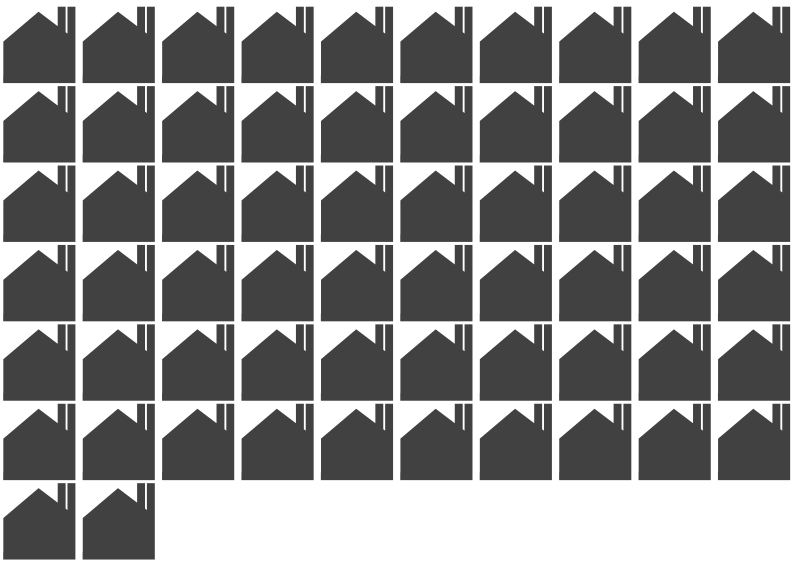
## The efficiency opportunity

If Mexico were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 27,000 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$3 billion over this period (in 2008 dollars).

If Mexico's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 62 gas-powered open cycle generation plants to produce the same 27,000 GWh of electricity per year.

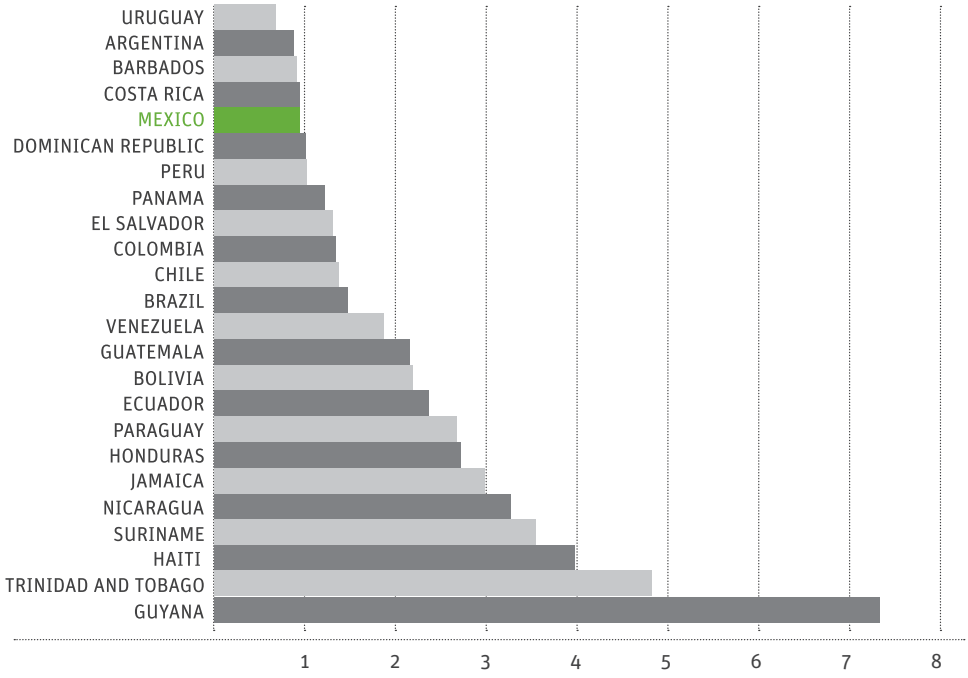
At today's prices, it would cost approximately US$10 billion just to build these plants, not counting operational and fuel costs.

Put another way, Mexico has two alternatives for producing 27,000 GWh of electricity in 2018: one costs US$3 billion, and the other US$10 billion.



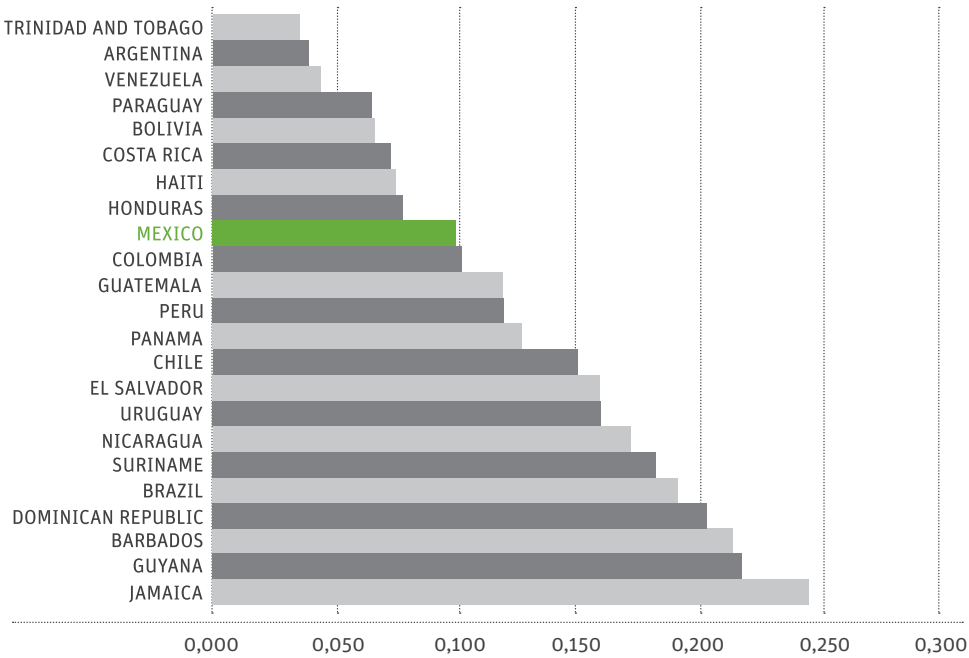
62 gas-powered open cycle generation plants

## Energy Intensity



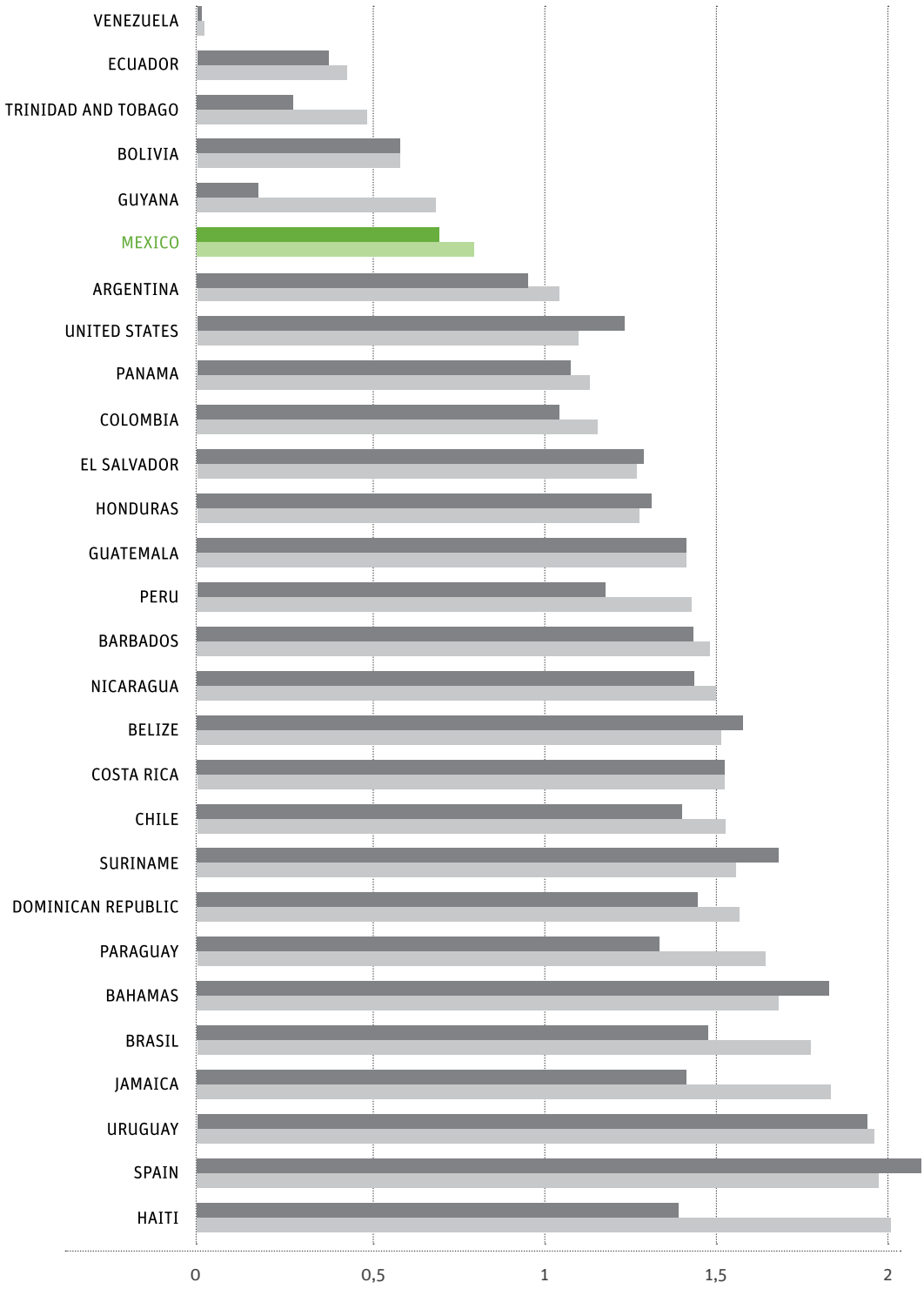

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Nicaragua

| | |
|---|---|
| Population: | 5,532,400 |
| $ GDP: | US$4.7 billion |
| Total Energy Consumption: | 2,546 ktoe |

## Energy productivity

Nicaragua's energy intensity index of 3.89 is higher than the average in the region, meaning that the country makes relatively inefficient use of its energy. However, Nicaragua has a lower dependency on fossil fuels than many Latin American countries: just 40 percent of its total energy consumption is generated from this source. Diesel and gasoline prices close to the regional average, while electricity prices are slightly above average.

## The efficiency opportunity

If Nicaragua were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 340 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$39 million over this period (in 2008 dollars).

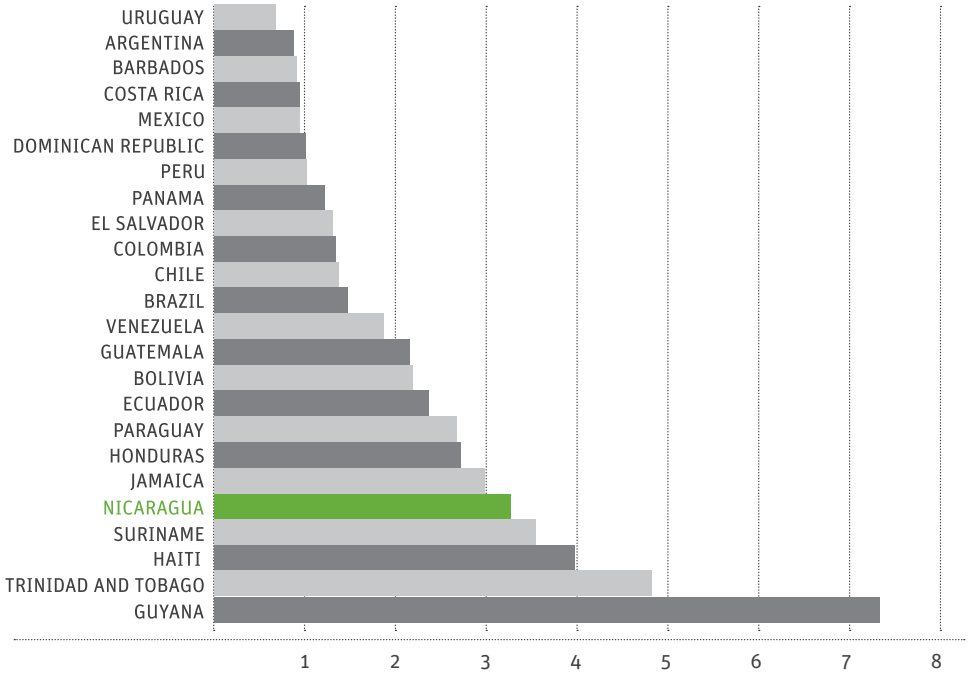
If Nicaragua's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 1 gas-powered open cycle generation plant to produce the same 340 GWh of electricity per year.

At today's prices, it would cost approximately US$127 million just to build this plant, not counting operational and fuel costs.

Put another way, Nicaragua has two alternatives for producing 340 GWh of electricity in 2018: one costs US$39 million, and the other US$127 million.

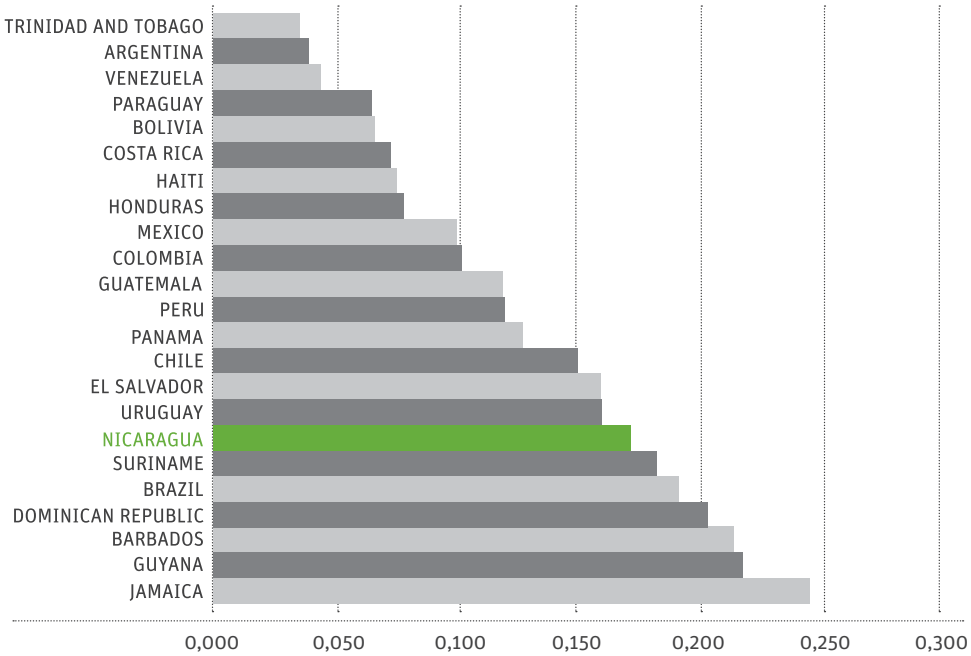
1 gas-powered open cycle generation plants

## Energy Intensity



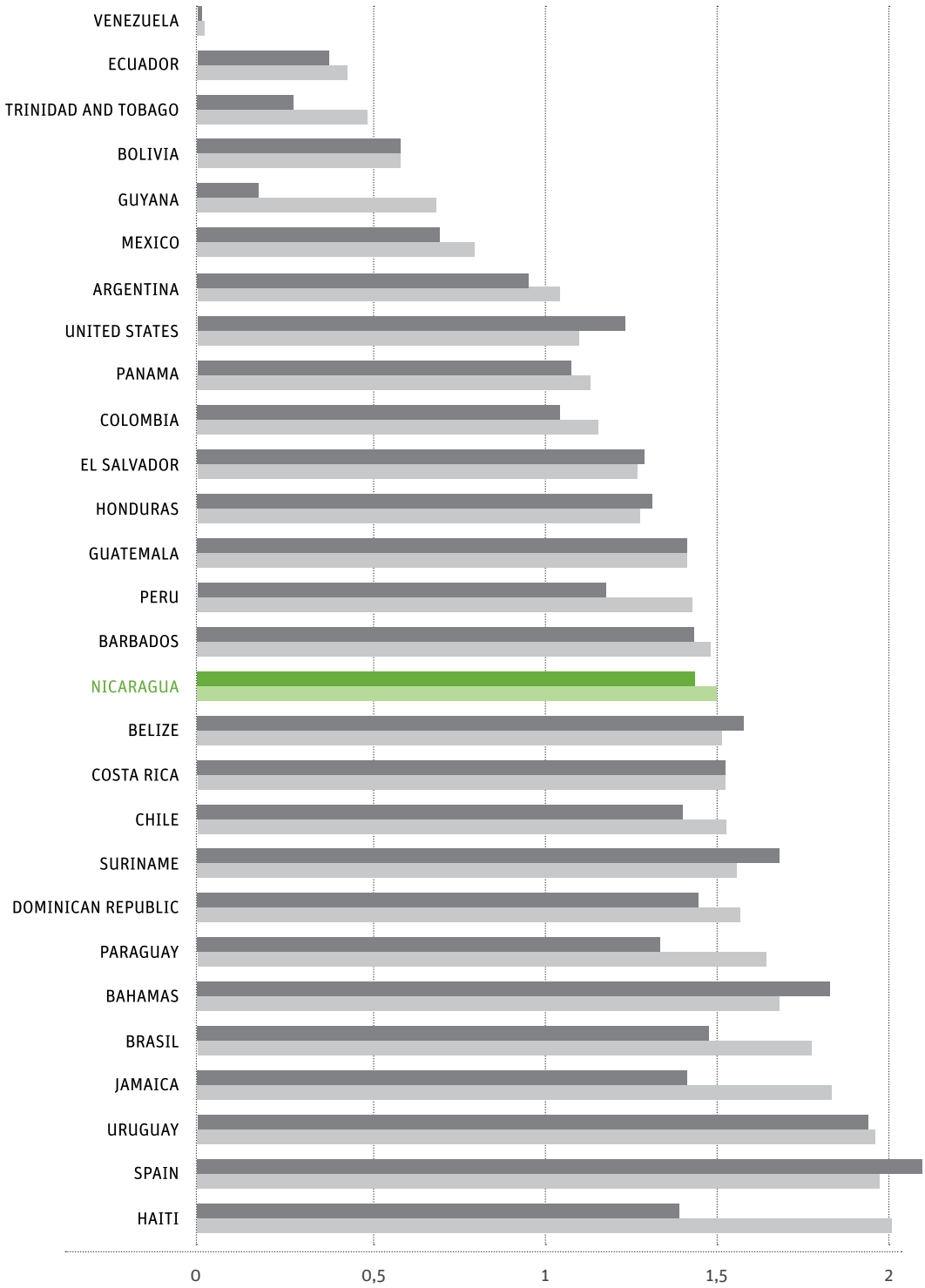

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Panama

| | |
|---|---|
| Population: | 3,287,000 |
| $ GDP: | $15.4 billion |
| Total Energy Consumption: | 2,671 ktoe |

## Energy productivity

Panama's energy intensity index of 1.47 is a little lower than the average in the region, meaning that the country makes efficient use of its energy. However, Panama is heavily dependent on fossil fuels: nearly 70 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are a little lower than the regional average. Prices for electricity range as well a little lower than the average.

## The efficiency opportunity

If Panama were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 760 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$88 million over this period (in 2008 dollars).

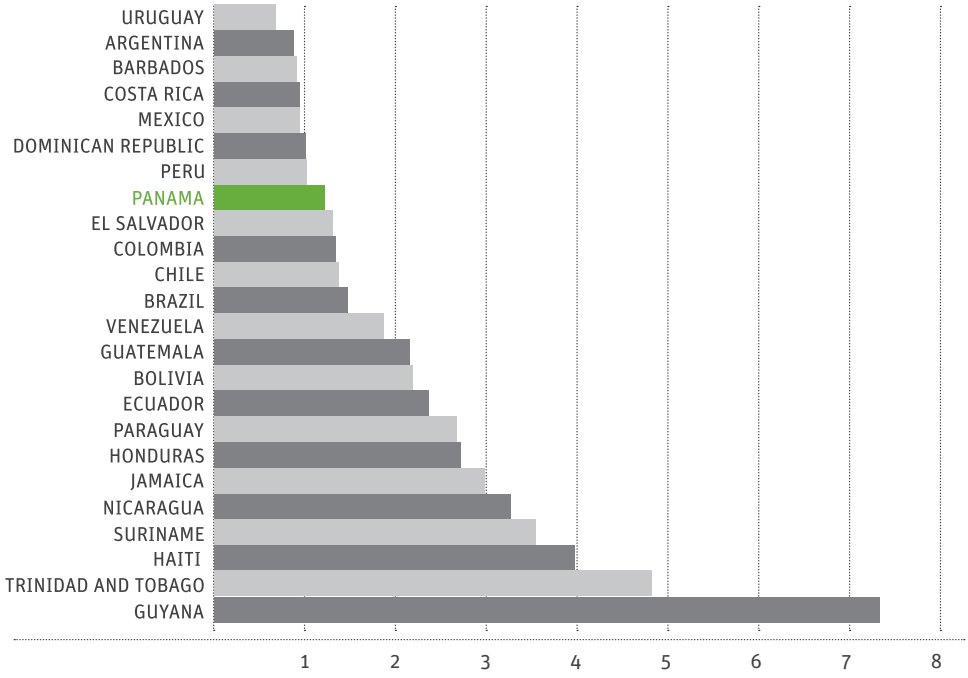
If Panama's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 760 GWh of electricity per year.

At today's prices, it would cost approximately US$282 million just to build these plants, not counting operational and fuel costs.

Put another way, Panama has two alternatives for producing 760 GWh of electricity in 2018: one costs US$88 million, and the other US$282 million.

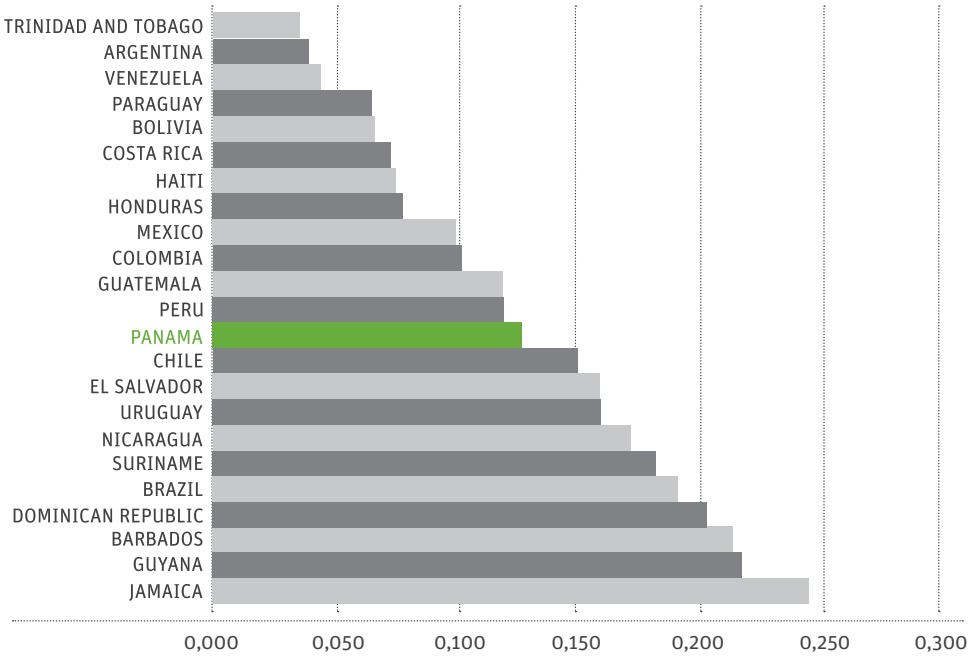
2 gas-powered open cycle generation plants

## Energy Intensity



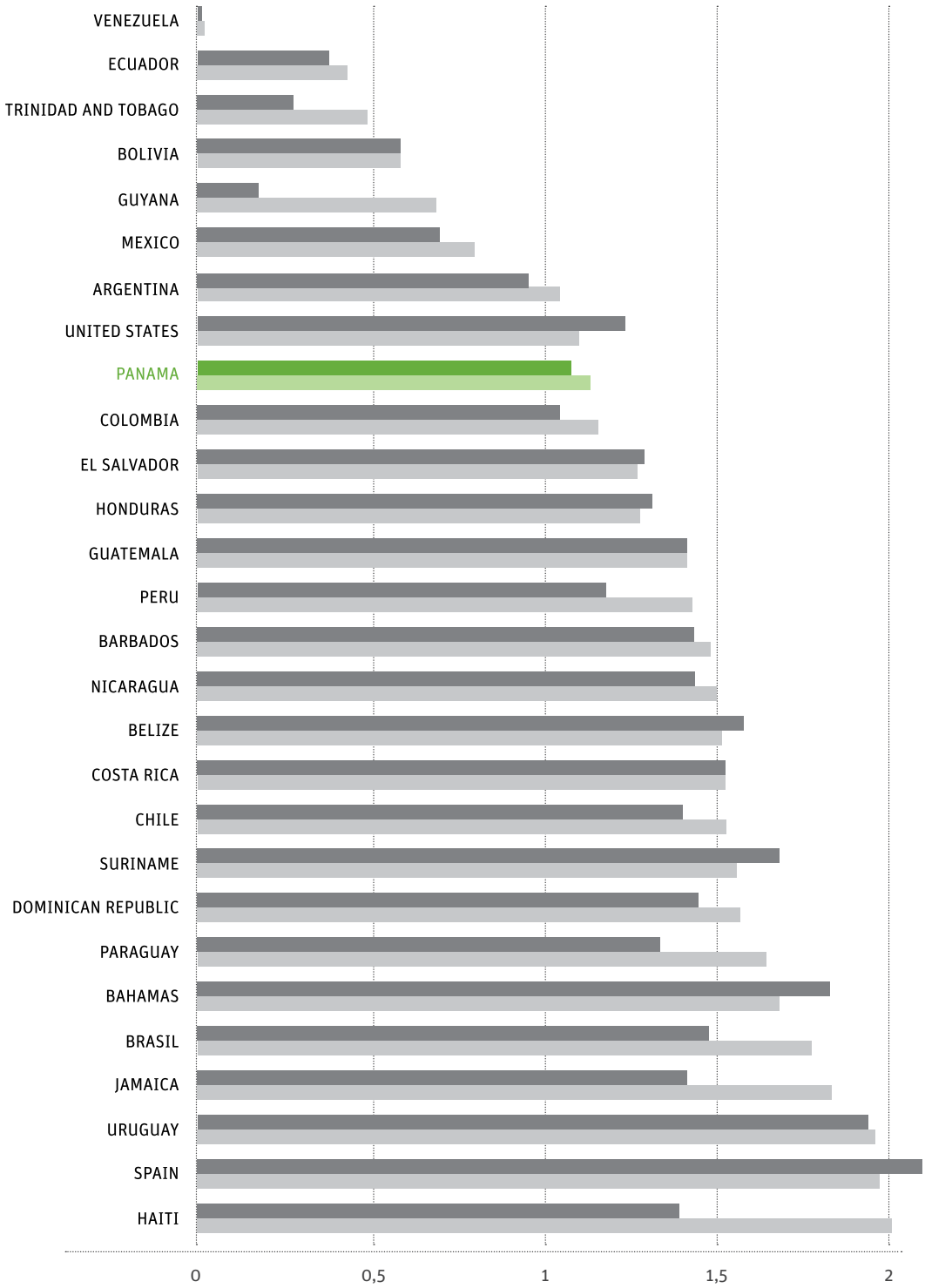

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Paraguay

| | |
|---|---|
| Population: | 6,016,000 |
| $ GDP: | US$8.37 billion |
| Total Energy Consumption: | 3,653 ktoe |

## Energy productivity

Paraguay's energy intensity index of 3.18 is a little higher than the average in the region, meaning that the country makes somewhat inefficient use of its energy. However, Paraguay has the second lowest dependency on fossil fuels of any country in Latin America: less than 30 percent of its total energy consumption is generated from this source. Diesel and gasoline prices are slightly higher than average in Paraguay, whereas electricity prices are among the lowest in the region.

## The efficiency opportunity

If Paraguay were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 800 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$92 million over this period (in 2008 dollars).

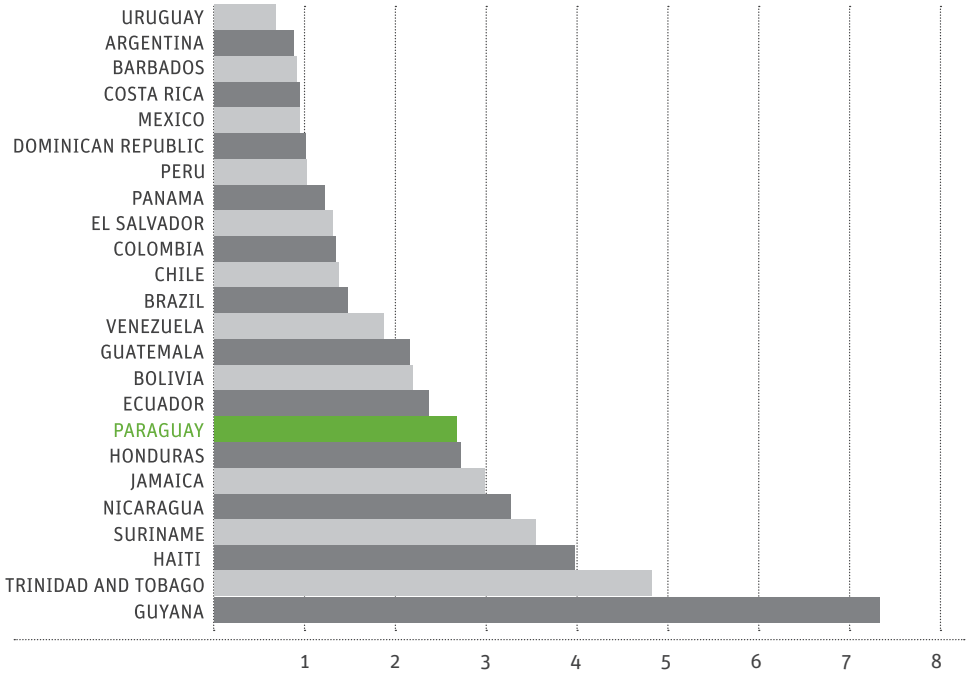
If Paraguay's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 800 GWh of electricity per year.

At today's prices, it would cost approximately US$296 million just to build these plants, not counting operational and fuel costs.

Put another way, Paraguay has two alternatives for producing 800 GWh in 2018: one costs US$92 million, and the other US$296 million.

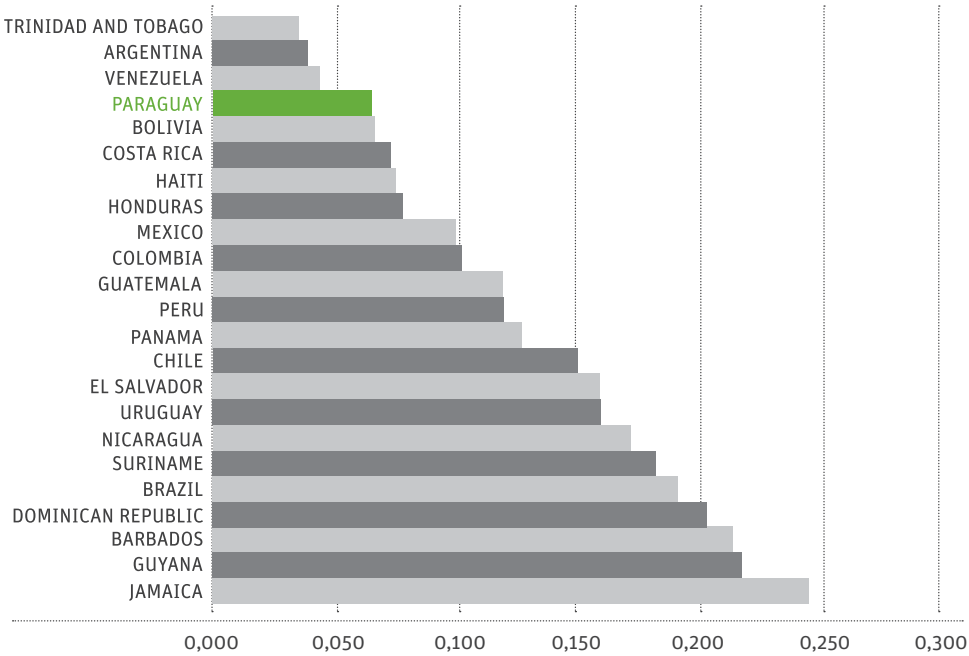
2 gas-powered open cycle generation plants

## Energy Intensity



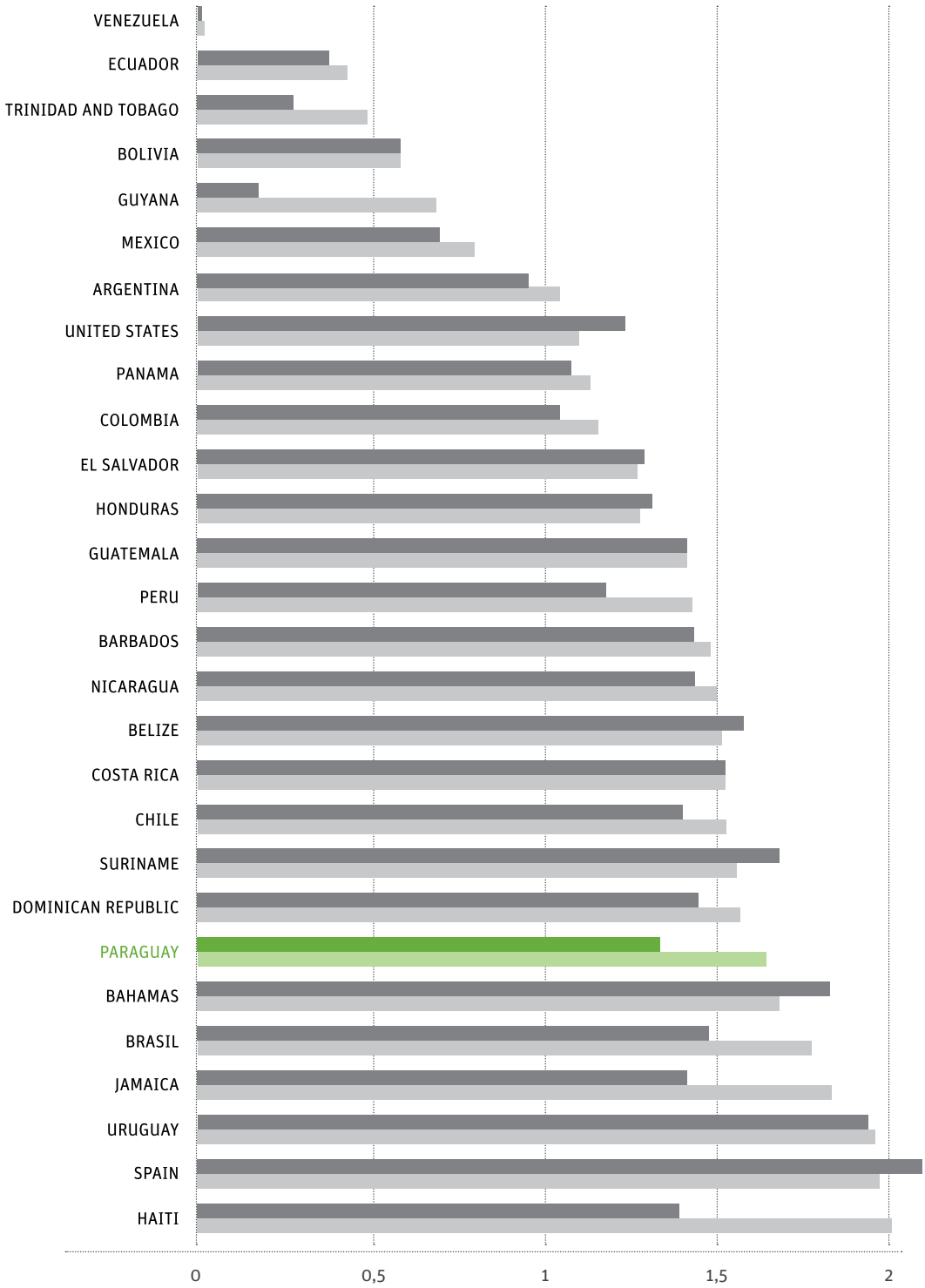

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Peru

| | |
|---|---|
| Population: | 27,589,000 |
| $ GDP: | US$70 billion |
| Total Energy Consumption: | 11,779 ktoe |

## Energy productivity

Peru's energy intensity index of 1.19 is one of the lowest in the region, meaning that the country makes relatively efficient use of its energy. However, Peru is heavily dependent on fossil fuels: nearly 70 percent of its total energy consumption is generated from this source. Prices for diesel and gasoline are close to average for the region, as are electricity prices.

## The efficiency opportunity

If Peru were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 3,700 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$429 million over this period (in 2008 dollars).

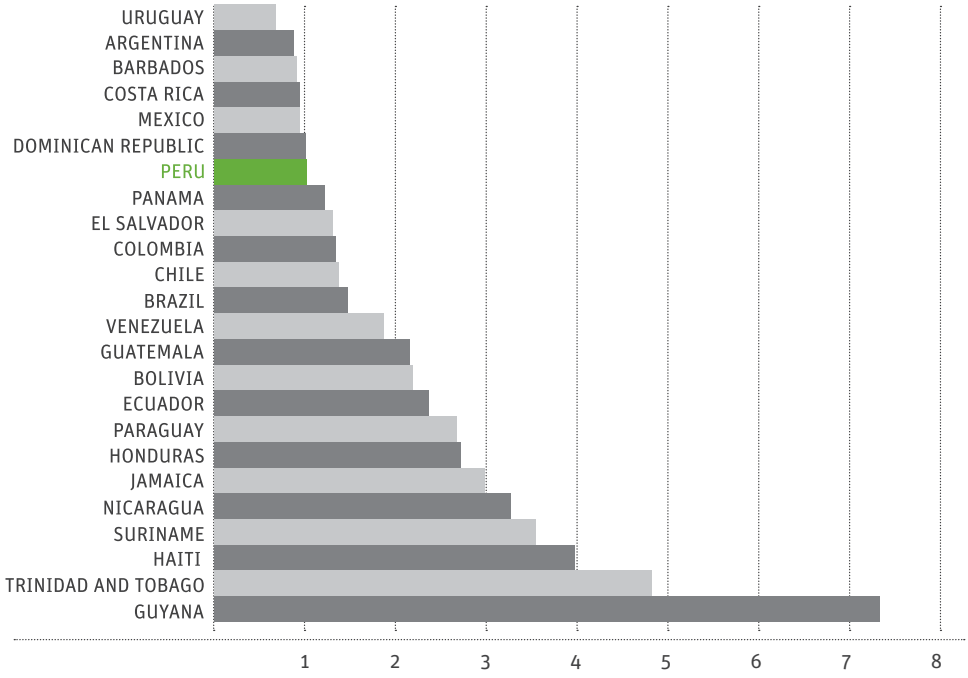
If Peru's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 8 gas-powered open cycle generation plants to produce the same 3,700 GWh of electricity per year.

At today's prices, it would cost approximately US$1.4 billion just to build these plants, not counting operational and fuel costs.

Put another way, Peru has two alternatives for producing 3,700 GWh of electricity in 2018: one costs US$429 million, and the other US$1.4 billion.

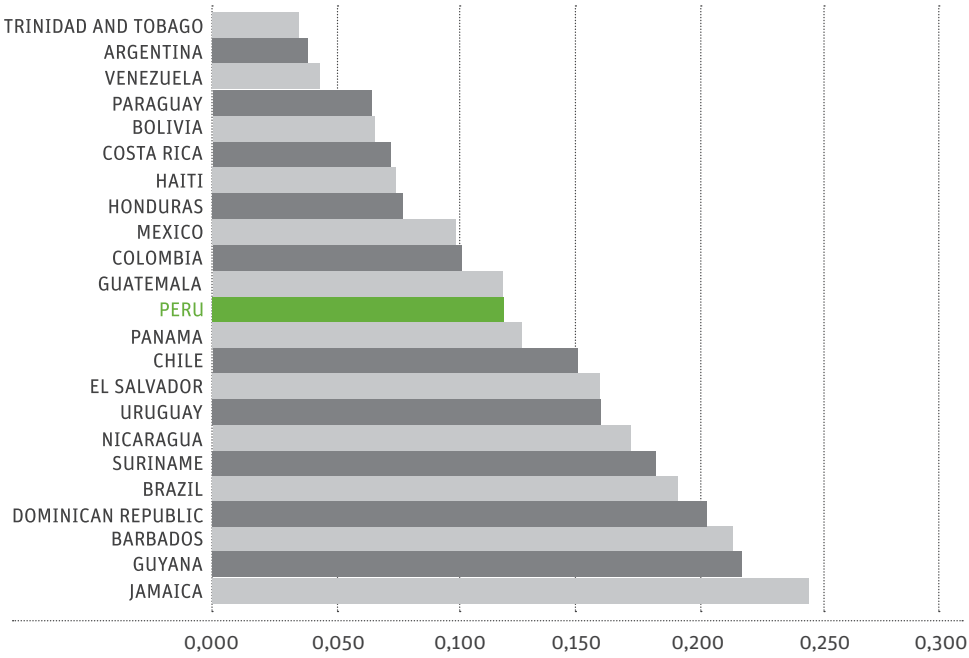
8 gas-powered open cycle generation plants

## Energy Intensity



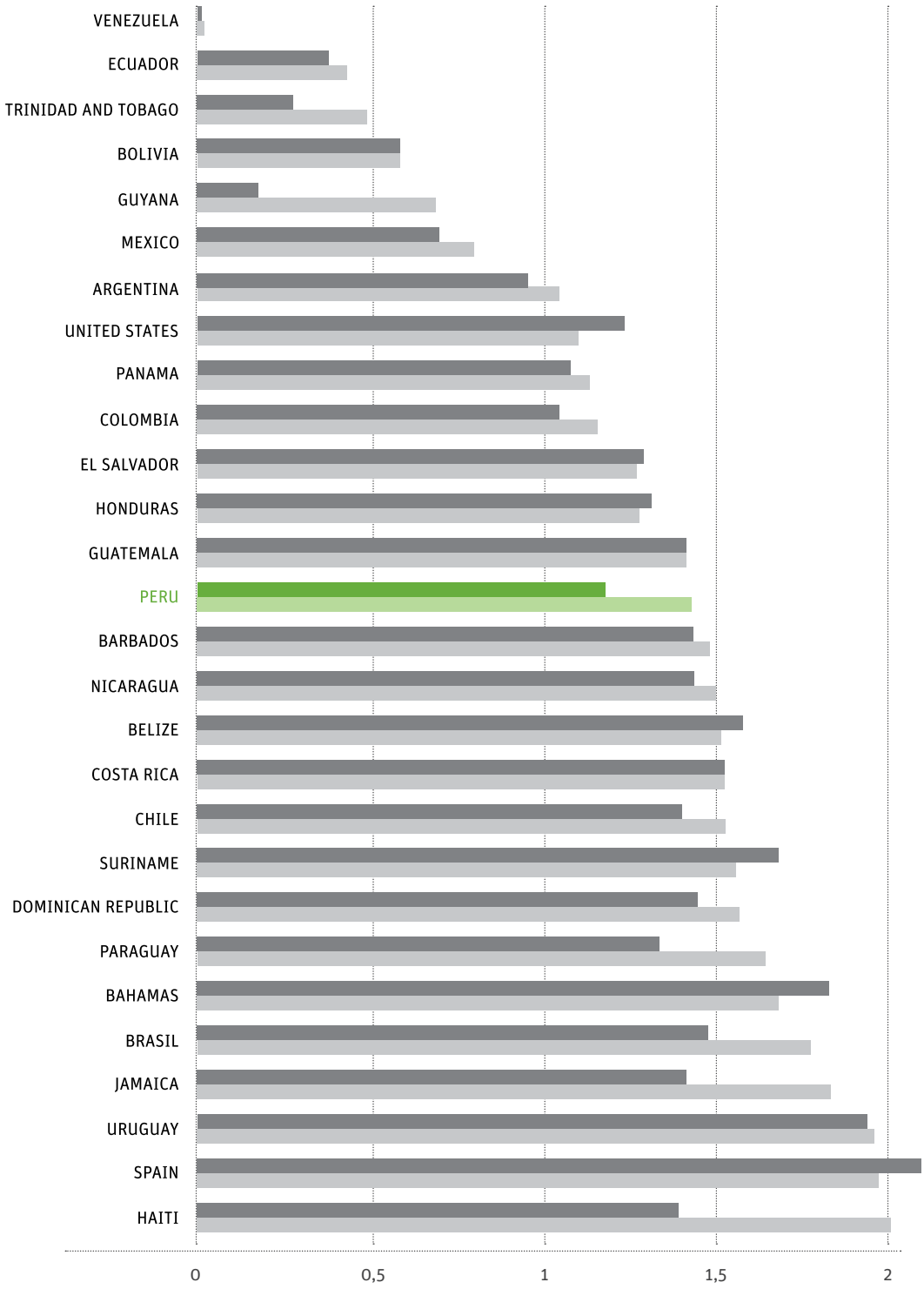

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Suriname

| | |
|---|---|
| Population: | 455,270 |
| GDP: | US$1.25 billion |
| Total Energy Consumption: | 619 ktoe |

## Energy productivity

Suriname's energy intensity index of 4.21 is one of the highest in all of Latin America and the Caribbean, meaning that the country does not make efficient use of its energy. There is no data available for its energy consumption generated from fossil fuels.

Diesel and gasoline prices are close to the regional average, while electricity prices are slightly higher than average.

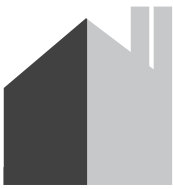
## The efficiency opportunity

If Suriname were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 223 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$25 million over this period (in 2008 dollars).

If Suriname's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 0.5 gas-powered open cycle generation plant to produce the same 223 GWh of electricity per year.

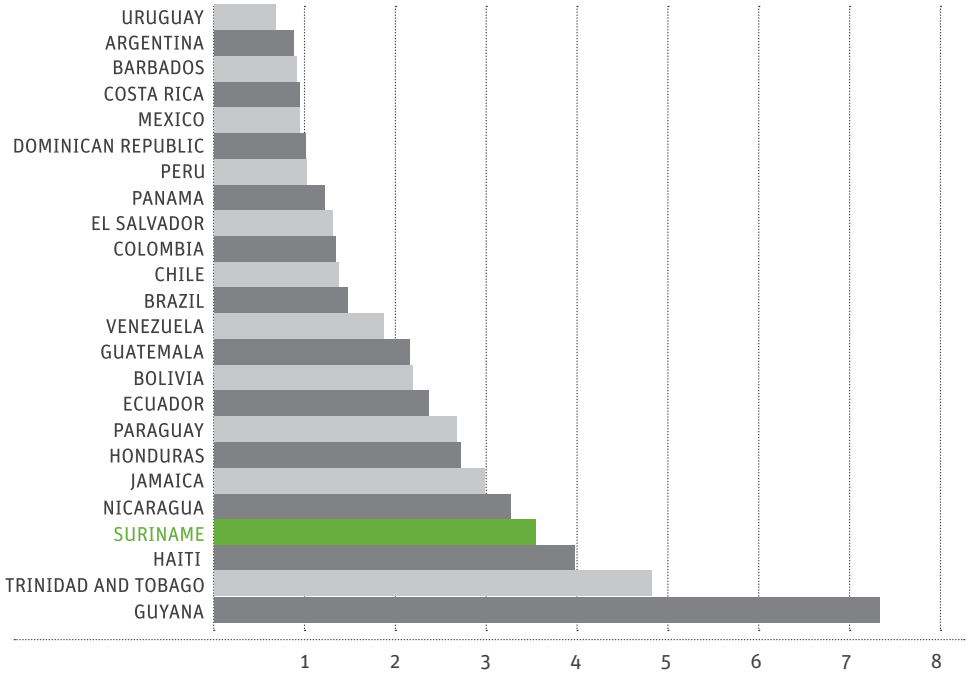
At today's prices, it would cost approximately US$83 million just to build this additional capacity, not counting operational and fuel costs.

Put another way, Suriname has two alternatives for producing 223 GWh of electricity in 2018: one costs US$25 million, and the other US$83 million.



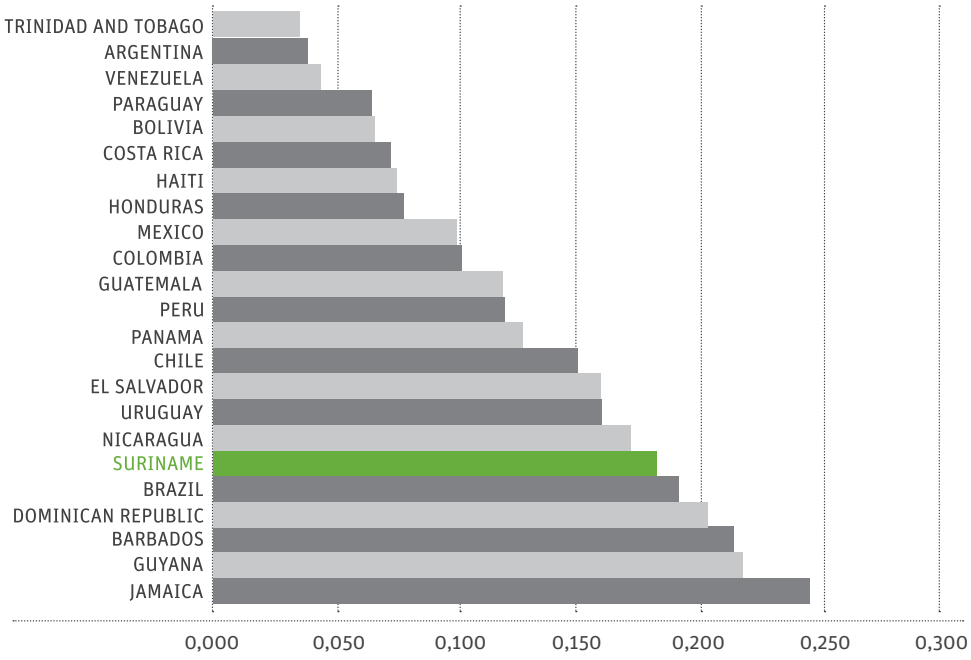
0.5 gas-powered open cycle generation plants

## Energy Intensity



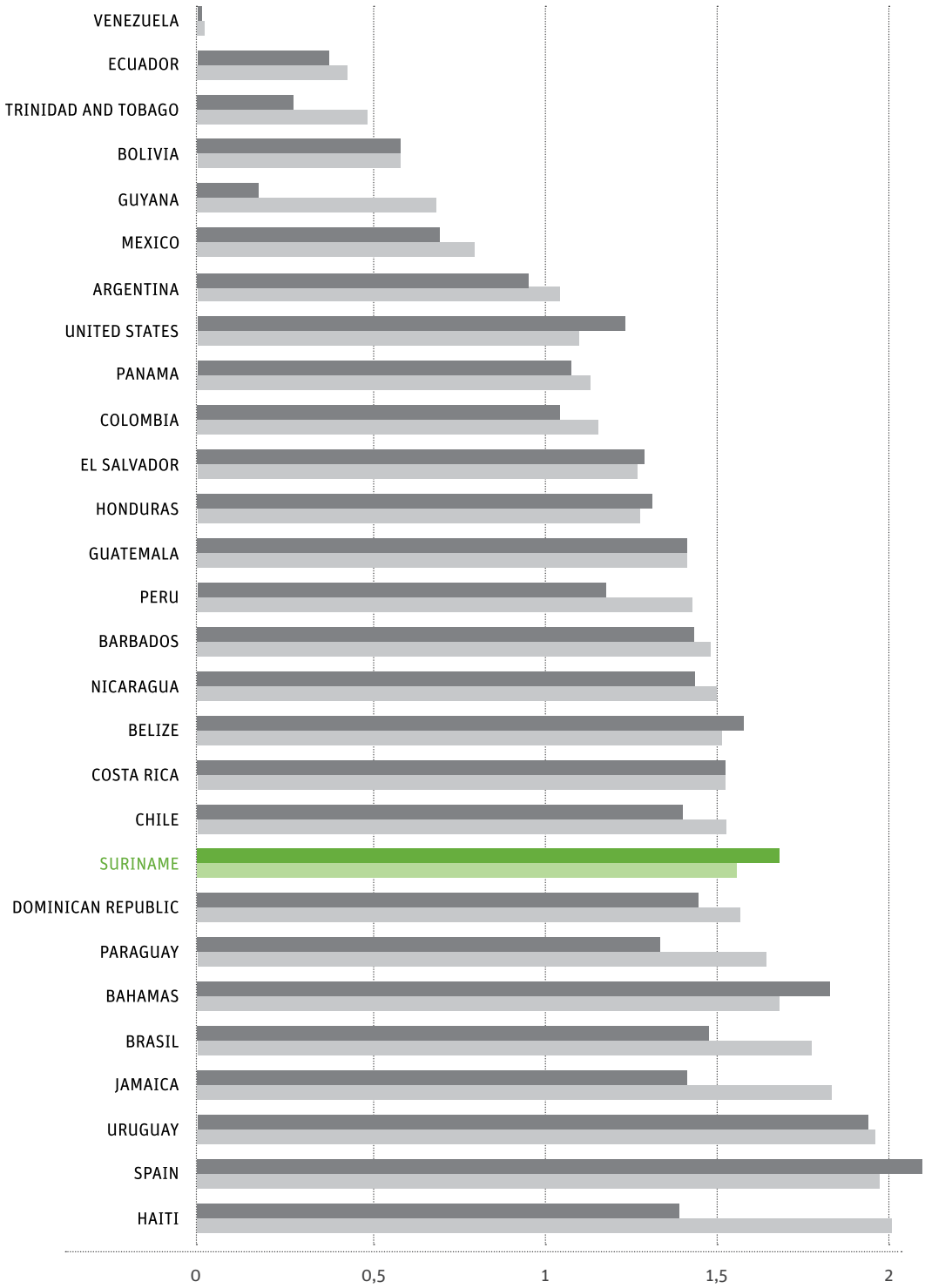

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Trinidad & Tobago

| | |
|---|---|
| Population: | 1,328,400 |
| $ GDP: | US$13 billion |
| Total Energy Consumption: | 2,323 ktoe |

## Energy productivity

Trinidad & Tobago's energy intensity index of 5.73 is the second highest in all of Latin America and the Caribbean, meaning that the country does not make efficient use of its energy. Trinidad & Tobago also has the highest dependency on fossil fuels in the region: almost 100% percent of its total energy consumption is generated from this source. Diesel and gasoline prices are the third lowest in the region, and electricity prices are the second lowest in the region.

## The efficiency opportunity

If Trinidad & Tobago were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 980 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$115 billion over this period (in 2008 dollars).

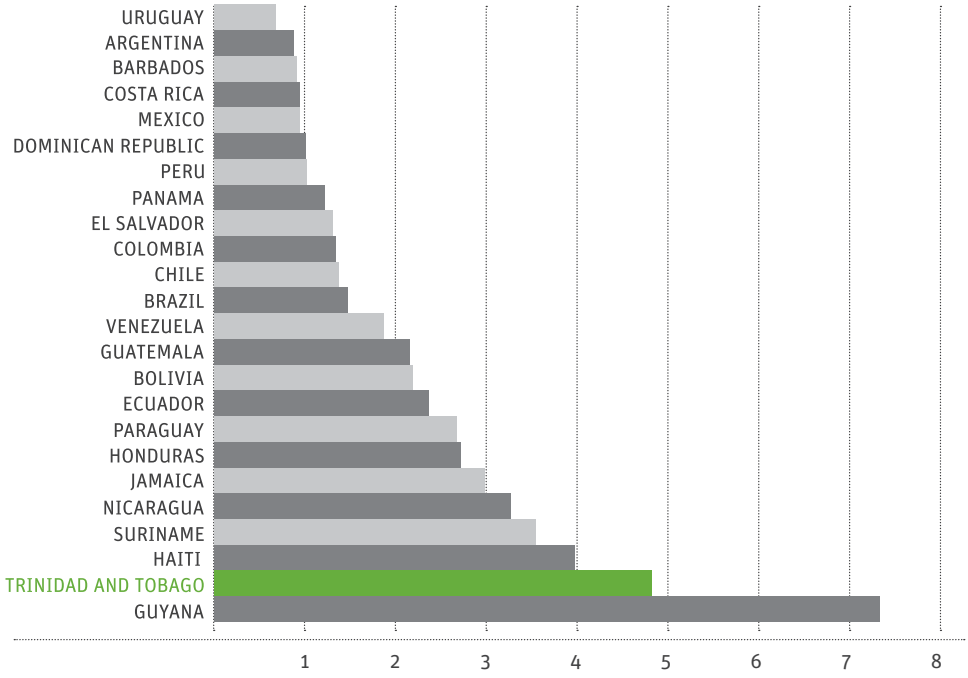
If Trinidad & Tobago's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 980 GWh of electricity per year.

At today's prices, it would cost approximately US$365 million just to build these plants, not counting operational and fuel costs.

Put another way, Trinidad & Tobago has two alternatives for producing 980 GWh of electricity in 2018: one costs US$115 million, and the other US$365 million.

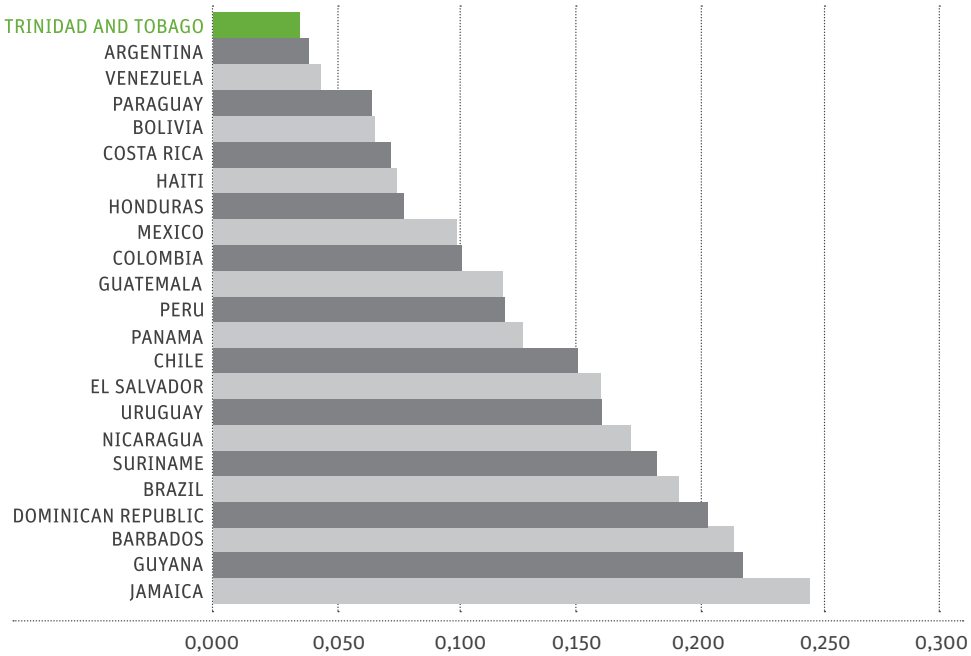
2 gas-powered open cycle generation plants

## Energy Intensity



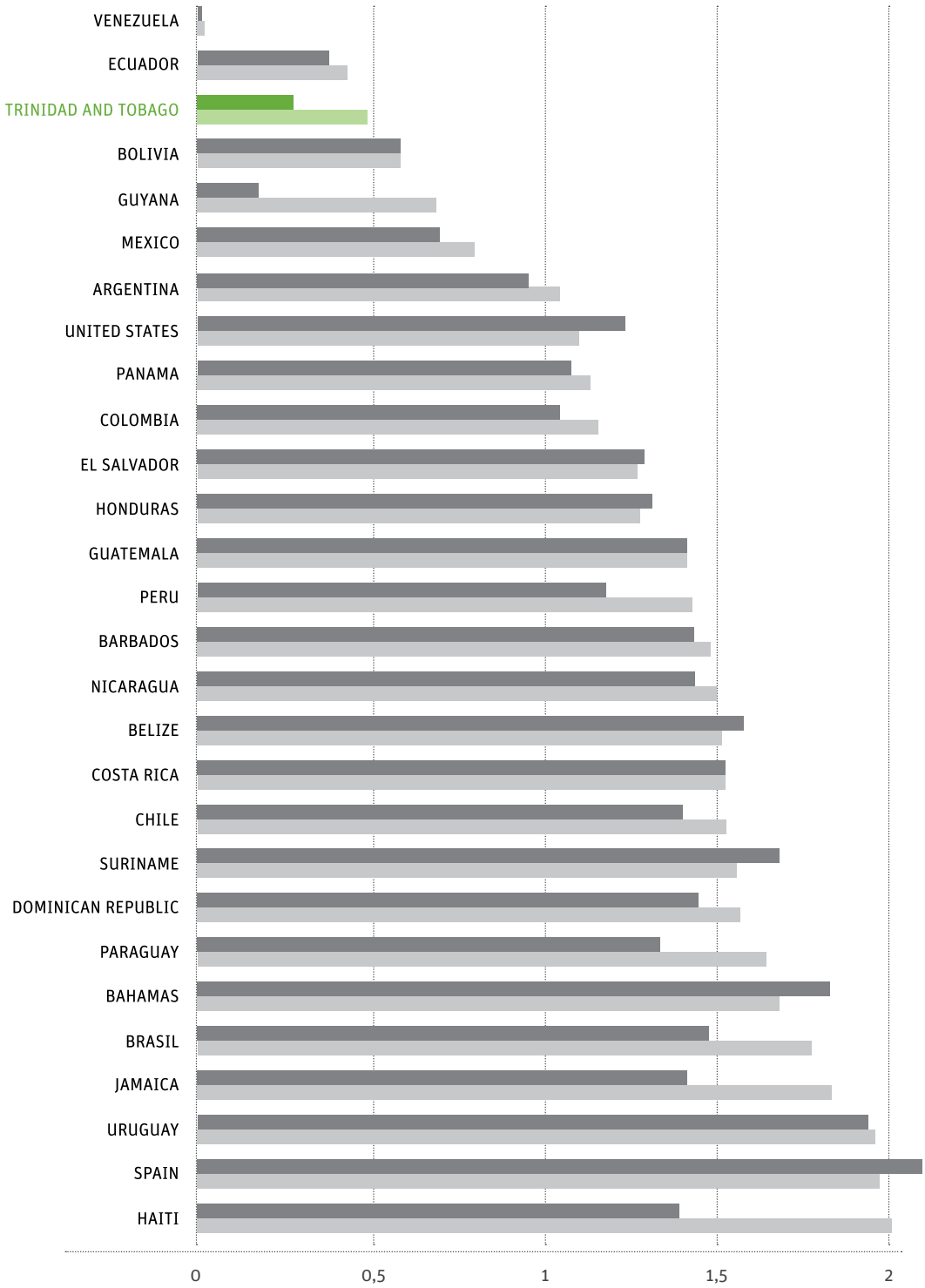

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Uruguay

| | |
|---|---|
| Population: | 3,314,500 |
| $ GDP: | US$23 billion |
| Total Energy Consumption: | 2,496 ktoe |

## Energy productivity

Uruguay energy intensity index of 0.82 is the lowest in the region, meaning that the country makes very efficient use of its energy. However, Uruguay is heavily dependent on fossil fuels: nearly 60 percent of its total energy consumption is generated from this source. Diesel and gasoline prices are among the highest in the region, and electricity prices are around average.

## The efficiency opportunity

If Uruguay were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 1,020 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$120 million over this period (in 2008 dollars).

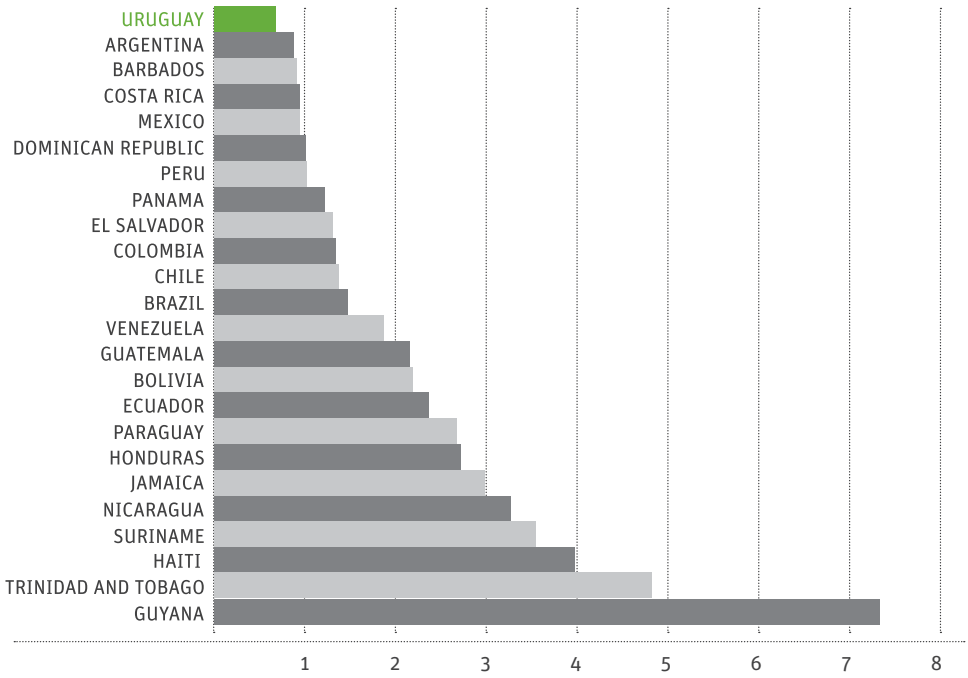
If Uruguay's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 2 gas-powered open cycle generation plants to produce the same 1,020 GWh of electricity per year.

At today's prices, it would cost approximately US$380 million just to build these plants, not counting operational and fuel costs.

Put another way, Uruguay has two alternatives for producing 1,020 GWh of electricity in 2018: one costs US$120 million, and the the other US$380 million.

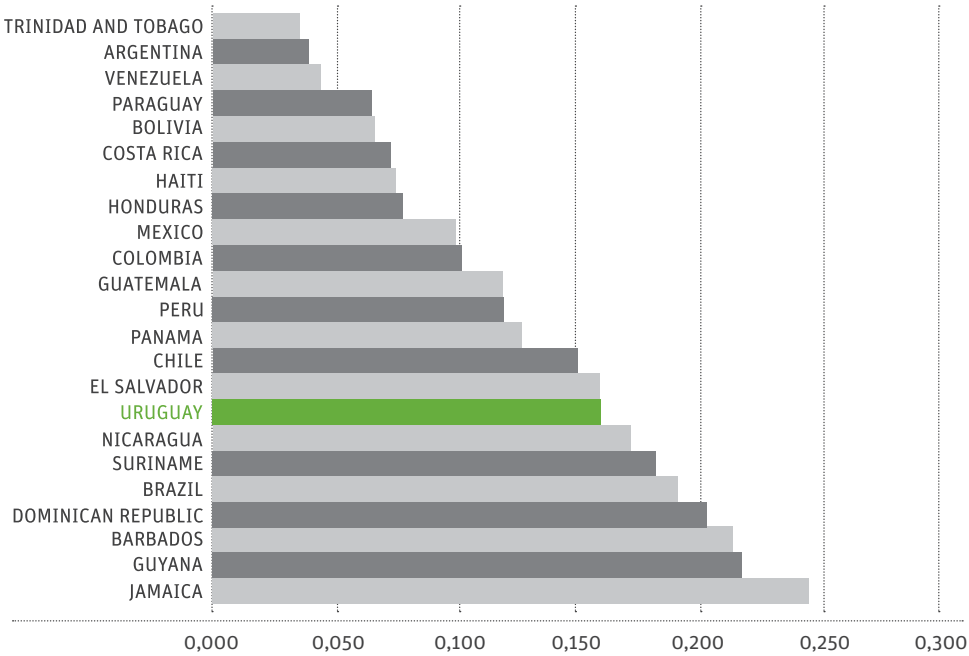
2 gas-powered open cycle generation plants

## Energy Intensity



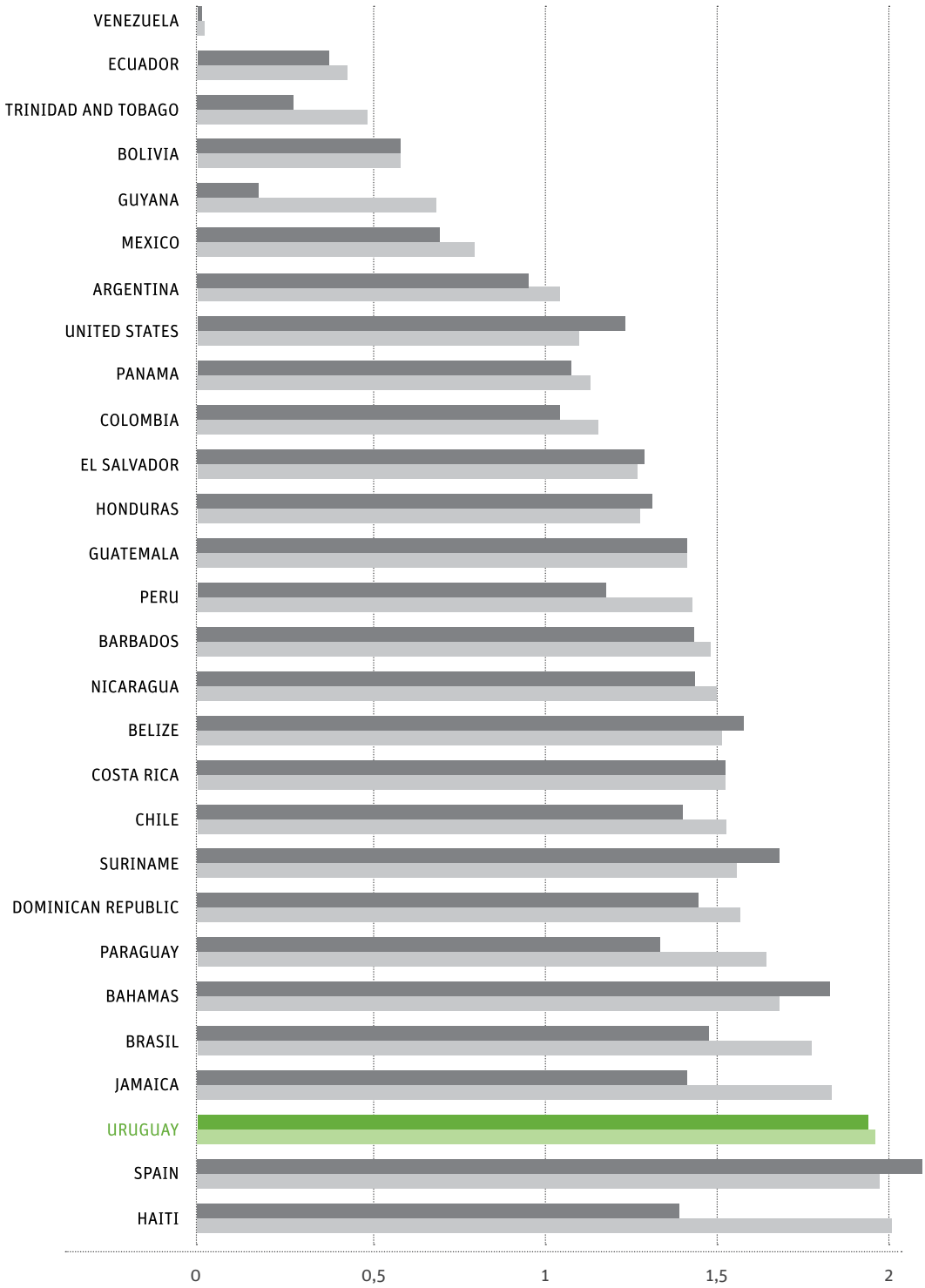

Source: OLADE 2006. For energy intensity definition see “SOME DEFINITIONS”

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

# Venezuela

| | |
|---|---|
| Population: | 27,021,000 |
| $ GDP: | $146 billion |
| Total Energy Consumption: | 40,743 ktoe |

## Energy productivity

Venezuela's energy intensity index of 2.23 is around average for the region, meaning that the country makes relatively efficient use of its energy. However, Venezuela is heavily dependent on fossil fuels: nearly 90 percent of its total energy consumption is generated from this source. Venezuela has Latin America's lowest diesel and gasoline prices, and its electricity prices are among the lowest in the region.

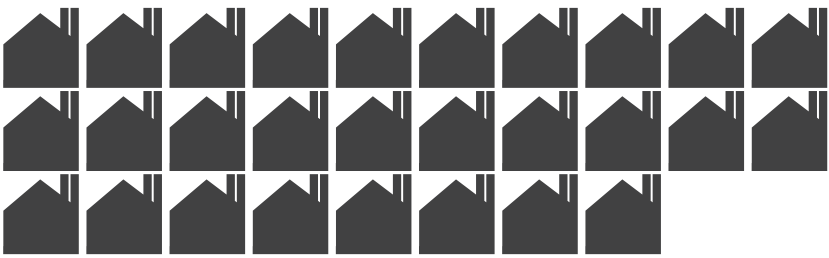
## The efficiency opportunity

If Venezuela were to improve its energy efficiency by 10% over the next 10 years, it would save the equivalent of 12,443 GWh of electricity per year by 2018. The cost of achieving that level of efficiency (based on investments in efficient light bulbs, electric motors, and other measures) would amount to around US$1.5 billion over this period (in 2008 dollars).

If Venezuela's energy demand continues to grow at the anticipated rate of 3.5% per year and the country does not become more energy efficient, it will need to build the equivalent of 28 gas-powered open cycle generation plants to produce the same 12,443 GWh of electricity per year.

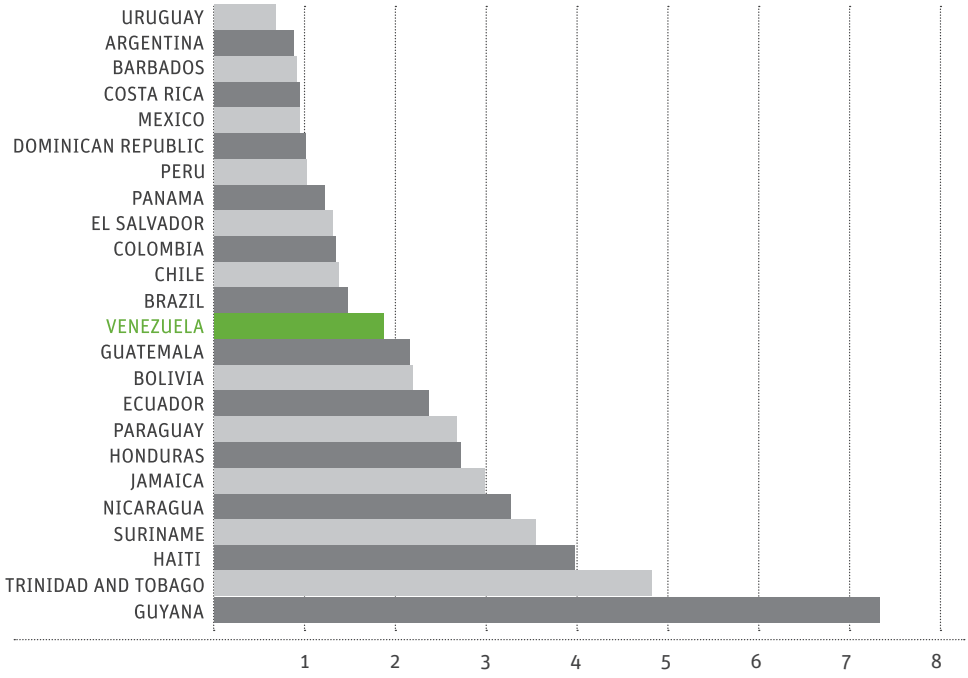
At today's prices, it would cost approximately US$4.6 billion just to build these plants, not counting operational and fuel costs.

Put another way, Venezuela has two alternatives for producing 12,443 GWh of electricity in 2018: one costs US$1.5 billion, and the other US$4.6 billion.



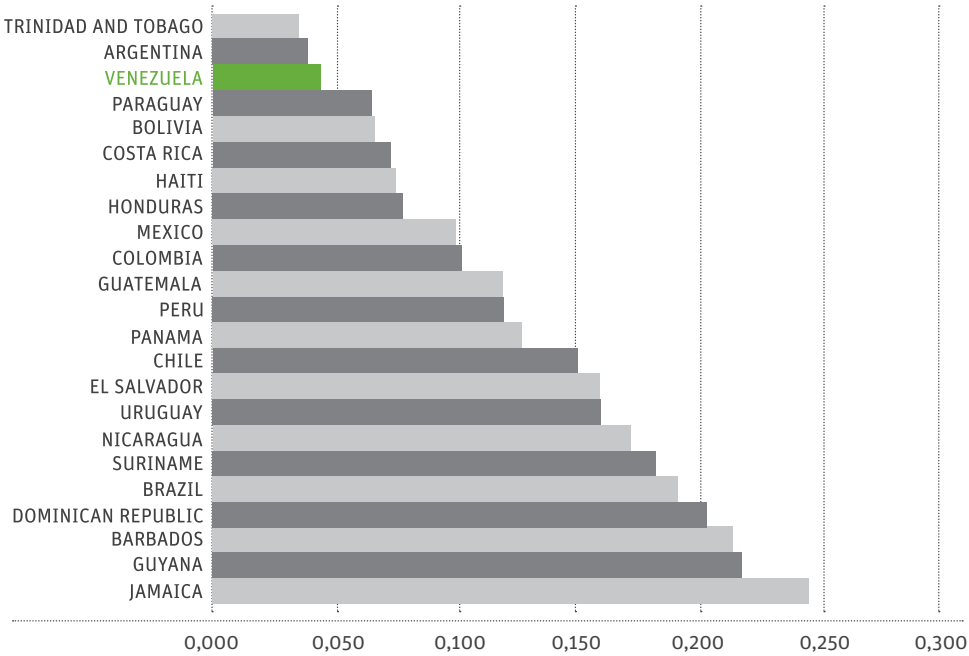
28 gas-powered open cycle generation plants

## Energy Intensity



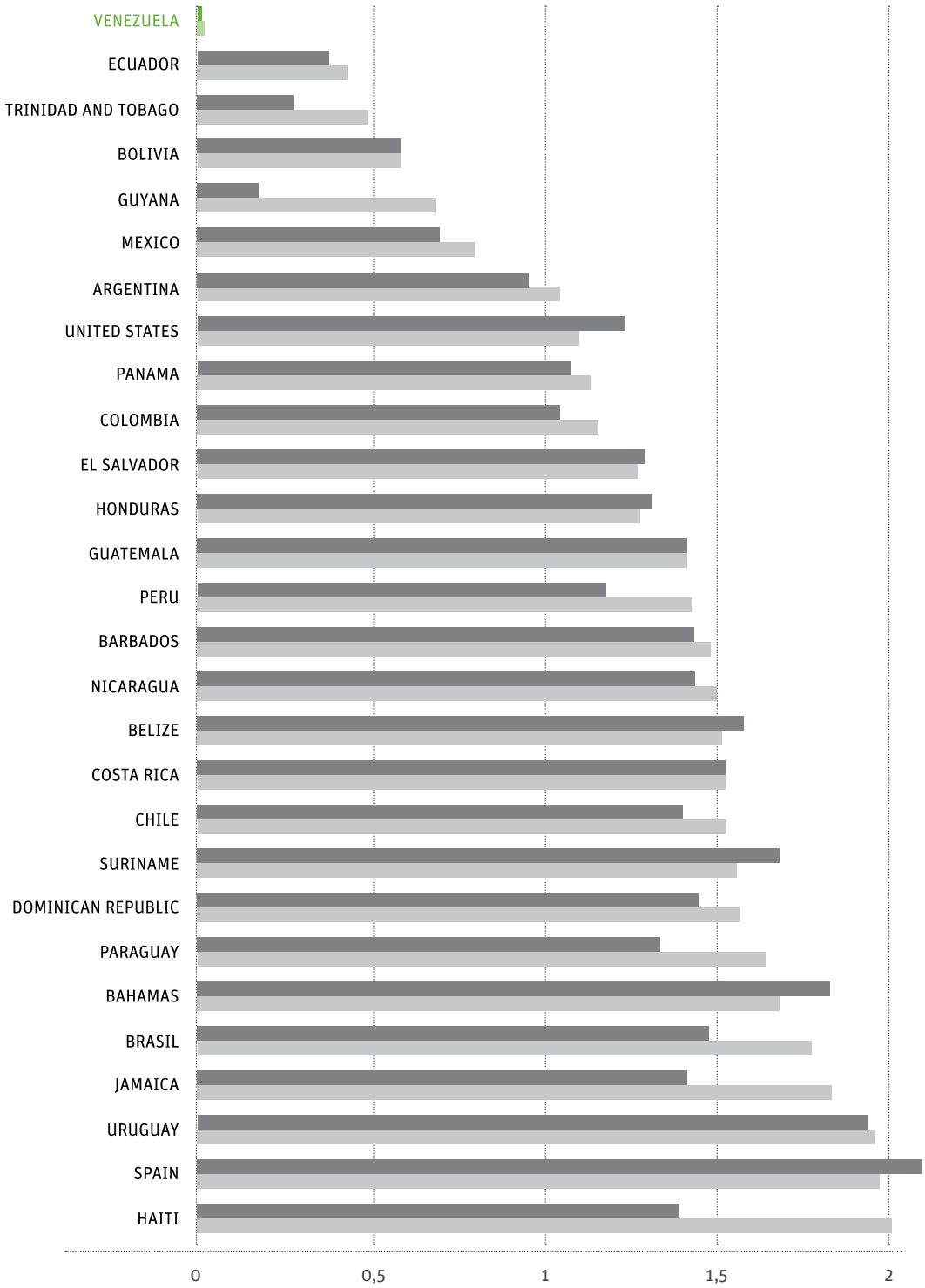

Source: OLADE 2006. For energy intensity definition see "SOME DEFINITIONS"

## Electricity Prices




Electricity Residential (US$/kWh).
Source: OLADE 2006. Price expressed in US$/kWh, taxes included.

## Gasoline and Diesel Prices




Gasoline and diesel prices. Prices expressed in US$/L.
Source: IDB, retail prices in capital cities on August 20, 2008

IDB

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