

Renewable Energy Policy Brief

ECUADOR

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1. Policy

Ecuador's 2008 Constitution explicitly states that the government will promote the use of clean and alternative energy sources, in addition to energy efficiency, while providing access to public services, preserving the environment and maintaining food and water security, among others.

Electricity

The National Plan for Good Living 2013-2022 (PNBV-SENPLADES 2013-2017) establishes the **target** of reaching 60% renewable energy generation capacity by 2017. The Objective 11.1 of this National Plan lays special emphasis on hydropower and bioenergy. The Electrification Master Plan 2013-2022, approved by Resolution CONELEC 041/13, plans for 25 hydropower projects totaling 4.2 GW of new capacity by 2022, as well as an additional 217MW of solar, wind and other non-conventional renewables. Previously, the National Plan for Good Living 2009-2013 had established the target of 6% renewable energy installed capacity (other than large hydro) by 2013.

The **regulatory framework** for electricity is the Electric Law of 2015, which explicitly states the objective of promoting renewable energy sources, including solid-waste biomass. This law establishes that the Ministry of Electricity and Renewable Energy (Ministerio de Electricidad y Energía Renovable – MEER) is the governmental entity in charge of the regulation and planning of the entire power sector of the country, and hence carries the responsibility of renewable energy promotion. The law provides for preferential regulations for renewable energy, which are still under development by the newly created electricity agency (ARCONEL) and expected in the second half of 2015. Previously, the Electric Law of 1996, mandated the now disbanded National Electric Council (CONELEC) to promote renewable through special dispatch regulations.

From 2000 to 2015, Ecuador had a **feed-in tariff** system to support renewable electricity deployment.¹ The feed-in tariff evolved over time in terms of duration, rates and technologies included (see **Table 1** below for a

summary). In 2000, Regulation CONELEC 008/00 established a 10-year feed-in tariff for wind, solar PV, biomass² and biogas, and geothermal, with a limit of 15MW per project. This was renewed in 2002 by Regulation CONELEC 003/02. In 2004, Regulation CONELEC 004/04 adjusted the rates, extended the feed-in tariff to 12 years and included small hydropower up to 10MW. In 2006 rates were adjusted again by Regulation CONELEC 009/06, notably for solar PV. In 2011, Regulation CONELEC 004/11 extended the feed-in tariff to 15 years, included hydro up to 50MW and revised the rates. In 2012, Resolution CONELEC 017/12 added ocean energy and CSP in the feed-in tariff. In 2013, Regulation CONELEC 001/13 didn't maintain solar PV under the feed-in tariff and set overall technology-specific capacity limits for wind, biomass and biogas, CSP, ocean energy and geothermal installations eligible for the tariff. In 2014, Resolution CONELEC 014/14 maintained the feed-in tariff only for biomass and biogas, with differentiated rates for the first time, and for hydropower smaller than 30MW.

Small-scale generators smaller than 1MW do not require a permit for operation (Decree 1581 of 1999). However, in order to benefit from the feed-in tariffs, they needed to be registered with the National Energy Council (CONELEC). The procedures for registration of small projects were established in 2008 by Regulation CONELEC 009/08. In 2013, Regulation CONELEC 002/13 superseded the 2008 regulation, and introduced two payments: a registration guarantee of USD 7000 for projects <500kW and USD 15000 for projects >500kW; and an execution guarantee of 1% of the total project cost.

¹ With the new electric law, the feed-in tariff and all other CONELEC regulations, which are based on the 1996 electric law. Existing projects maintain their legacy contracts and conditions.

² Including urban waste

Table 1- Ecuador Feed-in Tariff

	2000*	2002*	2004*	2006*	2011	2013 [§]	2014 ^{§§}
CONELEC Regulation	008/00	003/02	004/04	009/06	004/11	001/13	001/13c***
Tariff ^{§§§} (USD /MWh) ^{§§§§}							
Wind	100.5	100.5	93.1	93.9	91.3	117.4	X
Solar PV	136.5	136.5	283.7	520.4	400.3	X	X
CSP	X	X	X	X	310.2**	257.7	X
Biomass ³	102.3	102.3	90.4	96.7	110.5 (<5MW) 96.0 (>5MW)	110.8	96.7
Ocean	X	X	X	X	447.7**	324.3	X
Biogas	102.3	102.3	90.4	96.7	110.5 (<5MW) 96.0 (>5MW)	110.8	73.2
Geothermal	81.2	81.2	91.7	92.8	132.1	138.1	X
Hydro 30-50MW	X	X	X	X	62.1	65.1	X
Hydro 10-30MW	X	X	X	X	68.8	68.6	65.8
Hydro 5-10MW	X	X	50.0	50.0	71.7	78.1	65.8
Hydro <5MW	X	X	58.0	58.0	71.7	78.1	65.8
<p>* Max Power per project was 15MW for all technologies except for small hydro. ** Added in 2012 by CONELEC Resolution 017/12 *** As modified by Resolution CONELEC 014/14 [§] Max total installed capacity per technology: wind - 100 MW; solar CSP -10 MW; ocean - 5 MW; biomass and biogas (combined) – 100 MW; geothermal – 200 MW; small hydro – no limit. ^{§§} Max total installed capacity per technology: biomass and biogas (combined) – 100 MW; small hydro – no limit. ^{§§§}The Galapagos Islands had differentiated tariffs, for the last feed-in tariff in force it was: Biomass USD 106.4/MWh, Biogas USD 80.5/MWh. ^{§§§§} All amounts expressed in USD in original legislation</p>							

Grid access was facilitated by the feed-in tariff regulations, which mandated **preferential dispatch** for renewables. In the 2004 and 2006 feed-in tariff regulations, preferential dispatch was mandated until renewable generation reached 2% of the total electric system generation capacity, at which point new renewable energy generators would dispatch on an economic merit basis. In 2008, Regulation CONELEC 013/08 established preferential dispatch for renewable electricity up to 6% of the electric system operative installed capacity. In 2012, Resolution CONELEC 102/12 exempted hydro, biomass and geothermal (dispatchable technologies) from the preferential dispatch limit.

When a project developer builds a transmission line to connect a renewable energy project to the grid, compensations for those expenditures were established by the feed-in tariff regulations of 2002, 2004 and

2006 as an additional USD 0.06 cents/kWh/Km,⁴ with a maximum cost of USD 1.5 cents/kWh.

Connection to the grid requires since 2013 (Regulation CONELEC 001/13) the payment of a non-refundable fee (USD 10000⁵ for projects larger than 1MW and USD 5000 for projects smaller than 1MW) to the transmission or distribution company for a connection feasibility study. Payment of the fee does not guarantee connection. Once a project is cleared for connection, a guarantee of 0.5% of total investment is required, refundable when the project begins operation on the agreed timelines.

In terms of **local content**, 2013 CONELEC 001/13 established that 100% of non-qualified personnel and 50% of technical staff (not including administrative staff) during

³ Includes urban waste

⁴ USD cents 0.06 per kWh per km. The USD cents 1.5/kWh cap effectively means that transmission lines over 25km will get the same compensation regarding of their length.

⁵ Set in USD in the original regulation

construction and operation of renewable energy projects must be Ecuadorian.

Fiscal incentives were provided by the Electric Law of 1996, which provided import duty exemptions for solar, wind, geothermal and biomass equipment, as well as a 5-year income tax exemption for renewable energy developers. The 2015 Electric Law does not contain similar fiscal provisions.

Since 2011 (CONELEC 004/11) renewable energy projects receiving the feed-in tariff must contribute an amount (per kWh generated) to social and community development projects (“Estado del Buen Vivir”). As of 2014 (CONELEC 014/14) the amount is as follows: biomass USD 23.8/MWh,⁶ biogas USD 16.5/MWh, hydropower (<30MW) USD 18.9/MWh, wind USD 23.9/MWh, solar PV USD 118.0/MWh, CSP USD 87.4/MWh, ocean energy USD 127.7/MWh, and geothermal USD 33.6/MWh.

Direct public investment of USD 4.96 billion in hydropower from 2013 to 2021 is considered by the Electrification Master Plan 2013-2022, as approved by Resolution CONELEC 041/13. Until 2008 most public investment in renewable energy capacity (notably hydropower) was administered by a dedicated energy investment fund (FEISEH) which was funded with oil revenues. Following a 2008 reform⁷, hydrocarbon revenue was included directly into the government budget.

In 2008, the national Pre-Investment Institute funded **geothermal** energy pre-feasibility studies. The 2010 Geothermal Plan for Ecuador identifies 16 areas of potential interest for future developments, with a theoretical potential of 6000 MWe.

Due to **environmental concerns**, the government created the Galapagos Island Zero Fossil Fuels initiative to develop renewable energy projects and displace oil-based electricity generation. Two wind farms, two PV projects and two hybrid PV-biofuel-battery project are being developed with respective assistance from UNDP, Korea (KOICA), Japan (JICS) and Germany (KfW).

Transport

Ecuador has a **blending mandate** for 5% of biodiesel since 2013, as established by Decree 1303 of 2012. The Decree establishes free competition for local biodiesel producers (they are not subject to PETROECUADOR’s production monopoly) and states that the blending mandate is to gradually increase to 10% according to supply and national production. The decree also contemplates the definition of agro-environmental zoning for the plantation of oil palm.

In 2010 Guayaquil was selected for a pilot project to blend 5% bioethanol in gasoline. As of October 2014, all gasoline in Guayaquil contains 5% bioethanol blend.⁸

The Organic Law of Food Sovereignty of 2010 explicitly mandates the government to prioritize food production and limit “as possible” the use of food crops as biofuel feedstock. The *Biofuel and Agroenergy Programme* has the goal of promoting 80000 hectares of sugarcane plantation dedicated to bioethanol by 2018.⁹

Energy Access

The Electric Law of 2015 mandates the government to prioritize the development of rural-electrification projects, and to provide for them from the general budget, while allowing contributions from other public and private entities, local or foreign.

The main instrument for electrification of rural and marginalized areas is a dedicated fund created in 1973,¹⁰ the *Fund for Rural Energy and Electrification of Marginal Urban Areas (FERUM)*. According to the 1996 Electric Law FERUM funds are to be assigned with priority to electrifications projects based on renewable energies. Under the 1996 Electric Law FERUM was financed by a 10% fee on industrial and commercial electricity consumers. In 2008 Mandate 15 abolished the 10% fee and provided that FERUM would be financed from the general budget. In 2012 Ecuador budgeted USD 79 million for FERUM during the period 2012-2013, with the objective of providing electricity access to 65,000 households. From 1998 to 2009, FERUM was assigned a total of

⁶ Original amount in USD

⁷ Organic Law for Recovery of Use of State Oil Resources and Rationalization of Debt of 3 April 2008

⁸ Source: <http://www.sectoresestrategicos.gob.ec/desde-octubre-guayaquil-consumira-el-100-de-gasolina-ecopais/>

⁹ <http://www.agricultura.gob.ec/programa-de-biocombustible-y-agroenergia-apoya-a-canicultores/>

¹⁰ Initially known as Rural Electrification Fund (FER)

USD 519 million, of which only USD 9.6 million were disbursed for renewable energy projects.¹¹ FERUM is regulated by a 1998 CONELEC norm (R.O.S. 373) establishing the Fund's basic functioning rules and Regulation CONELEC 008/08.

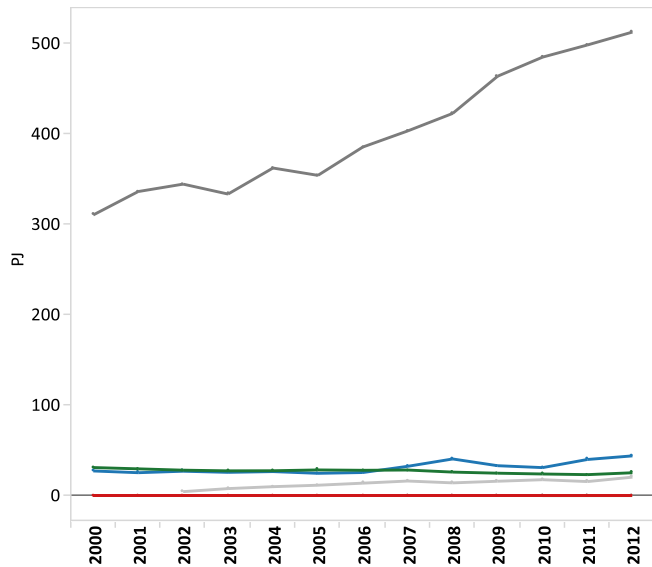
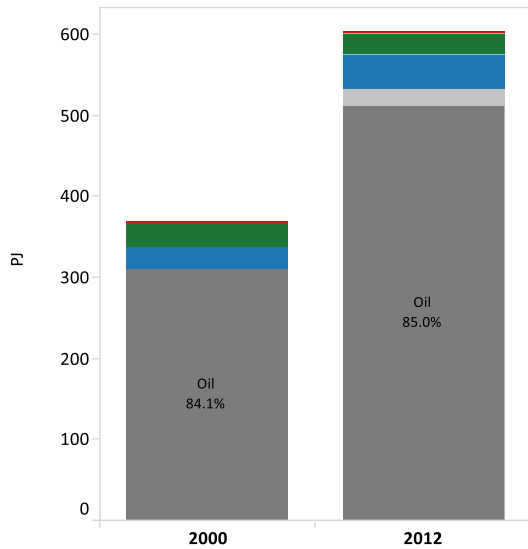
Currently, in order to increase access to electricity, the Government of Ecuador has

received support and funding for the implementation of various programs. Some of these programs include the use of photovoltaic systems, which are considered to be the most feasible solution in isolated areas such as the Ecuadorian Amazon Region. An example is an IDB's project that aims to benefit 800 families in the communities of this region.

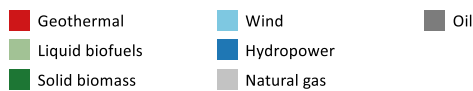
¹¹ Source: Desarrollo de la Energización Rural y la Electrificación Urbano-Marginal, Capítulo 9 CONELEC año 2009

2. Statistics

Total Primary Energy Supply



Excludes electricity trade

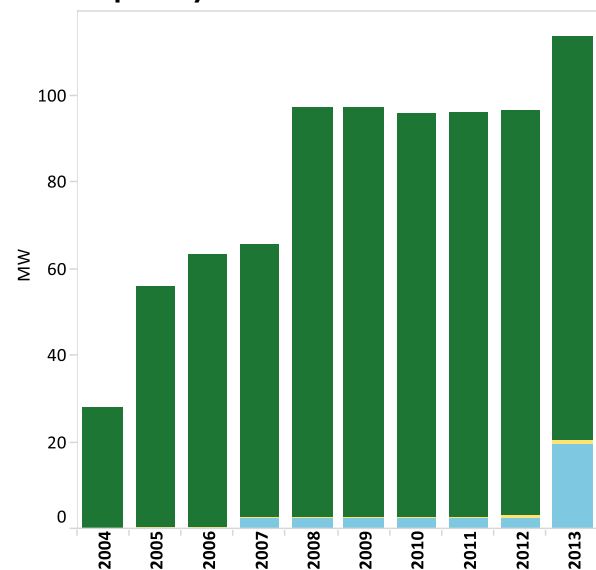
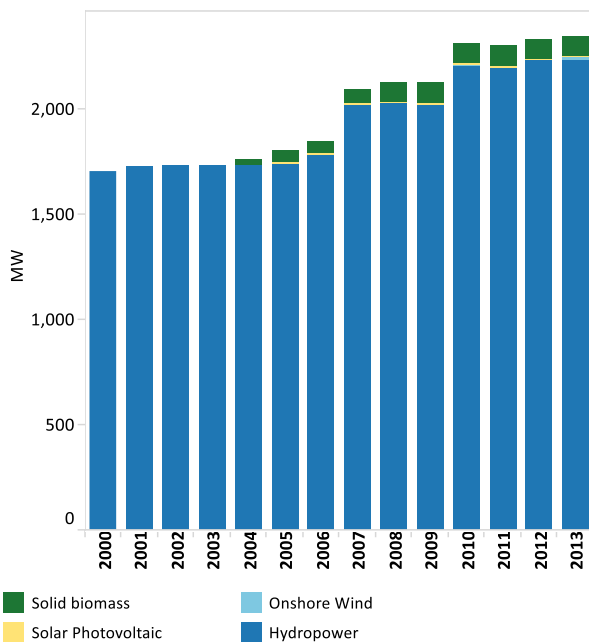


	Total Primary Energy Supply	Share of renewables
2000 Total	369.1 PJ	
Of which renewables	58.7 PJ	15.9%
2012 Total	603.8 PJ	
Of which renewables	69.7 PJ	11.6%

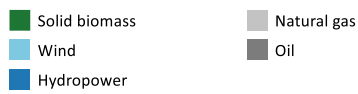
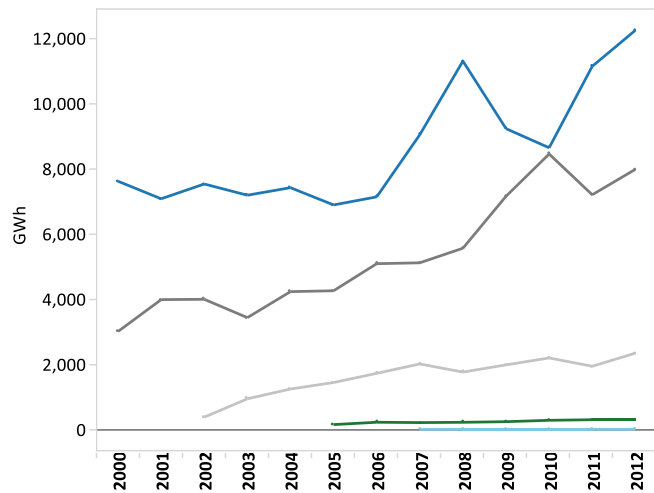
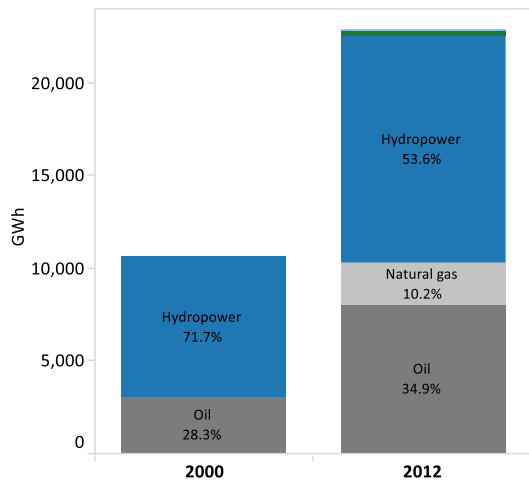
	Total Primary Energy Supply	Share in total renewables
2012 Geothermal	0.1 PJ	0.1%
Wind	0.0 PJ	0.0%
Liquid biofuels	0.2 PJ	0.2%
Solid biomass	25.4 PJ	36.4%
Hydropower	44.1 PJ	63.2%

Total includes electricity trade

Renewable Power Capacity



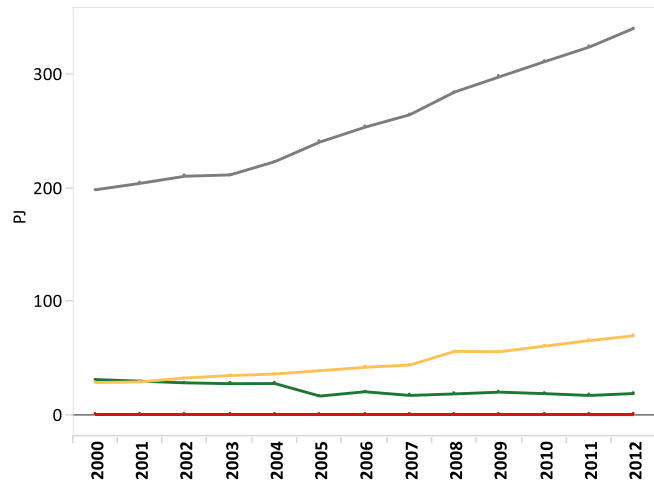
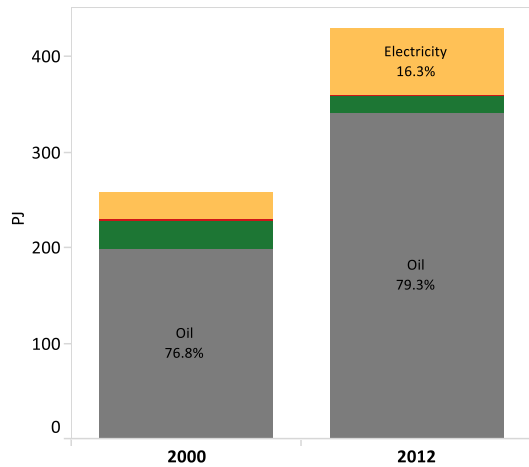
Electricity Generation



	Electricity generation	Share of renewables
2000	Total: 10,612.0 GWh	
	Of which renewables: 7,609.0 GWh	71.7%
2012	Total: 22,847.0 GWh	
	Of which renewables: 12,536.0 GWh	54.9%

	Electricity generation	Share in total renewables
2012	Wind: 2.0 GWh	0.0%
	Solid biomass: 296.0 GWh	2.4%
	Hydropower: 12,238.0 GWh	97.6%

Total Final Energy Consumption



	Total Final Energy Consumption	Share of renewables
2000	Total: 258.0 PJ	
	Of which renewables: 31.3 PJ	12.1%
2012	Total: 429.7 PJ	
	Of which renewables: 19.1 PJ	4.5%

	Total Final Energy Consumption	Share in total renewables
2012	Geothermal: 0.1 PJ	0.5%
	Liquid biofuels: 0.2 PJ	0.8%
	Solid biomass: 18.9 PJ	98.6%

Sources for these statistics: IRENA, IEA, UN

Renewable Energy Policy Briefs

This brief is part of an IRENA series providing a comprehensive and timely summary of renewable energy policies in Latin America (including Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela).

The brief brings together the most up-to-date information on renewable energy public policies for the power, heating and transport sectors, and also includes a section on energy access policies. The objective of this brief is not to provide an assessment of the reported policies. The brief is primarily based on the information contained in the [IEA/IRENA Joint Policies and Measures Database](#), complemented with information drawn from: (i) additional existing legislation, (ii) official government sources such as plans, reports and press releases, and (iii) input from country policymakers and experts. While the brief focuses on policies at the national level, sub-national policies are also included where relevant. Specific projects or programmes implemented by actors such as international organisations, development partners and the private sector are beyond the scope of this brief.

The information contained in this document is posted on IRENA's [REsource](#) web portal, will be used to update the [IEA/IRENA Joint Policies and Measures Database](#), and will form the basis of IRENA's future policy work in Latin America.



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