



Country energy information Ecuador

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SIXTH FRAMEWORK PROGRAMME PRIORITY 3

Underpinning the economic potential and cohesion of a larger and more integrated EU

SPECIFIC SUPPORT ACTION

Project Acronym: RECIPES

Project full title: Renewable Energy in emerging and developing countries: Current situation, market Potential and recommendations for a win-win-win for EU industry, the Environment and local Socio-economic development

Contract number: 513733

Start date of contract: 1st January 2005

Introduction

The information in this report was gathered from publicly available sources (the source list is available at www.energyrecipes.org), like surveys, statistical data from the internet and books and other publications. The information consists of:

1. indicators and indices;
2. descriptions of the relevant energy items/subjects /themes.

Due to differences in availability of data per country the level of detail of these reports will differ.

For all the 114 developing and emerging countries of the INCO list a report like this is available. (see also www.energyrecipes.org for the countries) Except for the following 15 countries, where more detailed reports are available.

Argentina	China	Cameroon
Brazil	India	Ghana
Colombia	Indonesia	Niger
Mexico	Pacific Islands	South-Africa
Peru	Thailand	Uganda

The RECIPES project

The RECIPES project aims to contribute to the implementation of renewable energy in emerging and developing countries. The RECIPES project is financed under the 6th Framework Programme for Research and Technological Development of the European Commission.

The main objective of the RECIPES project is to provide the European Commission and other stakeholders with pragmatic information and recommendations facilitating appropriate action to further the implementation of renewable energy in emerging and developing countries, taking into account:

- | The effects on the local socio-economic situation.
- | The competitive position of European renewable energy industry.
- | The impacts on the local and global environment.

Data collection on the situation and potential of renewable energy in emerging and developing countries is the core of the RECIPES project.

An identification of the RE market potential is carried out for 15 developing and emerging countries. Local experts gathered data for all of these countries. The results of these in-depth studies are extrapolated to 99 other developing and emerging countries for which data is gathered through desk research.

See the RECIPES website (www.energyrecipes.org) for relevant data collected and reports produced.

Environmental problems

Deforestation; soil erosion; desertification; water pollution; pollution from oil production wastes in ecologically sensitive areas of the Amazon Basin and Galapagos Islands

Environment - international agreements

Party to: Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands

signed, but not ratified: none of the selected agreements

Energy situation

Ecuador produces mainly oil and some natural gas. Crude oil is both used in domestic refineries and used for export. Residential energy use consists mainly of electricity, traditional biomass and petroleum products.¹³

About 63% of Ecuador's electricity production comes from hydroelectricity, with the remainder supplied by conventional thermal plants. While Ecuador has a net electricity surplus, it often faces supply shortages during the October-March dry season, when hydroelectricity output declines. To make up for these shortfalls, Ecuador must import electricity from Colombia. There are plans to build new electricity connections to Peru, which would further allow Ecuador to alleviate its seasonal power shortages and open additional markets for electricity exports.² Even though a large percentage of electricity production comes from hydro, the energy production is dominated by the use of hydrocarbons, especially oil. New renewable technologies (wind, solar, geothermal) are not represented in the total energy supply, despite Ecuador's enormous potential for geothermal power generation.¹⁰

Most of Ecuador's conventional thermal generating capacity is diesel-fired, supplied by imports and domestic refineries. Many of Ecuador's diesel power plants are old and inefficient, and often cannot meet electricity demand during the dry season. There have been efforts to increase gas-fired capacity in the country, such as the Machala plant and natural gas import deals with Peru; however, financial problems faced by the operators of conventional thermal plants continues to deter private investment.²

The 1,100-MW Paute plant, located in eastern Ecuador, represents over 60% of the country's hydroelectric generating capacity. In 2003, the state-owned operator of

the Paute plant, Hidropaute, won a tender to build the Mazar hydroelectric dam several miles upriver from Paute. When completed in 2007, the 180-MW Mazar plant will act as a secondary holding reservoir for Paute, reducing sediment buildup and increasing production capacity during the dry season. Another large hydroelectric facility is the planned San Francisco project, downstream from the existing Agoyan plant on the Pastaza River. The San Francisco project, owned by Hidropaute, is a run-of-river style plant, diverting water through a 7.5-mile, underground channel.²

Energy sector organisation

In 1999, the Ecuadorian government broke apart INECEL, the former, state-owned electricity monopoly that had controlled the generation, transmission, and distribution sectors. Six state-owned companies now dominate the generation sector, though there are important private producers supplying customers in the urban areas surrounding Quito and Guayaquil. A single, state-owned company, Transelectric, controls the transmission system. In the distribution sector, one municipal-owned and nineteen state-owned companies operate in the country. Most of these distributors are inefficient and suffer from sizable debt loads, which contributes to Ecuador's electricity shortages during the dry season. The Ecuadorian government has repeatedly tried to privatize the distribution sector, though each attempt has failed due to resistance from Congress, protests by labor unions and rural activists, and lack of interest from private investors.²

Renewable energy potential

Ecuador has an underdeveloped wind potential, although increasingly more companies are investing in wind energy projects.²⁴

Renewable energy

In order to reduce the use of diesel-fired energy on the Galapagos islands, a project was recently proposed to provide the islands with wind power and PV-systems. Frequent oil transport caused environmental damage due to oil spills.²³ A number of projects have been completed that were intended to replace some of the countries thermal energy production by renewable energy. An example is the "Las Chinchas" wind energy project, where a 10MW wind energy project was completed to prevent almost 20.000 tons of CO₂ yearly. The government is attempting to reduce the use of highly contaminating fuels like diesel.²⁴

	Ecuador	Unit
General		
Population (2005)	13363593	
Country area	272046	km ²
Total density of population (people/km ²)	49.000	capita/km ²
Growth of people % /year	1.240	%
Land use arable (%)	5.850	%
Land use perm crops (%)	4.930	%
Percentage of total people living in cities	61.300	%
HDI (2002)	0.735	
Social		
Illiteracy	92.500	%
Year of estimation	2003	
Corruption (CPI 2003) 0=high 10=low	2.200	
GDP in ppp mostly \$ 2004 est	49.51	billion

Economic

Income /capita \$ mostly 2004	3700	
Variability of income/capita GINI index (2004)	43.700	
Population below poverty line	45.000	%
Year of estimation	2001	
Total External Debt in % GDP (2004 est.)	49.200	%
Inflation rate (consumer prices) (%)	2.000	%
Year of estimation	2004	
Growth of economy	5.800	%
Year of estimation	2004	
EDI energy development index	0.635	

Energy development

Percentage of people connected to the grid (electricity)	89.700	%
Traditional fuel consumption (% of total energy requirements 2002) . Estimated consumption of fuel wood, charcoal, bagasse (sugar cane waste) and animal and vegetable wastes.	22.500	
Oil consumption	129000.000	bbl/day

Fossil fuel consumption

Year of estimation	2001	
Coal consumption (Million Short Tons)	0.000	millions short tonnes/year
Natural gas consumption, year 2001 if not mentioned others	160	million cu m
Nuclear power production (Billion Kilowatthours) 2003	0.000	billion kWh/year
Hydro electricity capacity (2003)	1.747	million kilowatts

Renewable energy situation

Geothermal, Solar, Wind, Wood and Waste Electricity Installed capacity (2003)	0.000	million kilowatts
RE biomass production of primary energy from combustible Renewables and Wast TJ/Year 2002	30501.000	
RE energy electricity consumption (2003)	0.000	billion kWh/year
Total Primary Energy Supply 2000	95.370	billion kWh/year
Share of total renewables in % of TPES 2000	16.500	%
Share of renewables excluding combustible renewables and waste in % of TPES 2000	8.000	%
TPES 2003	105.800	billion kWh/year
Share of Renewables in TPES % (2003)	13.900	%
Hydro (2003)	48.900	%
Geothermal, Solar, Wind, Tide (2003)	0.000	%
Combustible Renewables and Waste (2003)	51.100	%
Total kWh per capita	5964.000	

Energy consumption for various sectors

Industry	21.000	%
Transportation	52.000	%
Agriculture	0.000	%
Commercial and public services	5.000	%
Residential	21.000	%
Other purposes	1.000	%
Total oil production	523000.000	bbl/day

Energy production

Total coal production (Million Short Tons)	0.000	millions short tonnes/year
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Total natural gas production	160	million cu m
Total Electricity Production GWh	11888.000	GWh

Electricity

Electricity production from coal %	0.000	%
Electricity production from oil %	34.000	%
Electricity production from gas %	3.000	%
Electricity production from biomass %	0.000	%
Electricity production from waste %	0.000	%
Electricity production from nuclear %	0.000	%
Electricity production from hydro %	63.000	%
Electricity production from geothermal %	0.000	%
Electricity production from solar thermal and PV %	0.000	%
Electricity production from other sources %	0.000	%
Electricity consumption GWh (2003)	10554.000	GWh
Total final electricity consumption GWh (2002)	8521.000	GWh
Electricity used by Industry % (2002)	26.000	%
Electricity used by Transport % (2002)	0.000	%
Electricity used by Agriculture % (2002)	0.000	%
Electricity used by Commerce and Public Services % (2002)	26.000	%
Electricity used by Residential % (2002)	39.000	%
Electricity used by Other Non-Specified % (2002)	9.000	%
Electricity used by Non-Energy Use % (2002)	0.000	%