

Renewable Electricity Incentives in Central and South America, 2011/12

Investment and Operating Support Programmes



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London Research International

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List of Abbreviations

AD	Anaerobic digestion (biogas)
BAU	Business as Usual (emission trend)
CDM	Clean Development Mechanism of the Kyoto Protocol
CER	Certified Emissions Reduction certificate (part of the CDM)
CHP	Combined heat and power
CSP	Concentrated solar-thermal power
DNA	Designated National Authority
GEF	Global Environment Facility
GHG	Greenhouse gases
IEA	International Energy Agency
IMF	International Monetary Fund
OECD	Organisation for Economic Cooperation and Development
PV	Photovoltaic
RE	Renewable energy
RPS	Renewable Portfolio Standard
TSO	Transmission system operator
UNDP	United Nations Development Programme
UNFCCC	UN Framework Convention on Climate Change
VAT	Value added tax

Introduction

The energy sector is responsible for a third of global anthropogenic greenhouse (GHG) gases emissions. One of the key strategies that the member countries of the Organisation for Economic Co-operation and Development (OECD) have been implementing to manage emissions is to substantially increase the generation of power from renewable energy sources, such as wind, solar, marine and geothermal energy. In many cases, the production of renewable electricity has been encouraged by significant government incentives.

There are two types of subsidies relevant to power generation: *operating support incentives*, which are offered per unit of electricity produced; and *investment support*, which is usually awarded in the form of direct aid, soft loans or tax exemptions. Although investment support incentives are often substantial, they offer less security to prospective investors as the availability of funding often depends on lodging an early application, and the amount offered may not be known until after project details are presented.

Operating Support Incentives

The specifics of operating support schemes vary extensively across countries; however, most are based on two types of support structures—*feed-in tariffs*, and *premiums*. In addition, *tender schemes* are used in some countries for specific types of projects.

Feed-in Tariffs

A feed-in tariff (FIT) system is an incentive framework that guarantees a fixed price and buyer for electricity generated by renewable sources. It requires electricity network operators and utility companies to purchase all the output that renewable electricity generators supply to the grid at a set rate, regardless of whether or not the output is needed to satisfy demand at the time—this is known as an *obligatory purchase*. FIT rates and duration vary among countries and are specific to each renewable electricity generation technology employed. In some countries, generators can even receive FITs for electricity that is not supplied to the grid but consumed for their own use.

The FIT rates are, in most cases, subject to adjustments over time. In some countries, the tariff rates are periodically re-evaluated, while in others they are set for a period and thereafter lowered at a predetermined annual rate. The latter is termed a *degression rate*. In both instances, these adjustments seek to accurately correlate fixed tariff prices with the projected declines in generation costs as renewable power technologies and component supply chains mature.

The use of a FIT system is considered to be a relatively good incentive for driving investment in renewable development as it offers a degree of predictability to income through predetermined prices and guaranteed buyers. The use of FITs has increased in recent years, likely based on recent trends in the European Union (EU) where the largest growth in renewable electricity investment and development has occurred in countries using FITs as the primary support system.

The FIT incentive system, however, is seen as less market-oriented than other incentive schemes as it shields renewable electricity generators from the variability in the open wholesale electricity market. Given that grid operators are obliged to absorb all renewable electricity generated, there is some concern about the effect of large amounts of intermittent renewable power on the integrity grid and the electricity spot market.

Fixed and Variable Premiums

A variation on the FIT model is the premium incentive, also known as a green bonus scheme. Under the premium system, electricity generators sell their output on wholesale electricity markets at the same prices and under identical conditions as all other electricity generators. There is no purchase guarantee as found under the FIT system, although in some countries renewable electricity is given priority for purchase. To cover the costs of generating power from renewable energy sources under the premium system, generators are entitled to receive a supplementary amount, or “premium,” in addition to the market price of electricity for every MWh of electricity they sell. The premium is paid for by the relevant government agency or network operator, and the cost is recovered through a tax on electricity sales or from the government’s general budget.

There are two types of premiums: fixed and variable. Under a fixed premium, the generator receives a set premium for each unit of output sold on the open market regardless of the market price of electricity.

With a variable premium, the generator receives a variable amount, calculated as the difference between the market price at the time of sale and a predetermined higher price, normally set by a government agency. To illustrate the difference between fixed and variable premiums, hypothetical examples of both types of premium are provided below.

Under the fixed premium system, a spot market electricity price of 55 EUR/MWh and a fixed premium of 33 EUR/MWh provide a generation compensation of 88 EUR/MWh. If the market price falls to 45 EUR/MWh, the fixed premium remains 33 EUR/MWh and hence the generation compensation drops to 78 EUR/MWh.

Under the variable premium system, if the predetermined guaranteed income is 88 EUR/MWh, and the market price then falls from 55 EUR/MWh to 45 EUR/MWh, the premium is adjusted from 33 EUR/MWh to 43 EUR/MWh to compensate for this drop.

If there was an increase of 5 EUR/MWh in the wholesale electricity price to 60 EUR/MWh, under the fixed premium, then generation compensation would also increase by 5 EUR/MWh to 93 EUR/MWh. Under the variable premium system, the premium would fall 5 EUR/MWh to 28 EUR/MWh to maintain the generation compensation at 88 EUR/MWh.

Tender Schemes

Renewable electricity tender schemes employ a form of competitive tendering whereby an electricity supply contract is offered. Under this contract, the government or a network operator guarantees to purchase a predetermined amount of electricity generated using a specific renewable electricity generation technology. Developers submit tenders for the project concerned, competing according to the lowest price at which they are able to supply the renewable electricity output. In theory, this scheme should drive the output price of renewable electricity to its lowest possible level. In practice, however, this incentive scheme

can lead to renewable electricity generators providing unrealistic generation cost estimates in their tenders that they may be unable to achieve.

Tender schemes were used extensively in the past, but they have become less popular as more sophisticated incentive schemes such as FIT systems have been introduced. On the whole, however, tender schemes are not considered to be a particularly successful incentive system and have been ineffective at increasing renewable electricity generation.¹

Investment Support Incentives

Investment support incentive schemes are normally defined as financial assistance that covers a part of the initial capital investment cost of a project. They usually take the form of capital grants, soft loans, tax reductions or exemptions on the purchase of goods, and are generally applied as a secondary incentive scheme following an operating incentive scheme.²

Identifying the full range of investment support programmes in a country at a point in time can be time-consuming, as they are funded and managed by different government or quasi-government offices often at the national, regional and local levels. Investment support programmes often have a cap as they are generally funded under the government budget. When the fund is disbursed, the programme ends and it is not certain when a similar programme will next be created. Eligibility for a programme is not necessarily clear until the details of a project are presented to the concerned authority. This report, for reasons of conciseness, accuracy and simplicity, will focus primarily on the investment support schemes provided by national or federal governments.

1 OPTRES, Assessment and Optimisation of Renewable Energy Support Schemes in the European Electricity Market, February 2007, pp. 1–17. Available at <www.optres.fhg.de/OPTRES_FINAL_REPORT.pdf>.

2 Commission of the European Communities, The Support of Electricity from Renewable Energy Sources. Available at <ec.europa.eu/energy/climate_actions/doc/2008_res_working_document_en.pdf>.

Chapter 1: Argentina

1.1 Government Targets

Argentina ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. Argentina did not set any targets under the Copenhagen Accord, but did indicate that they would adopt policies to contribute to stabilising global emissions.³ The government has set a target of 8 per cent of total electricity consumption to be based on renewable energy sources (including hydropower under 30 MW) by 2016.⁴ Almost 30 per cent of people living in rural communities are not connected to the power grid and the government has committed to increasing the electrification rate among the population.⁵

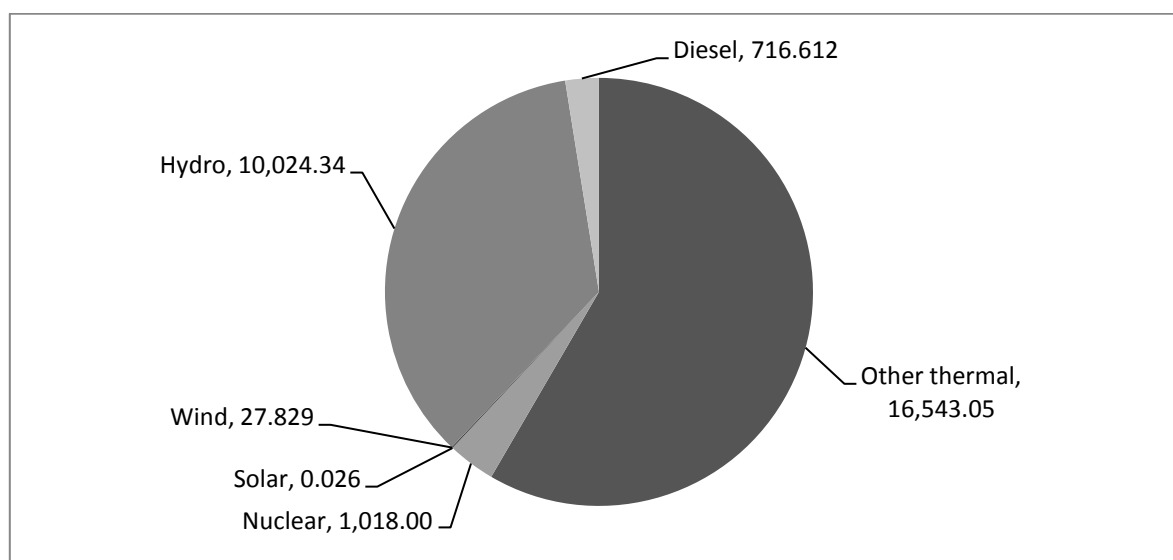
Table 1.1: Argentinean government commitments

GHG emissions	A Copenhagen Accord commitment to adopt policies that would contribute to stabilising emissions.
Renewable energy (RE)	No target set.
Renewable electricity	A goal for 8 per cent of total electricity consumption to come from renewable sources (including hydropower under 30 MW).

Source: Secretary of the Environment and Sustainable Development, Participación de fuentes renovables de energía en la generación eléctrica total. Available at <www.ambiente.gov.ar/?idarticulo=6195>.

1.2 Electricity Generation Mix

Figure 1.1: Total installed generating capacity in Argentina in 2009 (MW): 28,329.9 MW

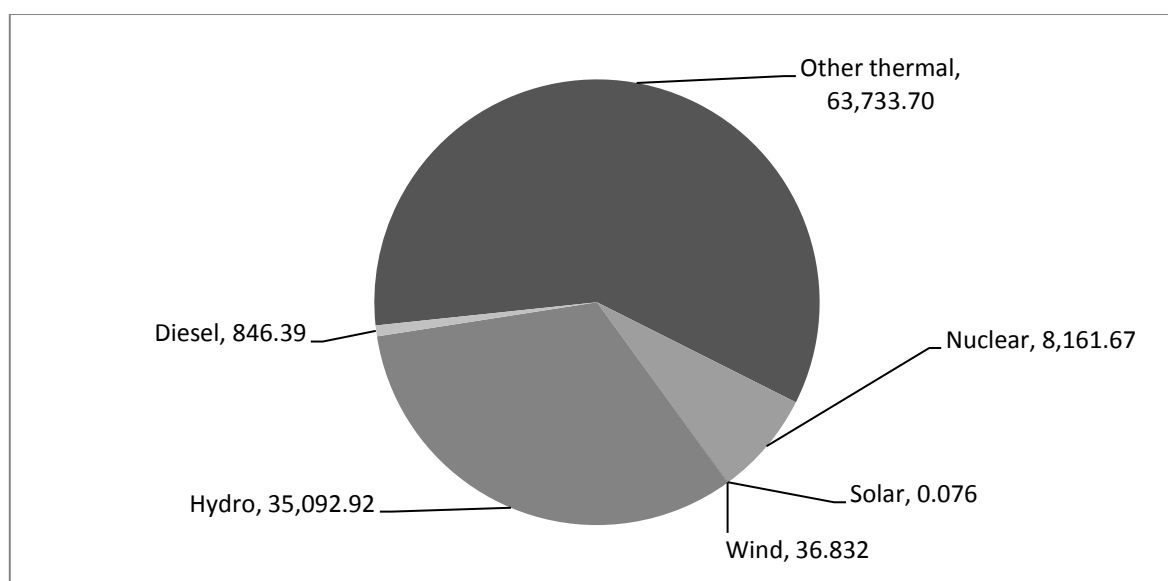


Source: Ministry of Energy, Electricity Statistics. Available at <www.energia.gov.ar/>.

³ MPA, Argentina frente al cambio climático: Un balance de la Cumbre de Copenhagen. Available at <www.mpargentino.com.ar/argentina-frente-al-cambio-climatico-un-balance-de-la-cumbre-de-copenhague-por-alieto-guadagni/>.

⁴ Secretary of the Environment and Sustainable Development, Participación de fuentes renovables de energía en la generación eléctrica total. Available at <www.ambiente.gov.ar/?idarticulo=6195>.

⁵ World Bank, Renewable Energy in Rural Markets. Available at <web.worldbank.org/external/projects/main?Projectid=P045048&Type=Overview&theSitePK=40941&pagePK=64283627&menuPK=64282134&piPK=64290415>.

Figure 1.2: Electricity generation mix in Argentina in 2009 (GWh): Total 107,871 GWh

Source: Ministry of Energy, Electricity Statistics. Available at <www.energia.gov.ar/>.

1.3 Operating Support Incentives

In 2006, a premium system was introduced in Argentina. Under the law, all renewable power generators (including hydro of up to 30 MW) receive 15 ARS/MWh (2.8 EUR/MWh)⁶ in addition to the sales increase of electricity on the wholesale market. For solar PV, generators can receive 900 ARS/MWh (172.46 EUR/MWh). These incentives are provided for 15 years and are paid out of a Renewable Energy Trust Fund, which is funded by a 0.3 ARS/MWh (0.058 EUR/MWh) surcharge on electricity consumption.⁷

In September 2010, the government held a public tender for large-scale renewable power projects. Under the tender, 895 MW of renewable power projects were awarded contracts, namely 17 wind power projects (754 MW in total), four biomass-fired power projects (110.4 MW in total), five small hydropower projects (10.6 MW in total) and six solar PV projects (20 MW in total). It is not known if or when another renewable power tender will be held. Under the tender contracts, those projects that are operational by 2014 will receive the following average tariff rates, all expressed in USD, for a period of 15 years:

- Wind power: 126.9 USD/MWh (95.72 EUR/MWh)
- Biomass: 287.6 USD/MWh (216.94 EUR/MWh)
- Small hydropower: 162.4 USD/MWh (122.50 EUR/MWh)
- Solar PV: 571.6 USD/MWh (431.68 EUR/MWh).⁸

⁶ Currency converted at EUR 1 = ARS 5.2187 (the average in 2010).

⁷ Ley 26.190 Regimen de Fomento Nacional para el uso de fuentes renovables de energía destinada a la producción de energía eléctrica. Objeto. Alcance. Ambito de aplicación. Autoridad de aplicación. Políticas. Régimen de inversiones. Beneficiarios. Beneficios. Sanciones. Fondo Fiduciario de Energías Renovables., Diciembre 6 de 2006. Available at <infoleg.mecon.gov.ar/infolegInternet/anexos/120000-124999/123565/norma.htm>.

⁸ ENARSA, Electric Energy Supply from Renewable Sources: Contract Awarding, 09 September 2010. Available at <www.enarsa.com.ar/english/nota30.htm>. The USD-EUR conversion rate used is EUR 1 = USD 1.3278 (the average in 2010).

1.4 Investment Support Incentives

Developers can have the value added tax (VAT) refunded on renewable power equipment (excluding vehicles). Physical assets can also receive accelerated depreciation in the first three years of operation. To be eligible for these incentives, the project must supply power to the public power grid or for public services.⁹

The National Agency for Promotion of Science and Technology, through the Sectoral Argentine Fund (FONARSEC), finances research and pilot projects for solar power.¹⁰ Renewable energy projects in Argentina are also able to benefit from receiving Certified Emission Reduction credits (CERs) through the Clean Development Mechanism (CDM). The Department of the Environment and Sustainable Development (*Secretaría de Ambiente y Desarrollo Sustentable*) is the designated national authority (DNA) for CDM projects.¹¹

⁹ Decree 562/2009: “promoción de energías renovables para la generación de energía eléctrica”. Available at <www.ambiente-cai.org.ar/novedades_Ambiente-CAI/ADS-Promocion_Energias_Renovables.pdf>.

¹⁰ Agencia Nacional de Promoción Científica y Tecnológica. Available at <www.agencia.gov.ar/spip.php?page=convocatorias_articulo&mostrar=1265>.

¹¹ For more information see the website at <www.ambiente.gov.ar>.

Chapter 2: Brazil

2.1 Government Targets

Brazil ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. Under the Copenhagen Accord, the government set a target to reduce emission levels by between 36.1 and 38.9 per cent from the GHG emission levels projected under a ‘business-as-usual’ scenario in 2020. To reduce emissions, the government plans to increase the use of biofuels for transport and renewable electricity, although specific targets for these initiatives were not made.¹

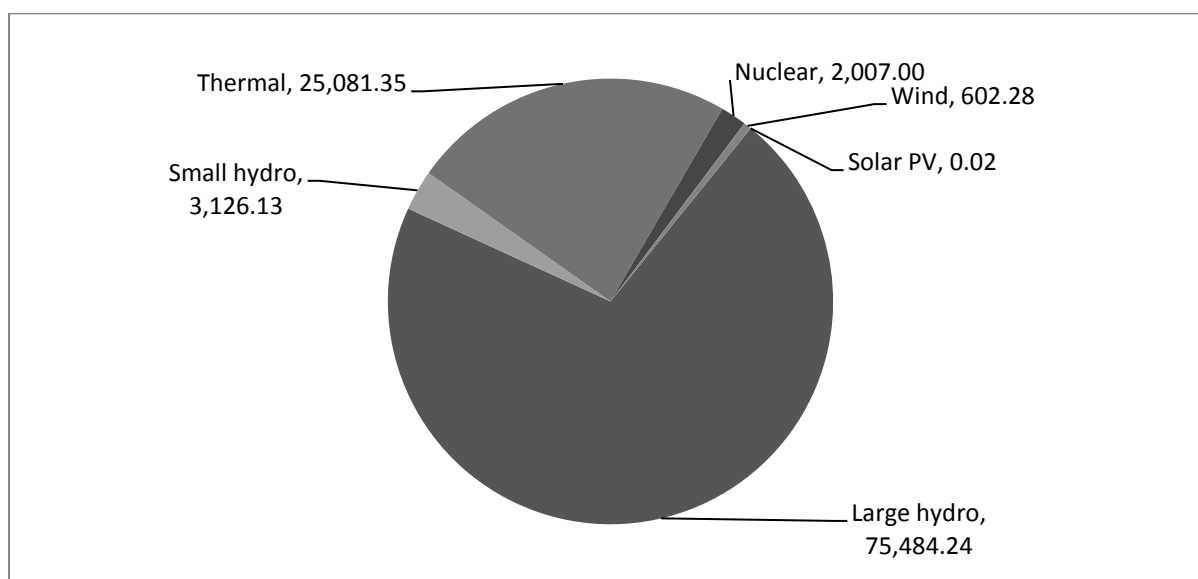
Table 2.1: Brazilian government commitments

GHG emissions	A Copenhagen Accord target of a 36.1 per cent to 38.9 per cent reduction by 2020.
Renewable energy (RE)	No target set.
Renewable electricity	No target set.

Source: Communication from the Embassy of Brazil to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/brazilcphaccord_app2.pdf>.

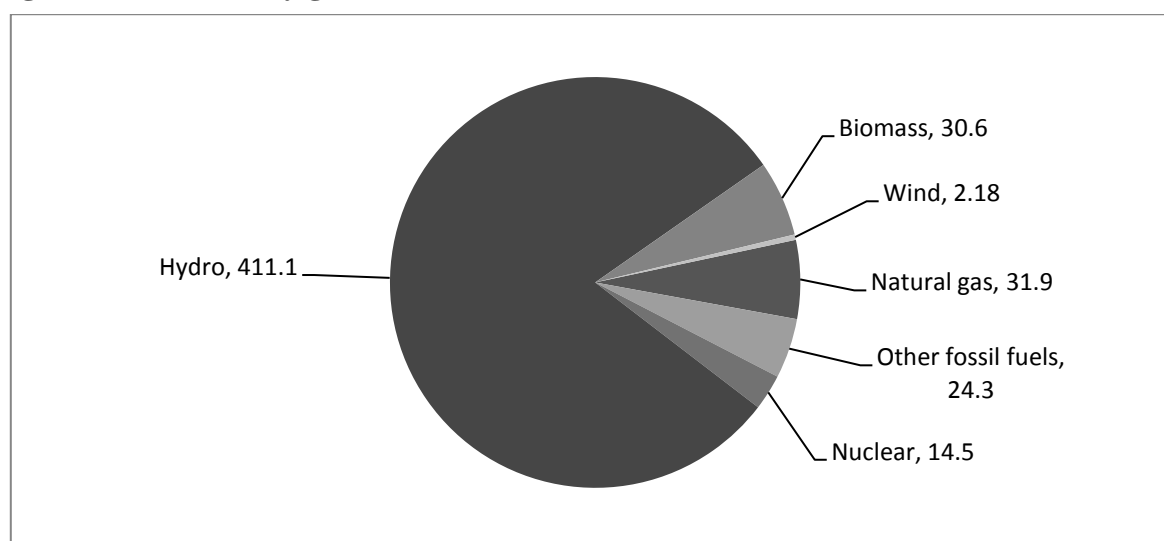
2.2 Electricity Generation Mix

Figure 2.1: Total installed generating capacity in Brazil in 2009 (MW): 106,301.02 MW



Source: ANEEL, Relatorio Aneel 2009. Available at <www.aneel.gov.br/biblioteca/downloads/livros/Relatorio_Aneel_2009.pdf>.

¹ Communication from the Embassy of Brazil to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/brazilcphaccord_app2.pdf>.

Figure 2.2: Electricity generation mix in Brazil in 2010 (TWh): Total 514.58 TWh

Source: Empresa de Pesquisa Energetica and Ministério de Minas e Energia, Balanço Energético Nacional 2011: Resultados Preliminares. Available at <ben.epe.gov.br/downloads/Resultados_Pre_BEN_2011.pdf>.

2.3 Operating Support Incentives

2.3.1 Feed-in Tariffs

The government's PROINFA (*Programa de Incentivo às Fontes Alternativas de Energia Elétrica*, Programme of Incentive to Alternative Sources of Electric Energy) had a target of installing 144 renewable power plants with a total installed capacity of 3,300 MW. Table 2.2 shows how this target breaks down.

Table 2.2: Breakdown of Brazil's PROINFA target for renewable power plants

Technology	# of installations	Combined capacity (MW)
Wind power	54	1,423
Small hydro	63	1,191
Biomass	27	685

To support this investment, a 20-year feed-in tariff (FIT) system was introduced. The FIT rates vary every year according to inflation. Table 2.3 shows the tariff rates for 2011.

Table 2.3: Feed-in tariff rates in Brazil in 2011 for generators in the PROINFA programme

Technology	BRL/MWh	EUR/MWh
Small hydro	172.35	73.93
Wind power	282.20	121.04
Biomass	138.35	59.34

Note: Exchange rate based on EUR 1 = BRL 2.3314 (the average exchange rate in 2010).

Source: ANEEL, Voto – Processo 48500.005885/2010-17, 17 December 2010. Available at <www.aneel.gov.br/cedoc/areh20101101_1.pdf>.

The projects approved for the first phase of PROINFA were selected in 2004 and 2005, but the 3,300 MW agreed under PROINFA had yet to be built as of August 2011. In December 2010, only 68 PROINFA projects with a combined capacity of 1,592 MW were operating, including: 43 wind farms with 1,111 MW of capacity, 23 small hydro plants with 414 MW, and two biomass plants with 66.5 MW. Originally, all the projects had to be operational by

December 2008 in order to be entitled to the PROINFA FIT rates, but developers were given an extension to the end of December 2010, which was then further extended to the end of December 2011. In order to qualify as a PROINFA project, at least 60 per cent of the equipment used has to be sourced in Brazil.²

2.3.1 Public Tenders

The government is now moving from the PROINFA FIT system to renewable energy tenders as the main mechanism to incentivise deployment. A public tender for renewable power projects (known as the A-3 Tender) was held in August 2010 and resulted in the contracting of 2,892 MW of new renewable power generating capacity. Two additional public tenders were held in August 2011, another A-3 Tender, and the Reserve Power Tender, intended to make up for lower-than-expected hydropower generation in recent years due to climactic conditions. Table 2.4 shows the results of the public tenders in 2010 and 2011. Table 2.5 compares the contracted price for the different generating technologies in the auctions. The rates will be given for 20 years (30 years for hydropower). All the biomass projects use *bagasse* as their feedstock.

Table 2.4: Amount of renewable power generating capacity awarded in public tenders in Brazil in 2010 and 2011

Technology	A-3 Tender August 2010 ^a		A-3 Tender August 2011 ^b		Reserve Power Tender August 2011 ^c	
	Number of projects	Total in MW	Number of projects	Total in MW	Number of projects	Total in MW
Wind	70	2,047.8	44	1,067.6	34	861.1
Biomass	12	712.9	4	197.8	7	357
Hydro	7	131.5	1	197.8	0	0
Total	89	2,892.2	49	1,715.4	41	1,218.1

Source: ^aEPE, Leilões de Fontes Alternativas contratam 89 usinas, com 2.892,2 MW, 26 August 2010.

Available at <www.epe.gov.br/imprensa/PressReleases/20100826_1.pdf>; ^bANEEL, Primeiro Leilão de Energia A-3 do ano tem deságio médio de 26,6%, 17 August 2011. Available at

<www.aneel.gov.br/aplicacoes/noticias/Output_Noticia.cfm?Identidade=4466&id_area=90>; ^cANEEL, Energia vendida no Leilão de Reserva tem deságio médio de 31,8%, 18 August 2011. Available at <www.aneel.gov.br/aplicacoes/noticias/Output_Noticia.cfm?Identidade=4472&id_area=90>.

Table 2.5: Results of renewable power tenders in Brazil in 2010 and 2011

Technology	August 2010 A-3 Tender ^a		August 2011 A-3 Tender ^b		August 2011 Reserve Power Tender ^c	
	BRL/MWh	EUR/MWh	BRL/MWh	EUR/MWh	BRL/MWh	EUR/MWh
Hydro	141.93	60.88	102.00	60.88	N/A	N/A
Biomass	144.20	61.85	102.41	61.85	100.4	43.06
Wind	130.86	56.13	99.57	56.13	99.54	42.70

Source: ^aEPE, Leilões de Fontes Alternativas contratam 89 usinas, com 2.892,2 MW, 26 August 2010.

Available at <www.epe.gov.br/imprensa/PressReleases/20100826_1.pdf>; ^bANEEL, Primeiro Leilão de Energia A-3 do ano tem deságio médio de 26,6%, 17 August 2011. Available at

<www.aneel.gov.br/aplicacoes/noticias/Output_Noticia.cfm?Identidade=4466&id_area=90>; ^cANEEL, Energia vendida no Leilão de Reserva tem deságio médio de 31,8%, 18 August 2011. Available at <www.aneel.gov.br/aplicacoes/noticias/Output_Noticia.cfm?Identidade=4472&id_area=90>.

Some individual states have their own incentive programmes. For example, in 2011, the state

² MME, PROINFA. Available at <www.mme.gov.br/programas/proinfa/>.

of Ceara started the *Fundo de Incentivo à Energia Solar* (FIES, the Incentive Fund for Solar Energy), which will offer higher tariffs to solar power generators in the state. The tariffs will be decided following a public tender and are expected to be announced in late 2011 or 2012.³

2.4 Investment Support Incentives

The Brazilian Development Bank (BNDES) offers external financing for up to 70-80 per cent of investment capital, excluding the purchase of imported goods and services, and the acquisition of land.⁴ The Inter-American Development Bank (IDB) has also provided grants for solar, wind and hydropower projects in Brazil.⁵

The government also encourages renewable power developers to benefit from receiving Certified Emission Reductions credits (CERs) through the Clean Development Mechanism (CDM).⁶ The Inter-ministerial Commission on Global Climate Change (*Comissão Interministerial de Mudança Global do Clima*) is the designated national authority (DNA) for CDM projects.⁷

³ ADECE. Energia Solar no Ceará, 2010. Available at <www.adece.ce.gov.br/noticias/texto.php?Noticia=312>.

⁴ Programa De Apoio Financeiro A Investimentos Em Fontes Alternativas De Energia Elétrica No Âmbito Do Proinfa. Available at <www.mme.gov.br/programas/proinfa/galerias/arquivos/programa/resolproinfa.pdf>.

⁵ IDB, Brazil Country Page. Available at <www.iadb.org/en/countries/brazil/brazil-and-the-idb,1002.html>.

⁶ Guide to the Clean Development Mechanism. Available at <www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_en/Galerias/Download/TheCleanDevelopmentMechanism_Guide2009.pdf>.

⁷ For more information see the website at <www.mct.gov.br/index.php/content/view/4016.html>.

Chapter 3: Chile

3.1 Government Targets

Renewable energy plays a prominent role in Chile's 2010-2015 energy strategy. The plan seeks to diversify Chile's energy mix and security of supply; two areas of pressing national concern, particularly in light of recent restrictions on natural gas imports from Argentina and droughts in southern Chile that have affected the performance of domestic hydro projects. Chile ratified the Kyoto Protocol, but as a non-Annex I country has no binding GHG emission targets. Under the Copenhagen Accord, the country set a target to reduce emissions by 20 per cent from 'business-as-usual' projections of GHG emission levels in 2020. The government also has a target to meet 20 per cent of total energy consumption with renewable alternatives by 2020, and for 10 per cent of total generation capacity to come from renewable energy sources by 2024.

Table 3.1: Chilean government commitments

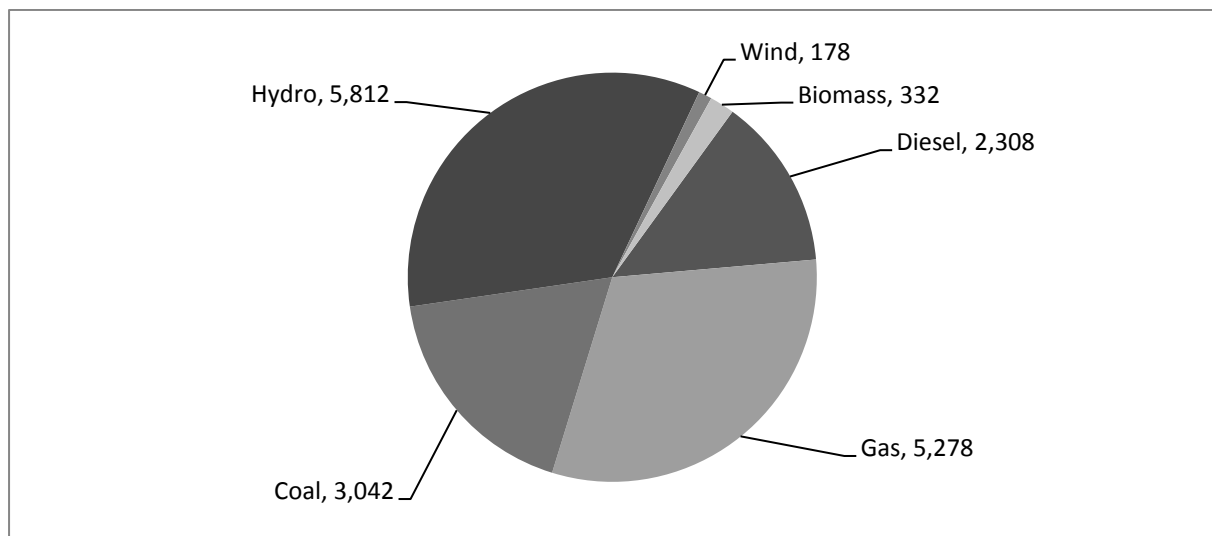
GHG emissions	Has no obligation under the Kyoto Protocol to reduce emissions. In 2010, Chile set a Copenhagen Accord target for a 20 per cent reduction from BAU levels projected for 2020.
Renewable energy (RE)	A government target of 20 per cent of energy consumption from renewable energy sources by 2020
Renewable electricity	A government target of 5 per cent of electricity generation from renewables by 2014, rising to 10 per cent by 2024

Source: Letter to the UNFCCC, 23 August 2010. Available at unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/chilecphaccord_app2.pdf; Ministry of Energy. Available at www.minenergia.cl.

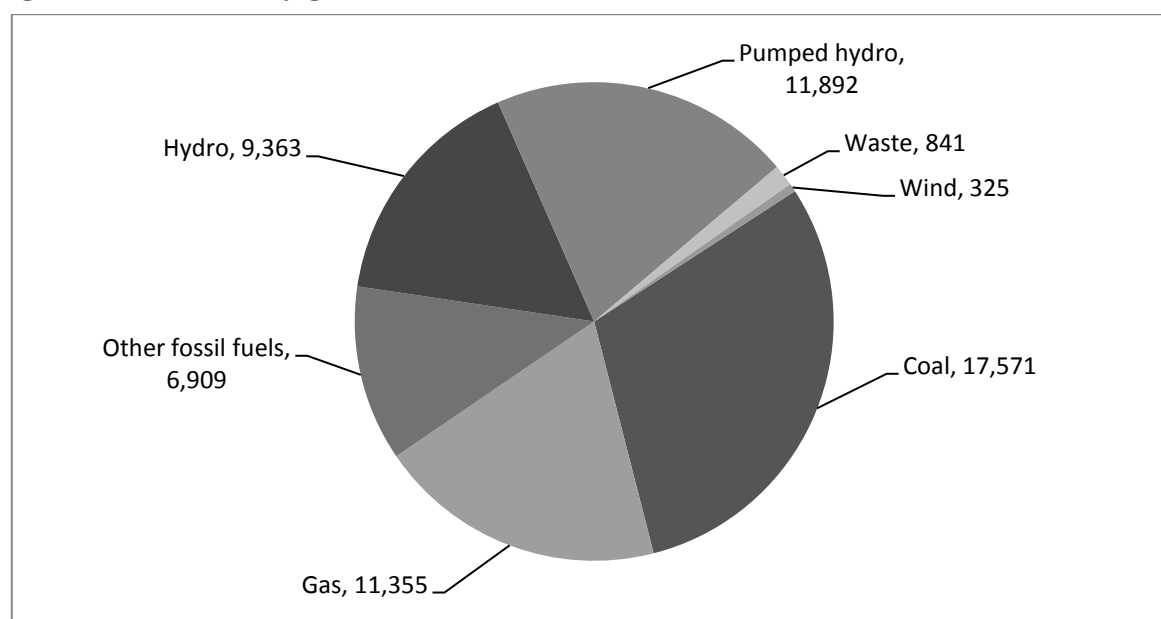
3.2 Electricity Generation Mix

The Chilean power system consists of four transmission systems: Sistema Interconectado del Norte Grande (SING), Central Interconnected System (SIC), Aysén, and Magallanes. These four grids are not connected and operate independently of each other.

Figure 3.1: Total installed generating capacity in Chile in 2011 (MW): 16,950 MW



Source: Comisión Nacional de Energía, Energy Statistics. Available at cne.cl.

Figure 3.2: Electricity generation mix in Chile in 2010 (GWh): Total 58,257 GWh

Note: Only includes the SIC and SING transmission zones.

Source: Comision Nacional de Energia, 2008 Energy Statistics. Available at <cne.cl>.

Table 3.2: Total installed generating capacity in Chile by transmission system in 2011 (MW)

Category	Sistema Interconectado Central (SIC)	Sistema Interconectado del Norte Grande (SING)	Magallanes	Aysen	Total
Conventional thermal	6,715	3,788	97	28	10,628
Hydro	5,778	13	0	21	5,812
Biomass	332	0	0	0	332
Wind	174	0	3	2	179
Total	12,999	3,801	100	51	16,951
Percentage share of renewables in total capacity	48.34%	0.34%	3.00%	45.10%	37.30%

Source: CNE, Statistics. Available at <www.cne.cl>.

3.3 Operating Support Incentives

Chile's 2008 legally enforced programme for Non-Conventional Renewable Energy (NCRE) lays the framework for its incentive strategy. The focus of the programme is the encouragement of geothermal, wind, solar, tidal, biomass, and small hydro (≤ 20 MW) power. Effective from the beginning of 2010, the programme obliges electricity producers with an installed capacity of greater than 200 MW to base at least 5 per cent of their production on renewable sources. From 2015, this quota will increase by 0.5 per cent annually, until it reaches 10 per cent in 2024.

The penalty fine for non-compliance with this regulation is UTM¹ 0.4 per MW below the quota. For example, in 2010 an electricity producer would need to pay CLP 14,849 (EUR

¹ Aka 'Monthly Tax Units' an index-linked unit of account designed by the government to avoid fiscal drag in the tax code. In 2010, the average UTM rate was UTM 1 = CLP 37,112. Information available at <valorutm.cl>.

21.93)² for each MW short of their quota. If during the following three years the electricity producer continued below their annual quota, the penalty fine payable would rise to UTM 0.6 (EUR 33.38) per MW.³

Also under the NCRE, renewable energy plants with capacities below 9 MW will receive obligatory connection to the transmission grid and grid operators must sign a power purchase agreement.

3.4 Investment Support Incentives

Since 2004, Chile's economic development agency (*Corporación de Fomento de la Producción de Chile*, CORFO) has been involved in incentivising renewable energy development in partnership with other government bodies and institutions. There are two main channels of development support—the All-Chile Attracting Investment Programme, and the Development and Pre-Investment NCRE Programme.

The All-Chile Attracting Investment Programme offers grants of up to USD 60,000 for pre-investment feasibility studies for renewable energy projects located outside of the Metropolitan region with a project value greater than USD 400,000.

Within the Metropolitan Region, CORFO will contribute up to 50 per cent of the total cost of studies or advice for projects, up to a maximum of 2 per cent of the total project value or UF⁴ 1,700 (EUR 53,158).

Another CORFO initiative, the Development and Innovation Fund (FDI), awards grants in three focus areas: development and adaptation of new technologies, diffusion and information transference between Chilean companies and institutions, and the development of technological capacity to take advantage of innovation.

In addition to these financing avenues, Chilean power projects are eligible to apply for Certified Emission Reductions credits (CERs) through the Clean Development Mechanism (CDM). The National Environment Commission (*Comisión Nacional del Medio Ambiente*, CONAMA) is the designated national authority (DNA) for all CDM projects in Chile.⁵

² The CLP – EUR conversion rate used is EUR 1 = CLP 677.067 (The average in 2010).

³ NCRE Law 2008. Available at <www.cne.cl/cnewww/opencms/08_Normativas/02_energias/renovables.html>.

⁴ Unidad de foment is an index-linked Chilean unit of account. In 2010, the average UF was UF 1 = CLP 21,171.80.

⁵ Chilean National Energy Commission, Factsheet. Available at <www.cne.cl/cnewww/opencms/05_Public_Estudios/publicaciones.html>.

Chapter 4: Colombia

4.1 Government Targets

Colombia ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. Colombia did not set any targets via the Copenhagen Accord either, but stated that it would design policies that would contribute to stabilising global emissions. Through the utilisation of the Clean Development Mechanism (CDM), the government has introduced a national target of reducing emissions levels by 30 per cent from a projected 'business-as-usual' emission scenario for 2012. The government also has a target for at least 77 per cent of total generating capacity to be based on renewable energy sources by 2020. In 2010, 68 per cent of total generating capacity was derived from renewable energy sources.¹

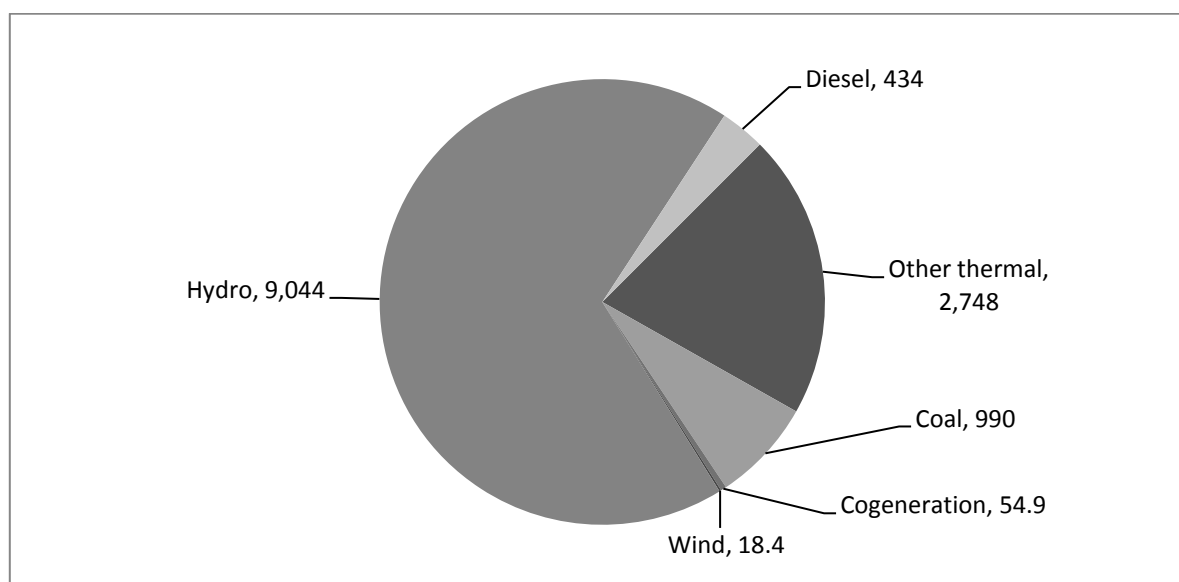
Table 4.1: Colombian government commitments

GHG emissions	A government target of reducing GHG emissions levels by 30 per cent from BAU projections of GHG emission levels in 2012.
Renewable energy (RE)	No target set.
Renewable electricity	A government target of 77 per cent of total generating capacity to be based on renewable energy sources by 2020.

Source: Foreign Ministry of Republic of Colombia. Letter to the UNFCCC, January 2010: Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/colombiacphaccord_app2.pdf>.

4.2 Electricity Generation Mix

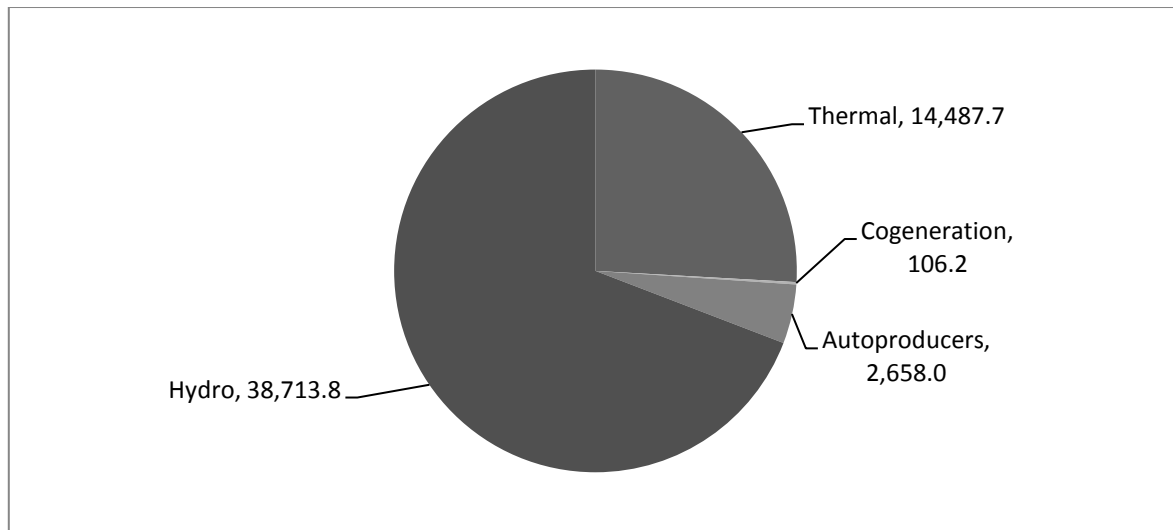
Figure 4.1: Total installed generating capacity in Colombia in 2010: 13,289 MW



Source: XM, Descripción del Sistema Eléctrico Colombiano. Available at <www.xm.com.co/Pages/DescripciondelSistemaElectricoColombiano.aspx/>.

¹ Foreign Ministry of Republic of Colombia. Letter to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/colombiacphaccord_app2.pdf>.

Figure 4.2: Electricity generation mix in Colombia in 2010: Total 55,965.7 GWh



Source: XM, Descripción del Sistema Eléctrico Colombiano. Available at www.xm.com.co/Pages/DescripciondelSistemaElectricoColombiano.aspx.

4.3 Operating Support Incentives

As of August 2011, there were no operating incentives for renewable power in Colombia.

4.4 Investment Support Incentives

In 2002, the government introduced a law that exempted electricity producers using wind or biomass from paying tax on their production as long as the project received Certified Emissions Reductions (CERs) credits under the CDM. Also, any equipment imported into the country to be used for CDM projects is exempt from VAT charges.²

As of August 2011, there are government funds directed at promoting renewable energy deployment. However, a new government programme, PROURE (The Rational and Efficient Use of Non-Conventional Sources of Energy Plan for 2010-2015), plans to start providing incentives to pilot projects in 2012. As of August 2011, there were no details available on the amount of funding or the types of projects that will receive funding.³

In June 2011, the Inter-American Development Bank (IDB) approved a USD 90 million programme to support lending to energy efficiency and renewable energy projects in Colombia, in association with Bancolombia, the largest bank in Colombia, and the World Bank's International Finance Corporation and Clean Technology Fund. The IDB has also awarded Colombia a USD 2.7 million grant to finance feasibility studies into geothermal power in the country.⁴ The Ministry of the Environment and Sustainable Development (*Ministerio de Ambiente, Vivienda y Desarrollo Territorial*) is the designated national authority (DNA) for CDM projects.⁵

² Law 788 of 2002. Article 18 and 95. Available at www.secretariassenado.gov.co/senado/basedoc/ley/2002/ley_0788_2002.html.

³ Ministry of Mines and Energy, PROURE. Available at www.si3ea.gov.co/Portals/2/plan.pdf.

⁴ IDB, Colombia. Available at www.iadb.org/en/countries/colombia/colombia-and-the-idb,1026.html.

⁵ For more information see the website at www.minambiente.gov.co/portal/default.aspx.

Chapter 5: Costa Rica

5.1 Government Targets

Costa Rica ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. During the creation of the Copenhagen Accord, Costa Rica did not introduce any binding targets but has indicated that it will pursue policies to reduce domestic emissions growth and work towards achieving carbon neutrality. Increasing the use of biofuels and renewable power are the two primary ways the government expects to reduce emissions growth.¹

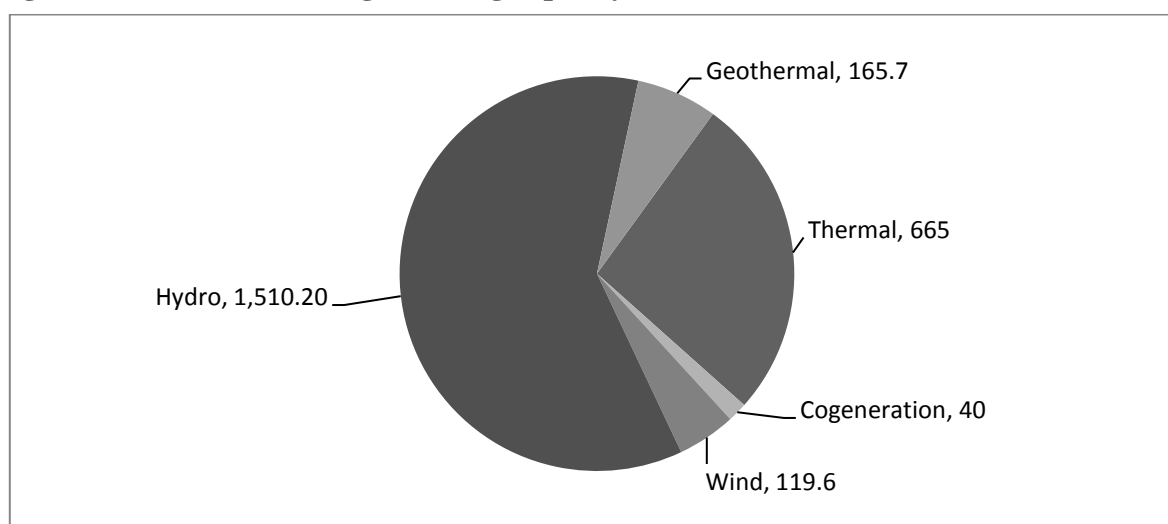
Table 5.1: Costa Rican government commitments

GHG emissions	A long-term goal to become carbon neutral.
Renewable energy (RE)	No target set.
Renewable electricity	From IDB: Increase share of renewable power to 95.6 per cent of total generation by 2014. Non-hydropower renewable power generation to comprise 17.5 per cent of total generation by 2014.

Source: Communication from the Embassy of Costa Rica to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/costaricacphaccord_app2_2.pdf>; Inter-American Development Bank. Documento of the project with Costa Rica. Available at: <idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=36308489>.

5.2 Electricity Generation Mix

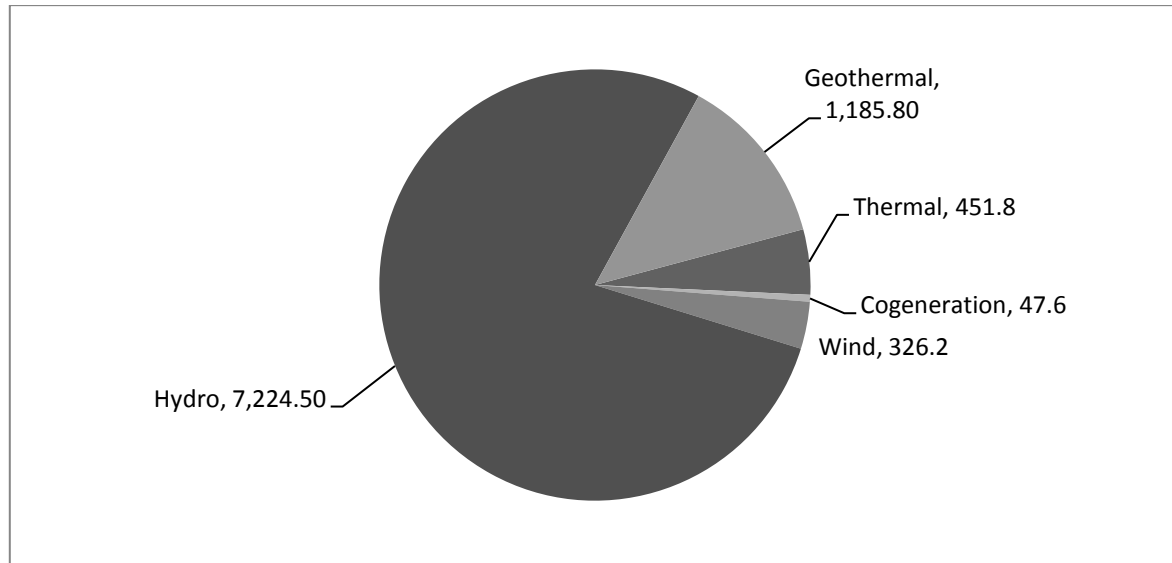
Figure 5.1: Total installed generating capacity in Costa Rica in 2009: 2,500.5MW



Source: UN Economic Commission for Latin America and the Caribbean. Electricity Statistics. Available at <www.ceaconline.org/pdf/Estadisticas_Electricas_CA_2009.pdf>.

¹ Communication from the Embassy of Costa Rica to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/costaricacphaccord_app2_2.pdf>.

Figure 5.2: Electricity generation mix in Costa Rica in 2009: Total 9,235.9 GWh



Source: United Nations Economic Commission for Latin America and the Caribbean. Electricity Statistics. Available at <www.ceaconline.org/pdf/Estadisticas_Electricas_CA_2009.pdf>.

As seen in Figures 5.2 and 5.3, Chile is rich in hydropower reserves. The Inter-American Development Bank (IDB) has a target to add 250 MW of additional renewable generation by 2014 to increase the share of renewable electricity in total generation mix from 94.6 per cent of total generation in 2009 to 95.6 per cent. Included in this goal is a sub-target of non-hydropower renewable power generation to comprise 17.5 per cent of total generation in 2014, compared to 16.2 per cent in 2009.² The IDB plans to invest USD 1.06 billion into transportation, energy, education and health between 2011 and 2014. It is not clear how much of the programme's funds will be invested in renewable energy.³

5.3 Operating Support Incentives

The sole purchaser of electricity in Costa Rica is the state-owned Costa Rican Institute of Electricity (*Instituto Costarricense de Electricidad*, ICE). Independent power producers (IPPs) can enter into power purchase agreements (PPAs) with ICE, generally for a duration of 15 years. Each PPA is negotiated separately and there are no fixed tariff rates for renewable electricity.⁴ However, the maximum tariff rate that a generator can receive from the ICE is capped at 80 USD/MWh (60.25 EUR/MWh⁵). In practice, most IPPs receive between 30 and 80 USD/MWh (22.59-60.25 EUR/MWh).⁶

² Inter-American Development Bank. Documento of the project with Costa Rica. Available at <idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=36308489>.

³ Inter-American Development Bank. Documento of the project with Costa Rica. Available at <idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=36308489>.

⁴ Public Service Regulating Authority, ARESEP. Tariff methodology. Available at <www.aresp.go.cr/docs/POLITICA%20Y%20METODOLOGIA%20TARIFARIA.pdf>.

⁵ The USD-EUR conversion rate used is EUR 1 = USD 1.3278 (the average in 2010).

⁶ ARESEP, Statistics. Available at <www.aresp.go.cr/cgi-bin/index.fwx?area=09&cmd=servicios&id=9707&sub=1523>.

5.4 Investment Support Incentives

The Central American Bank for Economic Integration invested USD 9.9 million into the development of the 15.3 MW Valle Central Wind Energy Project, implemented by the state-owned national distribution systems operator, *Compañía Nacional de Fuerza y Luz*.⁷

Renewable energy projects in Costa Rica are also able to benefit from receiving Certified Emission Reductions credits (CERs) through the Clean Development Mechanism (CDM). Hydro, wind, and biomass power projects are currently receiving credits. The Ministry of the Environment and Energy (*Ministerio del Ambiente y Energia*) is the designated national authority (DNA) for CDM projects.⁸

⁷ Central American Bank for Economic Integration. 2009 Annual Report. Available at <www.bcie.org/english/publicaciones/memorias/2009/BCIE_MEMORIA_2009_INGLES.pdf>.

⁸ Information from the UNFCCC. Available at <www.unfccc.int>. The ministry's website is available at <www.minae.go.cr/>.

Chapter 6: Ecuador

6.1 Government Targets

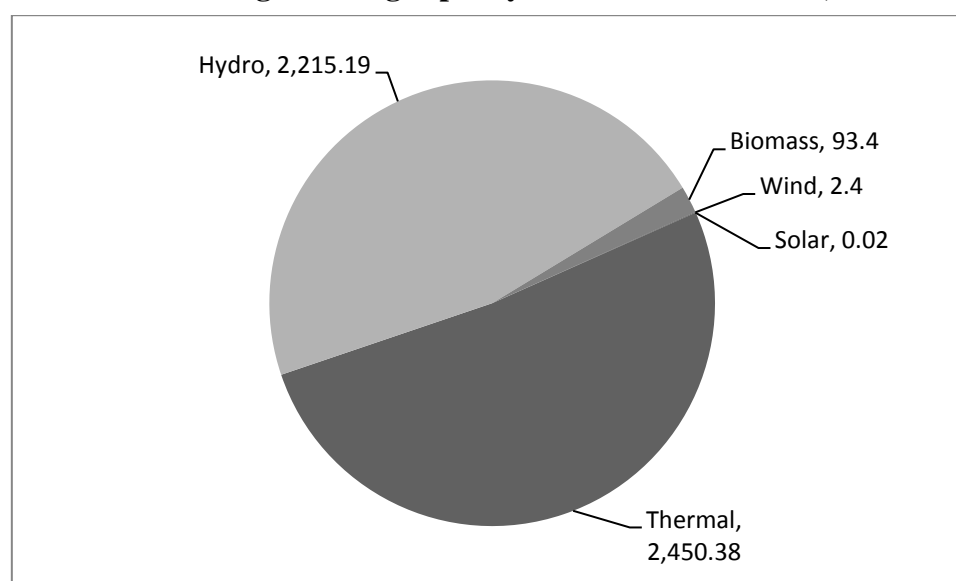
Ecuador ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. Ecuador has not ratified or approved the Copenhagen Accord.¹ The government has agreed not to develop the Ishpingo-Tambococha-Tiputini oil field in the Yasuni National Park in exchange for USD 3.6 billion from international donors in a programme administered by the UNDP.² The country currently has no renewable energy or renewable electricity targets.

Table 6.1: Ecuadorian government commitments

GHG emissions	No target set.
Renewable energy (RE)	No target set.
Renewable electricity	No target set.

6.2 Electricity Generation Mix

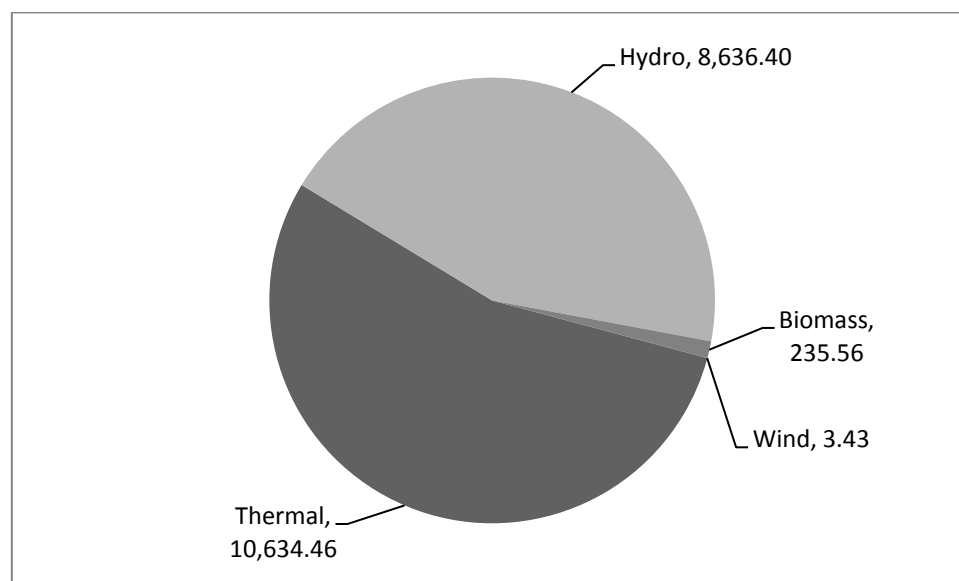
Figure 6.1: Total installed generating capacity in Ecuador in 2010: 4,761.39 MW



Source: National Electricity Council (CONELEC), Electricity Statistics. Available at www.conelec.gob.ec/indicadores/.

¹ Press Release from the Cultural and Heritage Ministry. Available at ministeriopatrimonio.ezn.ec/es/inicio/noticias/2010/abril-2010/842-ecuador-no-suscribira-acuerdo-de-copenhague.

² Latin American General Secretariat. La iniciativa Yasuní ITT: ambicioso plan de Ecuador contra el cambio climático, September 2010. Available at segib.org/news/2010/09/la-iniciativa-yasuni-itt-ambicioso-plan-de-ecuador-contra-el-cambio-climatico/.

Figure 6.2: Electricity generation mix in Ecuador in 2010: Total 20,382.76 GWh

Source: National Electricity Council (CONELEC), Electricity Statistics. Available at www.conelec.gob.ec/indicadores/.

6.3 Operating Support Incentives

In April 2011, the state-owned power monopoly CONELEC (*El Consejo Nacional de Electricidad*) approved a fixed premium system for renewable power generation that will start on 1 January 2013. Under the premium system, wind, solar, biomass, biogas, geothermal and small hydro (up to 50 MW) power producers will be able to receive fixed premiums on top of the wholesale market price for a duration of 15 years. The premium rates will be higher on the Galapagos Islands than on mainland Ecuador and are expressed in USD in the regulation (see Table 6.2).³ In 2009, the last year for which prices are available, the average wholesale price of electricity was 45.8 USD/MWh (34.49 EUR/MWh).⁴

Table 6.2: Fixed premium rates for renewable power in Ecuador from 2013

Technology		Mainland Ecuador		Galapagos Islands	
		USD/MWh	EUR/MWh ^a	USD/MWh	EUR/MWh ^a
Wind		91.3	68.76	100.4	75.61
Solar PV		400.3	301.48	440.3	331.60
Biomass and biogas	< 5 MW	110.5	83.22	121.6	91.58
	≥ 5 MW	96.0	72.30	105.6	79.53
Geothermal		132.1	99.49	145.3	109.43
Hydro	≤ 10 MW	71.7	54.00	71.7	54.00
	>10 ≤ 30 MW	68.8	51.82	68.8	51.82
	>30 ≤ 50 MW	62.1	46.77	62.1	46.77

Note: ^aThe USD-EUR conversion rate used is EUR 1 = USD 1.3278 (the average in 2010).

Source: Regulation 004/11. Point 6. Available at

http://www.conelec.gob.ec/normativa/REGULACION%20004_1_reforma%2012_01_12.pdf.

³ Regulation 004/11. Point 6. Available at www.conelec.gob.ec/contenido.php?cd=10017.

⁴ CONELEC, Precios Medios en el Mercado Eléctrico Mayorista. Available at www.conelec.gob.ec/contenido.php?cd=1078&l=1.

6.4 Investment Support Incentives

The government has a Rural and Marginal Urban Electrification Fund (FERUM) to connect off-grid communities. Renewable power, such as solar, biomass or small hydro, is given priority allocation in the budget.⁵ In 2011, the budget was USD 127 million.⁶ Any fuel used in electricity generation is exempt from VAT.⁷

There are several international institutions that provide grants and loans. In 2010, the Inter American Development Bank (IDB) provided a grant of USD 47 million to assist the government in developing policies to increase electrification.⁸

Renewable energy projects in Ecuador are also able to benefit from receiving Certified Emission Reductions credits (CERs) through the Clean Development Mechanism (CDM). The Ministry of the Environment (*Ministerio del Ambiente*) is the designated national authority (DNA) for CDM projects.⁹

⁵ Electric Sector Law, “Ley de Regimen del Sector Electrico”. Available at <www.derecho-ambiental.org/Derecho/Legislacion/Ley-Regimen-Sector-Elctrico.html>.

⁶ Inter American Development Bank, Ecuador document. Available at <idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=35818674>.

⁷ Regulation 004/09. Point 19. Available at <www.conelec.gob.ec/normativa/004-09%20COMPLEMENTARIA%202.pdf>.

⁸ Inter American Development Bank, Ecuador document. Available at <idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=35818674>.

⁹ Ministry of the Environment, Mitigación. Available at <www.ambiente.gov.ec/>.

Chapter 7: Honduras

7.1 Government Targets

Honduras ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. Through the Copenhagen Accord, the government committed to implement climate change adaptation and mitigation measures when additional financial resources are made available, and to work towards a long-term goal of becoming carbon neutral.¹ The government has introduced a target for 48.6 per cent of total generating capacity to be derived from clean energy sources by 2015, compared to 38 per cent in 2008.²

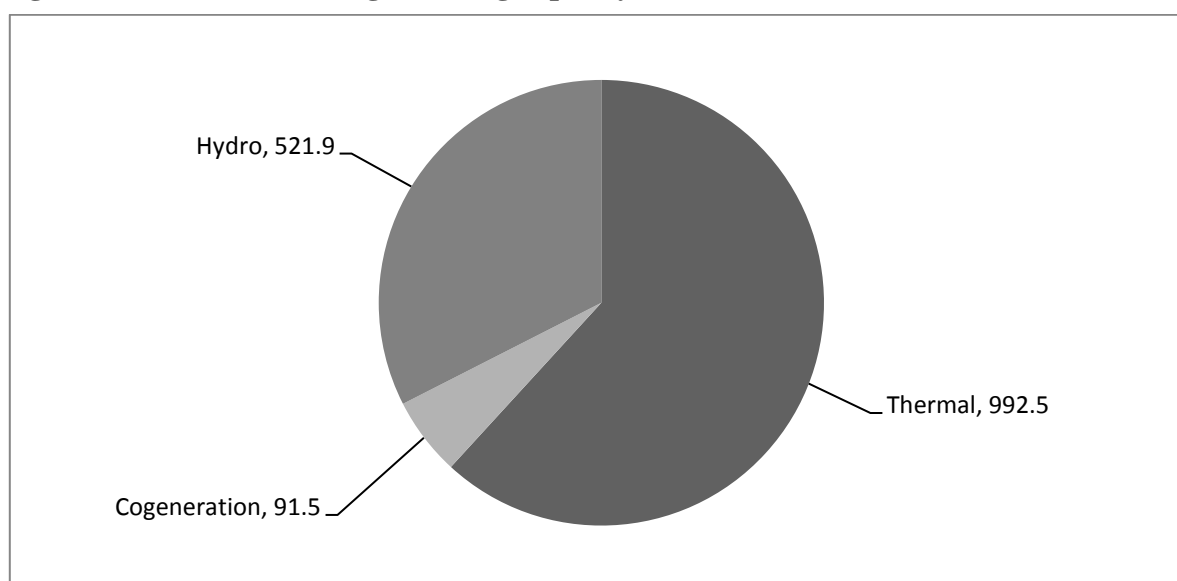
Table 7.1: Honduran government commitments

GHG emissions	A long-term goal for carbon neutrality.
Renewable energy (RE)	No target set
Renewable electricity	A government target of 48.6 per cent of total generating capacity to be based on clean energy sources by 2015

Source: Communication from the Embassy of Honduras to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/hondurascphaccord.pdf>; Generation Expansion Programme 2011-2015. Available at <www.ceaconline.org/pdf/INFORME%20GTPIR_2011_2025.pdf>.

7.2 Electricity Generation Mix

Figure 7.1: Total installed generating capacity in Honduras in 2009: 1,605.9 MW

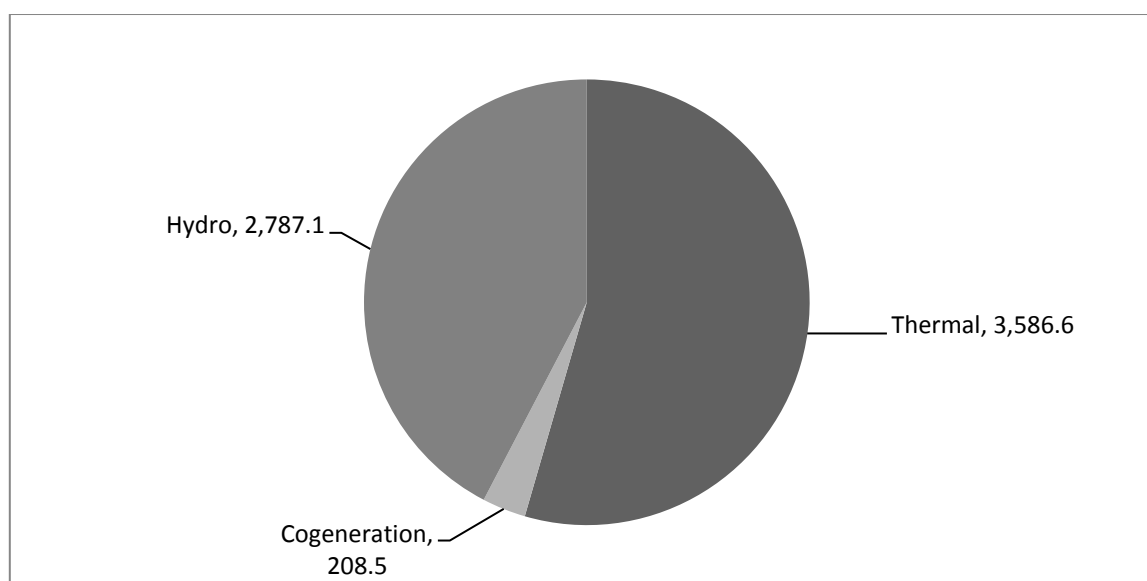


Source: National Electricity Company (Empresa Nacional de Energia Electrica), Electricity Statistics. Available at <www.enee.hn/Estadisticas2009/estadisticasPDF_2009/CUA1_2009%20.pdf>.

¹ Communication from the Embassy of Honduras to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/hondurascphaccord.pdf>.

² Generation Expansion Programme 2011-2015. Available at <www.ceaconline.org/pdf/INFORME%20GTPIR_2011_2025.pdf>.

Figure 7.2: Electricity generation mix in Honduras in 2009: Total 6,582.2 GWh



Source: National Electricity Company (Empresa Nacional de Energía Eléctrica), Electricity Statistics. Available at <www.enee.hn/Estadisticas2009/estadisticasPDF_2009/CUA1_2009%20.pdf>.

7.3 Operating Support Incentives

Under Law 70-2007, the state-owned National Electricity Company (*Empresa Nacional de Energía Eléctrica*, ENEE) is obligated to enter into 20-year power purchasing agreements (PPAs) at set tariffs with renewable and non-renewable power generators with capacities under 50 MW.³ The tariffs are set annually by the government and renewable power generators receive a tariff rate 10 per cent higher than conventional power generators. According to the Honduran Association of Small Power Generation (AHPPER), renewable power developers received an average of 105 USD/MWh (79.08 EUR/MWh) in 2009, the latest year for which figures are available.⁴

7.4 Investment Support Incentives

Renewable energy equipment and the sale of renewable power is exempt from VAT charges.⁵

In May 2011, The Inter-American Development Bank (IDB) approved a USD 20 million loan to Banco Financiera Comercial Hondureña S.A. (a subsidiary of Grupo Financiero Ficohsa) to support its loans for small renewable energy projects. Under the agreement, the IDB will assist Banco Ficohsa in selecting appropriate projects for financing.⁶ Renewable energy projects in Honduras are also able to benefit from receiving Certified Emission Reductions credits (CERs) through the CDM. The National Resources Environment Secretary (*Secretaría de Recursos Naturales y Ambiente*) is the designated national authority for CDM projects.⁷

³ Decree 70-2007. Renewable Energy Law. Available at <www.ahpper.org/Documentosdesc/DECRETO_70-2007.pdf>.

⁴ AHPPER, Analysis of Honduran Renewable Energy Market for the Central American Bank for Project Integration. Available at <www.ahpper.org/Documentos/estudio.pdf>.

⁵ Decree 70-2007. Renewable Energy Law. Available at <www.ahpper.org/Documentosdesc/DECRETO_70-2007.pdf>.

⁶ Press release of the Honduran Embassy. Available at <www.embajadahondurasrd.org/joomla/index.php/nota-de-prensa/notas-de-prensa/154-bid-otorga-a-honduras-20-millones-de-dolares-.html>.

⁷ For more information see the website at <www.serna.gob.hn>.

Chapter 8: Mexico

8.1 Government Targets

Mexico ratified the Kyoto Protocol in 2000, but as a non-Annex I country has no GHG emissions targets under the treaty. Through the Copenhagen Accord, the government set a target to reduce GHG emission levels by 30 per cent from a projected ‘business-as-usual’ scenario for 2020.¹ The government also has a goal for 35 per cent of total generating capacity to be based on clean energy sources (including nuclear) by 2024.² In 2010, 26 per cent of total generating capacity was based on clean energy sources.

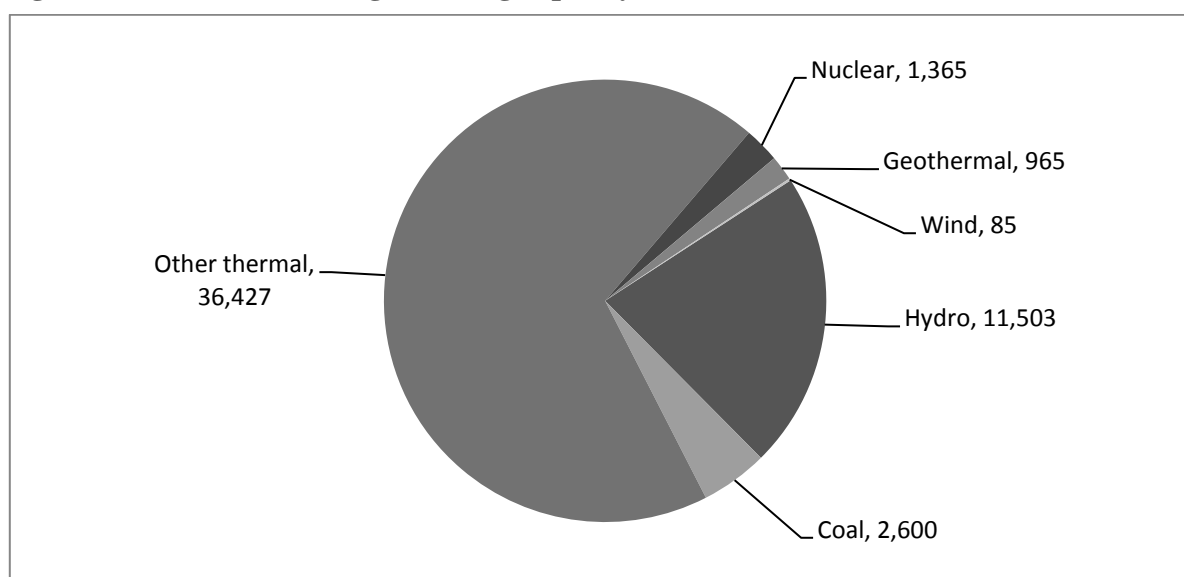
Table 8.1: Mexican government commitments

GHG emissions	A Copenhagen Accord target of a 30 per cent reduction from BAU projections in 2020, with a 50 per cent reduction from BAU projections in 2050.
Renewable energy (RE)	No target set.
Renewable electricity	A target of 35 per cent of total generating capacity to be based on clean energy sources by 2024.

Source: Ministry of Energy, National Energy Strategy 2024, February 2010. Available at <www.sener.gob.mx/webSener/res/0/EstrategiaNacionaldeEnergia.pdf>; Mexico’s Letter to the UNFCCC, January 2010. Available at <unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php>.

8.2 Electricity Generation Mix

Figure 8.1: Total installed generating capacity in Mexico in 2009 (MW): 52,945 MW

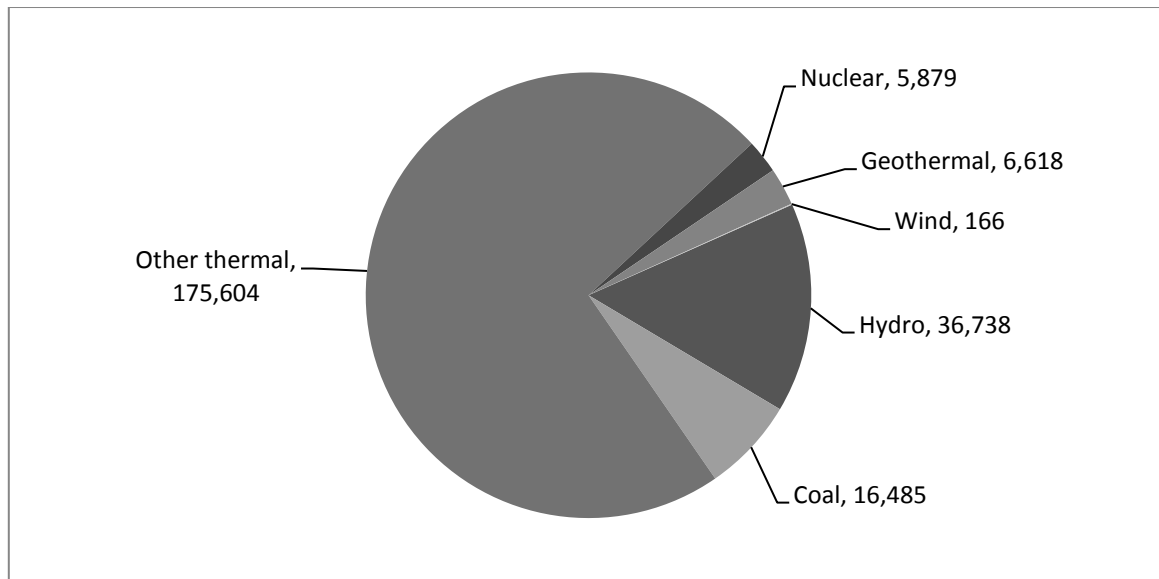


Source: Ministry of Energy, SENER, Electricity Statistics. Available at <www.sener.gob.mx/>.

¹ Ministry of the Environment, Programa Especial de Cambio Climático 2009 – 2012, October 2009. Available at <www.semarnat.gob.mx/temas/cambioclimatico/Paginas/pecc.aspx>.

² Ministry of Energy, National Energy Strategy 2024, February 2010. Available at <www.sener.gob.mx/webSener/res/0/EstrategiaNacionaldeEnergia.pdf>.

Figure 8.2: Electricity generation mix in Mexico in 2010 (GWh): Total 241,491 GWh



Source: Ministry of Energy, SENER, Electricity Statistics. Available at www.sener.gob.mx/portal/Default.aspx?id=1430.

8.3 Operating Support Incentives

As of June 2011, there was no feed-in tariff system for renewable power in Mexico. Under the 2008 Law on the Use of Renewable Energy and the Financing of the Energy Transition (*Ley para el Aprovechamiento de las Energías Renovables y el Financiamiento de la Transición Energética*), the federal government and the individual states are empowered to hold public tenders for renewable power development.³

In 2009, the state electricity corporation, Comisión Federal de Electricidad (CFE), launched two tenders for large wind power projects.⁴ The successful developers will receive a fixed premium for five years, paid for by a USD 25 million grant from the Global Environment Facility (GEF). One project, the 101.5-MW La Venta III windfarm, will receive a five-year premium of 11 USD/MWh (8.28 EUR/MWh⁵) above the tender purchase price of electricity agreed between the developers and the CFE. However, the price at which the CFE will purchase power from the wind farm is not known.⁶ The Comisión Reguladora de Energía is the energy regulator.⁷

³ Ley para el Aprovechamiento de las Energías Renovables y el Financiamiento de la Transición Energética, September 2008. Available at www.diputados.gob.mx/LeyesBiblio/pdf/LAERFTE.pdf.

⁴ Ministry of Energy, Renewable Energies for the Sustainable Development of Mexico, 2009. Available at www.sener.gob.mx/webSener/res/0/RE_for_Sustainable_Development_Mx_2009.pdf.

⁵ The USD-EUR conversion rate used is EUR 1 = USD 1.3278 (the average in 2010).

⁶ World Bank, Project Appraisal. Available at www.sener.gob.mx/webSener/res/PE_y_DT/pe/Mexico_GEF_LSRDP_PAD_7_June_20061.pdf.

⁷ See website at www.cre.gob.mx.

8.4 Investment Support Incentives

In 2009, the government created a Fund for Energy Transition and the Sustainable Use of Energy. The Fund, which is expected to start operating in late 2011, will provide loans or credit guarantees for projects that comply with the government's renewable energy and energy efficiency policy. Initially, USD 60 million will be allocated.⁸ In addition, accelerated depreciation (100 per cent in the first year) is offered for all investments in renewable energy equipment.⁹

Loans are available for renewable energy projects from international financial institutions. The Inter-American Development Bank (IDB) has provided USD 101 million in loans for wind power development and has helped build partnerships between Mexico and foreign companies in the sector.¹⁰ In 2009, the World Bank authorised a USD 1.05 billion 17-year Green Growth Development Loan to Mexico. The loan will be used by the Mexican government to finance low-carbon transportation and energy projects as well as energy efficiency improvements.¹¹ Mexico also received a USD 49.3 million loan from the Global Environment Facility (GEF) in May 2010 to construct a hybrid concentrated solar-thermal and natural gas-fired power plant, the Agua Prieta II thermo-solar hybrid power plant. Tenders are expected to be finalised in late 2011 and the plant should be completed in 2012.¹²

Renewable energy projects in Mexico are also able to benefit from receiving Certified Emission Reduction credits (CERs) through the Clean Development Mechanism (CDM).¹³ The Inter-ministerial Commission on Climate Change (*Comisión Intersecretarial de Cambio Climático*) is the designated national authority (DNA) for CDM projects.¹⁴

⁸ World Bank, Framework for a Green Growth Development Loan, 16 September 2009. Available at <www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2009/10/16/000350881_20091016091956/Rendered/PDF/494910PGD0REVI101Official0Use0only1.pdf>.

⁹ Juan Mata, Mexico Large-Scale Renewable Energy Development Project, 2006. Available at <siteresources.worldbank.org/EXTENERGY/Resources/336805-1137702984816/2135734-1142019089614/JuanMata.ppt>.

¹⁰ IDB, IDB to Finance Historic Expansion of Wind Power in Mexico, December 2009. Available at <www.iadb.org/news-releases/2009-12/english/idb-to-finance-historic-expansion-of-wind-power-in-mexico--6118.html>.

¹¹ World Bank, Framework for a Green Growth Development Loan, 16 September 2009. Available at <www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2009/10/16/000350881_20091016091956/Rendered/PDF/494910PGD0REVI101Official0Use0only1.pdf>.

¹² World Bank, Hybrid Solar Thermal Plant. Available at <web.worldbank.org/external/projects/main?Projectid=P066426>.

¹³ See the UNFCCC website at <unfccc.int>.

¹⁴ For more information see the website at <www.semarnat.gob.mx/temas/cambioclimatico/Paginas/cicc.aspx>

Chapter 9: Nicaragua

9.1 Government Targets

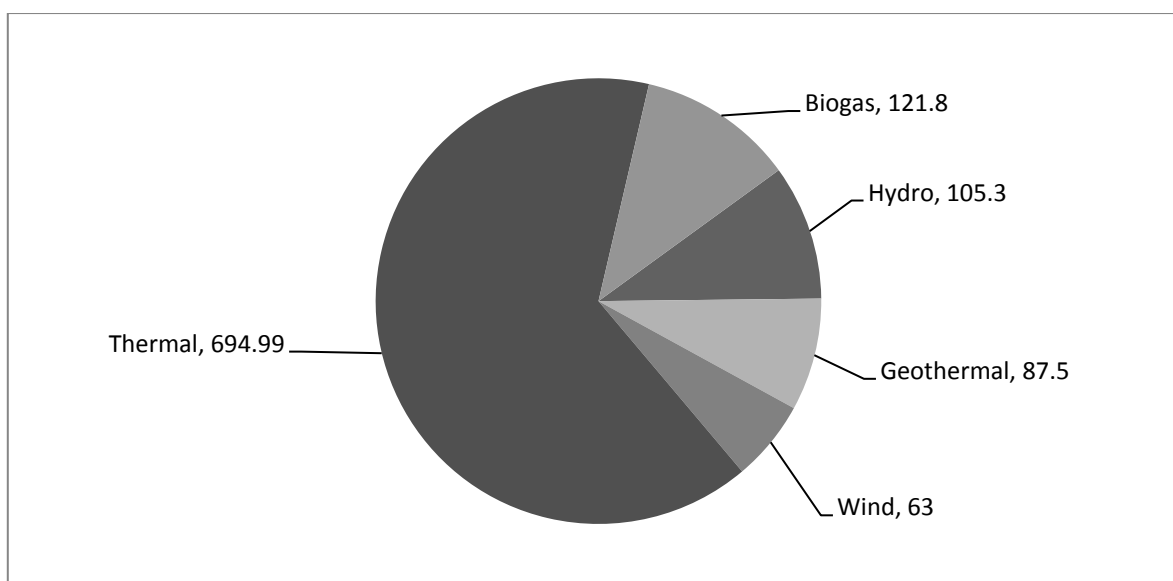
Nicaragua ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. The government has not ratified the Copenhagen Accord. There is a government target of 60 per cent of total generation capacity to be based on clean energy sources by 2015, increasing to 90 per cent by 2017, compared to 24 per cent in 2010.¹

Table 9.1: Nicaraguan government commitments

GHG emissions	No target set.
Renewable energy (RE)	No target set.
Renewable electricity	A government target of 60 per cent of total generating capacity to be based on clean energy sources by 2015, increasing to 90 per cent by 2017.

9.2 Electricity Generation Mix

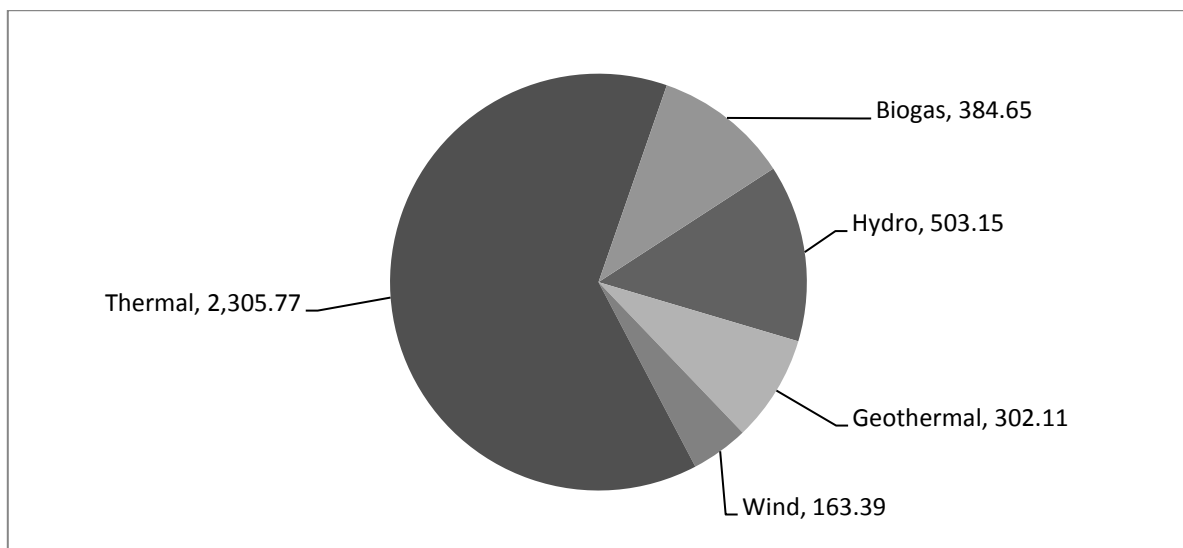
Figure 9.1: Total installed generating capacity in Nicaragua in 2010 (MW): 1,072.59 MW



Source: Nicaraguan Energy Institute, Electricity Statistics. Available at www.ine.gob.ni/DGE/estadisticas/serieHistorica/Capacidad_Instalada.pdf.

¹ "Nicaragua plans to generate 90% of energy from renewable sources by 2017". Available at www.nicanoticias.com/2011/06/01/nicaragua-proyecta-generar-el-90-de-energia-con-fuentes-renovables-en-2017/.

Figure 9.2: Electricity generation mix in Nicaragua in 2010 (GWh): Total 3,659.07 GW



Source: Nicaraguan Energy Institute, Electricity Statistics. Available at www.ine.gob.ni/DGE/estadisticas/serieHistorica/Capacidad_Instalada.pdf.

9.3 Operating Support Incentives

There were no available operating incentives for renewable power in Nicaragua as of August 2011.

9.4 Investment Support Incentives

In 2005, the government introduced the Law for the Promotion of Electricity Generation from Renewable Sources, which exempts developers from paying VAT on pre-investment work, construction, equipment, materials and supplies for renewable energy project. Developers are also exempt from paying all taxes on the sale of their production and the sale of carbon credits for the first seven years. Developers of renewable energy projects also have their property taxes reduced by 75 per cent for the first three years, by 50 percent for the following five years, and by 25 per cent for an additional 2 years.²

In July 2011, the Inter-American Development Bank (IDB) approved a USD 22 million for Nicaragua's National Sustainable Electrification and Renewable Energy Programme (*Programa Nacional de Electrificación Sostenible y Energía Renovable*, PNESER). The programme will support the construction of 214 kilometres of new transmission lines that will enable further development of wind and geothermal power as well as provide funding to renewable energy projects. Additional funding for the PNESER from other international donors is under consideration.³ The IDB has also proposed a USD 4.5 million programme to develop the domestic biogas sector for low-income rural households.⁴

² Law 532, "Promotion of Electricity Generation from Renewable Sources". Available at www.tramitesnicaragua.org/Media/Editor_Repo/file/ley%20532.pdf.

³ IDB, IDB approves USD 22 million loan to improve electricity service in Nicaragua, 27 July 2011. Available at www.iadb.org/en/news/news-releases/2011-07-27/electricity-service-in-nicaragua,9478.html.

⁴ IDB Project Information. Available at www.iadb.org/en/projects/project,1303.html?id=NI-M1025.

Renewable energy projects in Nicaragua are able to benefit from receiving Certified Emission Reduction credits (CERs) through the Clean Development Mechanism (CDM). The Ministry of the Environment and Natural Resources (*Ministerio del Ambiente y los Recursos Naturales*) is the designated national authority for CDM projects.⁵

⁵ For more information see the website at <www.marena.gob.ni>

Chapter 10: Peru

10.1 Government Targets

Peru ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. The government has not set any target under the Copenhagen Accord, but did indicate that it would design and implement measures to reduce emissions, and to reduce deforestation rates to zero by 2012. The government also has a target of 33 per cent of total generating capacity to be based on clean energy sources by 2020, compared to 21 per cent in 2010.¹

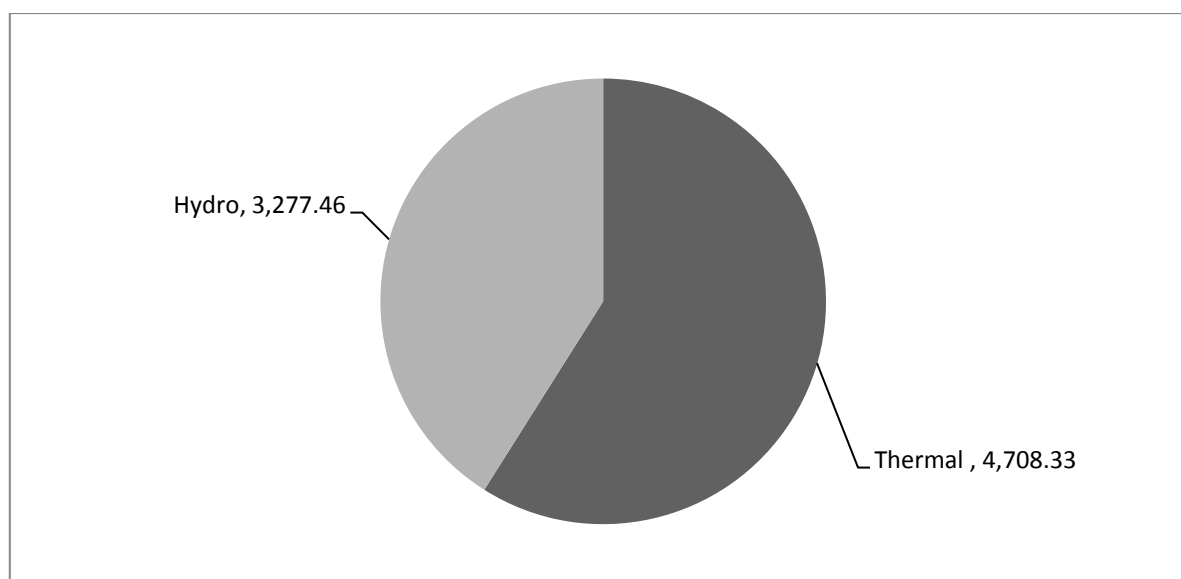
Table 10.1: Peruvian government commitments

GHG emissions	A Copenhagen Accord commitment to design and implement measures to reduce emissions.
Renewable energy (RE)	No target set.
Renewable electricity	A government target for 33 per cent of total generating capacity to be based on clean energy sources by 2020.

Source: Embassy of Peru in Germany, Letter to the UNFCCC, January 2010: Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/colombiacphaccord_app2.pdf>.

10.2 Electricity Generation Mix

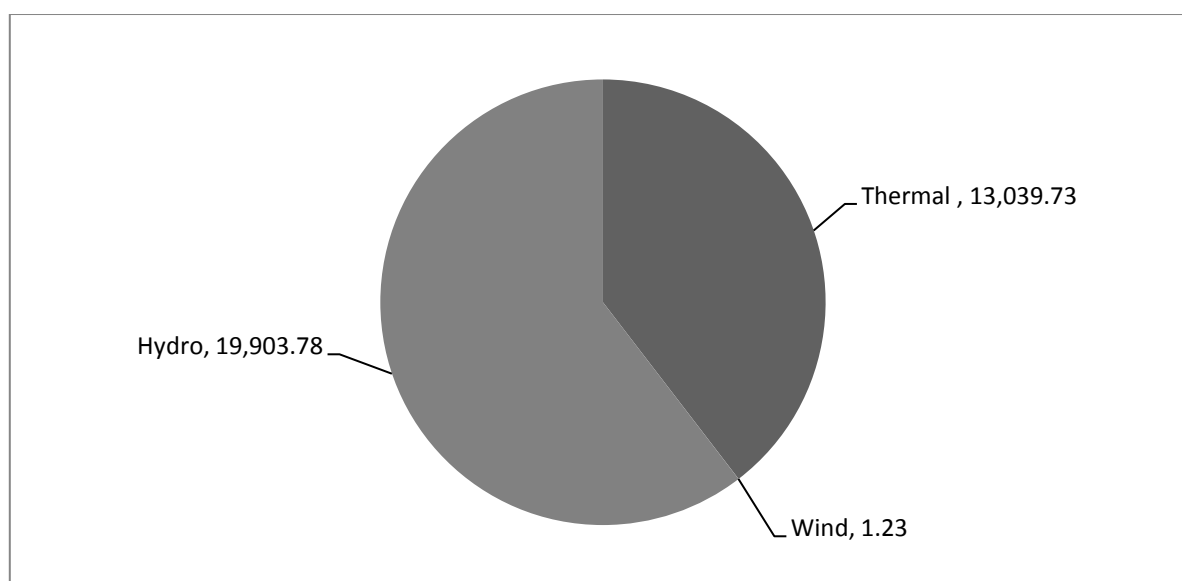
Figure 10.1: Total installed generating capacity in Peru in 2009 (MW): 7,986.5 MW



Note: Thermal includes gas, coal, diesel, waste and biomass.

Source: Ministry of Energy and Mines, Electricity Statistics. Available at <www.minem.gob.pe>.

¹ Embassy of Peru in Germany. Letter to the UNFCCC, January 2010. Available at <unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/perucphaccord_app2.pdf>.

Figure 10.2: Electricity generation mix in Peru in 2009 (GWh): Total 32,944.74 GWh

Note: Thermal includes gas, coal, diesel, waste and biomass.

Source: Ministry of Energy and Mines, Electricity Statistics. Available at <www.minem.gob.pe>.

10.3 Operating Support Incentives

In 2008, the government introduced the Law for Investment Promotion in Electricity Generation and Renewable Energies (Law 1.002), which included incentives to increase the deployment of renewable power from biomass, wind, solar, geothermal, tidal and small hydro (< 20 MW). Under the law, the government holds regular public auctions for renewable power with the contract winners receiving a set rate for all generation for 15 to 20 years.² The first auction was held in 2009 and was for 1,314 GWh of annual renewable power generation, excluding hydropower under 20 MW. There was an additional tender for small hydropower that awarded fixed-price contracts to 500 MW worth of installed capacity.³ Table 10.2 shows the tariff rates awarded to developers in the public tender held in 2009. The tariff rates awarded to developers are expressed in USD in Peru.

Table 10.2: Tariff rates awarded to renewable power projects in Peru in the 2009 public tender

Technology	Tariff rates		Total generation supported (GWh a year)
	USD/MWh	EUR/MWh ^a	
Biomass	120	90.52	813
Wind	110	82.98	320
Solar	269	202.91	181
Hydro (< 20 MW)	74	55.82	N/A

Note: ^aThe USD-EUR conversion rate used is EUR 1 = USD 1.3278 (the average in 2010).

Source: Ministry of Energy and Mines, Electricity Statistics. Available at <www.minem.gob.pe>.

² Legislative Decree No. 1002, Article 7. Available at <www2.osinerg.gob.pe/.../D.%20Leg.%201002-CONCORDADO.doc>.

³ Wind Power in Peru. Regulatory Aspects: Ministry of Energy and Mines. Available at <www.tech4cdm.com/userfiles/18_Aspectos%20Normativos%20de%20la%20Energia%20Eolica%20en%20Peru%20Ricardo%20Vasquez%20DGE.pdf>.

The Energy and Mining Investment Supervisory Body (*Organismo Supervisor de Inversión en Energía y Minería*, OSINERGMIN, part of the Ministry of Energy and Mines) has announced that another public tender for an additional 1,981 GWh, 681 GWh of which will be dedicated for small hydropower, of annual generation of renewable power will be held in late 2011.⁴

10.4 Investment Support Incentives

Renewable electricity is exempt from sales tax,⁵ and investments in renewable energy projects are eligible to receive accelerated depreciation rates of up to 20 per cent a year.⁶

The government is also investing USD 38.4 million in rural electrification projects using small hydro and solar power.⁷

In July 2011, the Inter-American Development Bank (IDB) approved a USD 25 million loan to Peru to promote renewable energy and energy efficiency, the third of such loans. The first two loans, approved in 2009 and 2010, were to promote renewable energy, to modernise the energy system, and to create a national plan for biomass and biofuel production.⁸

Renewable energy projects in Peru are also able to receive Certified Emission Reduction credits (CERs) via the Clean Development Mechanism (CDM). The Ministry of the Environment (*Ministerio del Ambiente*) is the designated national authority (DNA) for CDM projects.⁹

⁴ Information available at OSINERGMIN website

<www2.osinerg.gob.pe/EnergiasRenovables/contenido/SubastaEnCurso.html>.

⁵ Electricity General Management, Ministry of Energy and Mines. News Letter DGE No.4, April 2007.

Available at <www.minem.gob.pe/minem/archivos/file/Electricidad/promocion%20electrica/Informativo4-07.pdf>.

⁶ Wind Power in Peru. Regulatory Aspects. Ministry of Energy and mines. Available at

<www.tech4cdm.com/userfiles/18_Aspectos%20Normativos%20de%20la%20Energia%20Eolica%20en%20Peru%20Ricardo%20Vasquez%20DGE.pdf>.

⁷ Ministry of Mines and Energy, National Plan for Rural Electrification with Renewable Energy. Available at <www.dremsm.gob.pe/archivos/electricidad/energia%20renovable.pdf>.

⁸ IDB, IDB approves \$25 million for a sustainable energy matrix in Peru. Available at

<www.iadb.org/en/news/news-releases/2011-07-21/sustainable-energy-matrix-in-peru,9472.html>.

⁹ For more information see the website at <www.minam.gob.pe>

Chapter 11: Venezuela

11.1 Government Targets

Venezuela ratified the Kyoto Protocol, but as a non-Annex I country has no GHG emissions targets under the treaty. Venezuela has not ratified or approved the Copenhagen Accord.⁸¹ In addition, the government does not allow CDM projects to be developed in Venezuela.⁸²

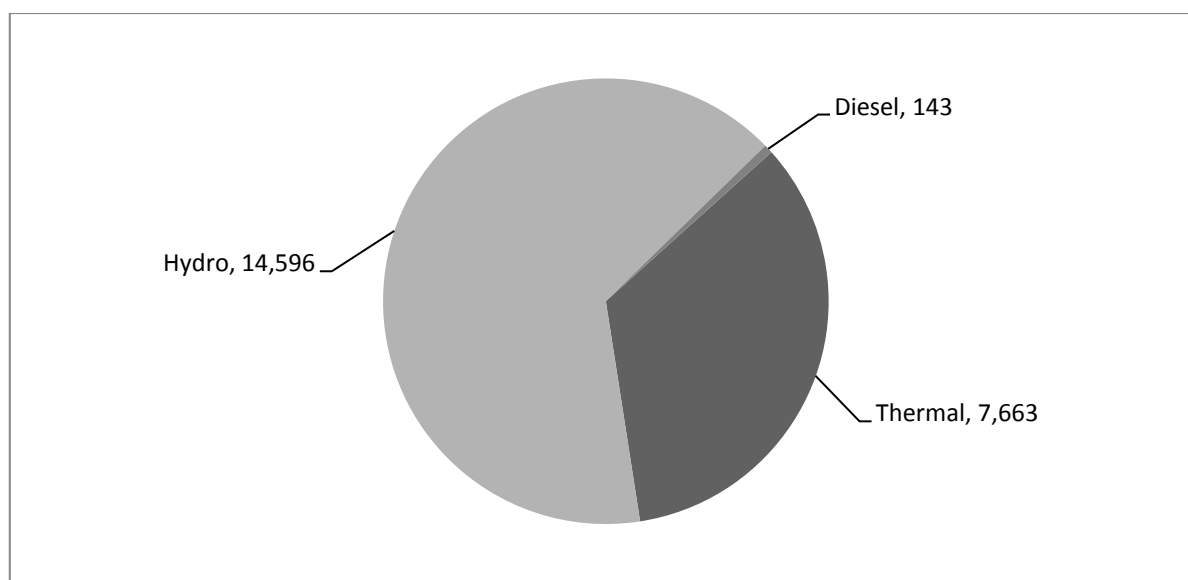
Table 11.1: Venezuelan government commitments

GHG emissions	No target set.
Renewable energy (RE)	No target set.
Renewable electricity	No target set.

Source: News letter sent to UNFCCC. Available at unfccc.int/files/meetings/cop_15/press/application/pdf/cop15_mw_notas_copenhagen.pdf.

11.2 Electricity Generation Mix

Figure 11.1: Total installed generating capacity in Venezuela in 2009: 22,402 MW

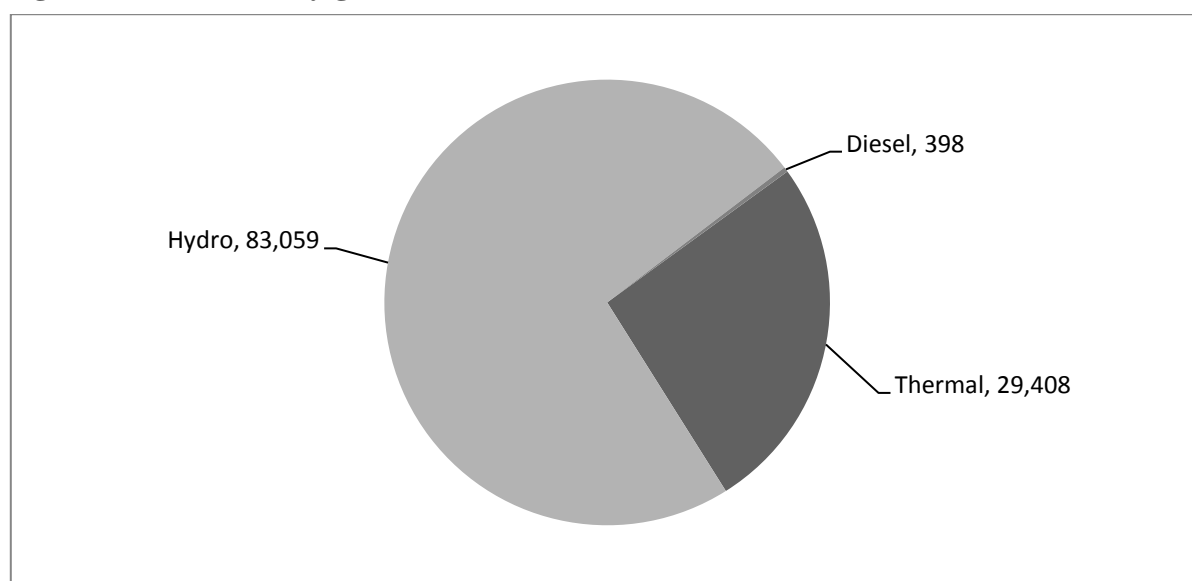


Source: Venezuelan Chamber of Power Industry, Electricity Statistics. Available at www.caveinel.org.ve.

⁸¹ News letter sent to UNFCCC. Available at unfccc.int/files/meetings/cop_15/press/application/pdf/cop15_mw_notas_copenhagen.pdf.

⁸² Consejo de Redaccion, The market for carbon credits in Latin America. Available at www.consejoderedaccion.org/sitio/CdR_documents/actividades/bonos_carbono_2010/VENEZUELA.pdf.

Figure 11.2: Electricity generation mix in Venezuela in 2007: Total 112,866 GWh



Source: Venezuelan Chamber of Power Industry, Electricity Statistics. Available at <www.caveinel.org.ve>.

11.3 Operating Support Incentives

There were no available operating incentives for renewable power in Venezuela as of August 2011.

11.4 Investment Support Incentives

Facilities that have a combined heat and power (CHP) plant that is for their own use and does not export power to the grid are exempt from paying tax on fuel purchases and have simplified regulations for equipment imports.⁸³

In April 2010, the Venezuelan state-owned National Electricity Corporation (CORPOELEC) and the Argentinean Pescarmona Metallurgical Industry (IMPESA) agreed to construct a wind farm with a capacity of 25.2 MW. The wind farm will be partially funded by the government, but details on the funding and costs were not available.⁸⁴

⁸³ Official Gazette No. 39,298 of November 3, 2009. Available at <www.fundelec.gob.ve/drupal-6.14/sites/default/files/RESOLUCION%20002%20EE%20MPPEE.pdf>.

⁸⁴ Government press release, April 2010. Available at <www.embvenezuela.uy.org/doc.aspx?id=2603>.

Glossary

Anaerobic digestion for biogas	The process of the breakdown of biodegradable material in the absence of oxygen to produce biogas suitable for use in energy production. Generally used on wastewater sludge and organic wastes.
Bagasse	Bagasse is the fibre left over after the juice has been squeezed out of sugarcane stalks in the production of sugar.
Biogas	Any form of methane gas produced from organic sources. Biogas generally comes from sewage or landfill sites.
Biomass	A generic term for all organic material used as an energy source. Biomass includes 1) solid biomass, such as wood or municipal waste (biowaste), and 2) biogas.
Capacity	The rated output of a power generation unit.
Concentrated solar-thermal plant	An electricity-generating plant that uses mirrors or lenses to focus the heat from sunlight onto a small area to generate electricity.
Combined cycle power plants	Power plants with gas and steam turbine generators. The waste heat from gas turbine generators is used to produce steam for steam turbine generators.
Combined heat and power plant (CHP)	A power plant that generates both electricity and heat. CHP plants may use renewable energy sources such as biomass. Renewable electricity generated at CHP plants is included in the statistics of renewable electricity generation. Sometimes referred to as a <i>cogeneration</i> plant.
Co-firing with biomass	The combustion of biomass and fossil fuels (generally coal or natural gas) together. This is less polluting than the use of fossil fuels alone. It has the advantage that it can be done in conventional power plants without large-scale redevelopment.
Cogeneration plant	See <i>combined heat and power plant</i> .
Degression	Successively lower rates or amounts. In this report, it is applied to electricity tariffs that decrease at a set amount every year.

Distribution system operator (DSO)	The DSO manages the low- and medium-voltage power network that transmits and distributes electricity from the high-voltage grid run by the transmission system operator to customers. Smaller generators can be directly connected to the low- or medium-voltage grid. According to EU regulations, DSOs must be run independently of generators and suppliers, in other words they must be legally unbundled.
Feed-in tariff (FIT)	A primary support mechanism used by governments to promote renewable electricity development. It generally offers price guarantees for a set period of time and a system of obligatory purchase of all power by a network operator. See <i>premium</i> and <i>tradable green certificates</i> for comparison.
Fixed premium	A fixed premium, sometimes called a Green Bonus, is a set value that renewable electricity generators receive in addition to the sales price (or market price) of electricity. Therefore, the net generation compensation is the sales or market price of electricity plus this fixed premium. See <i>variable premium</i> for comparison.
Generation	In this report, it refers to the production of electricity.
Generating capacity	See <i>capacity</i> .
Generation compensation	The total amount of compensation that a generator receives for their power output. In this report, this includes, where appropriate, the market price of electricity plus operating incentives.
Greenhouse gases (GHG)	Those gases that contribute to global warming through the greenhouse effect. These include carbon dioxide, methane, nitrous oxide, etc.
Hydro (electric) power plants	Any power plant that uses the flow of water to generate electricity. There are “large hydro” (or simply “hydro”), “small hydro” and “mini-hydro”. Although there are no official definitions, small hydro and mini-hydro are generally defined as having a capacity under 10 MW and 1 MW, respectively.
Incentives	Government programmes to promote the development of renewable energy. See also <i>primary support mechanism</i> .
Installed capacity	Power generating capacity measured in Watts. See also <i>generation</i> .
Interconnector	A physical connection between separate grids (in general between different countries) to allow for the import and export of electricity.
Lignite	The lowest grade of coal, often referred to as brown coal. It tends to be more polluting than black or hard coal.
Microgeneration	Small-scale electricity generation, usually for private use, although if surplus electricity is created it can be sold to the network. In the UK it is defined as having a maximum capacity of 50 kW.

Net metering	Net metering is a programme offered by power utilities for customers that install renewable electricity systems to generate their own electricity that can be used to offset a portion of the electricity provided by the utility. Any excess electricity generated by the customer is sold to the utility company, generally at the retail tariff rate.
Obligatory purchase	In this report, the policy that a network operator or utility has to purchase all the output of a renewable electricity generating installation regardless of demand. Generally found with a <i>feed-in tariff</i> incentive.
Off-peak hours	The period of day when demand for power is at the lowest (generally at night).
Peak hours	The period of day when demand for power is the highest.
Premium	An operating incentive where renewable electricity generators receive a government-set supplement in addition to the sales or market price of electricity per unit of output sold. Unlike the FIT there is no system of obligatory purchase. There are generally two types: <i>fixed</i> and <i>variable premiums</i> .
Primary energy consumption	Sometimes referred to as gross inland consumption of energy. The quantity of all energy consumed within the borders, including imports. It is a measure of all energy sources before they are converted into energy. Generally measured in tonnes of oil equivalent (toe).
Pumped storage hydro (electric) power plants	These plants are for peak load use. Water which is pumped up to an upper reservoir during the off-peak hours and is discharged during the peak hours to generate electricity.
Renewable electricity	Electricity generated from a renewable energy source.
Renewable energy	Renewable energy is any form of energy (electricity, heat, transportation fuels, etc.) produced by renewable energy sources such as hydro, wind, biomass, wave and tidal, solar, and geothermal.
Solid biomass	Solid organic material that can be used for energy production, generally realised through combustion. For example, wood waste.
Solid fuels	Generally forms of coal or their derivatives.
Solar PV (photovoltaic)	The direct conversion of sunlight into electricity.
Suppliers	Those who sell electricity to end users.
Thermal power plant	Power plants that generate electricity by combustion. They include gas-, coal- and oil-fired power plants. National statistics sometimes include plants of solid biomass and biogas combustion and the co-firing of biomass and fossil fuels, as well as combined heat and power plants. If this is the case, a note is made in the report.

Thin-film	A new type of solar PV panel that uses less silicon than traditional PV panels.
Tradable green certificates	A primary support mechanism in which renewable electricity generators are awarded certificates for their power generation from renewable sources. Suppliers or distributors have a quota obligation for renewable energy and need to buy the certificates to prove they have met their quota.
Variable premium	A premium system in which the generation compensation is capped at a set amount. The variable premium fills in the gap between the market price of electricity and the set amount and hence the variable premium will change with the market price of electricity.
Wholesale electricity market	The purchase and sale of electricity from generators to resellers on the open market.

Sources: For a detailed glossary see the Energy Information Administration, Glossary of Electricity Terms. Available at <www.eia.gov/cneaf/electricity/epav1/glossary.html>.