



Bundesministerium
für Wirtschaft
und Energie



Exportinitiative Energy

NEIRA Marcelo

6 October 2016



Durchführer



Energy efficiency in electricity production and supply of the oil, mining and tourism industry in remote and ecologically sensitive areas

- 1. Overview of the current energy situation in Ecuador**
- 2. Major mining projects; and options for efficient energy supply**
- 3. The electrical matrix: Achievements and Future Prospects**
- 4. Prospects for Non-Conventional Renewable Energy**
- 5. Possibilities of private participation in energy projects**

1. Overview of the current energy situation in Ecuador

Continental Ecuador and Galapagos



1. Overview of the current energy situation in Ecuador

Main Regulations:

Constitution:

“Art. 316 The State may delegate the participation in strategic sectors and public services to joint ventures in which it has a majority stake. The delegation shall be subject to the national interest and respect the deadlines and limits set by law for each strategic sector

In cases that are established by the law, the state may, exceptionally, delegate the exercise of these activities to the private initiative and the popular and solidarity economy,."

1. Overview of the current energy situation in Ecuador

Main Regulations :

Electrical Law:

“Art. 25 In any of the following cases, the state may, through the MEER, delegate the participation in the electricity sector to private equity firms and companies of the popular and solidarity economy.

1. When necessary to meet the public, collective or general interest;
2. When demand for the service can not be covered by public or joint ventures;
3. In the case of projects using non-conventional renewable energies that are not in the Master Plan of Electricity.”

1. Overview of the current energy situation in Ecuador

Main Regulations :

Incentives Law for Public-Private Partnerships and Foreign Investment:

- The Interagency Committee on Public Private Partnerships has been created for the approval of public projects and the application of the system of incentives required by this law ...
- The investments that have been made in the context of the implementation of public projects in the form of public-private partnerships may obtain exemptions from the income tax, the tax on foreign exchange outflows, the taxes on foreign trade and more benefits, the Internal Tax Regime Law allows for such public projects.

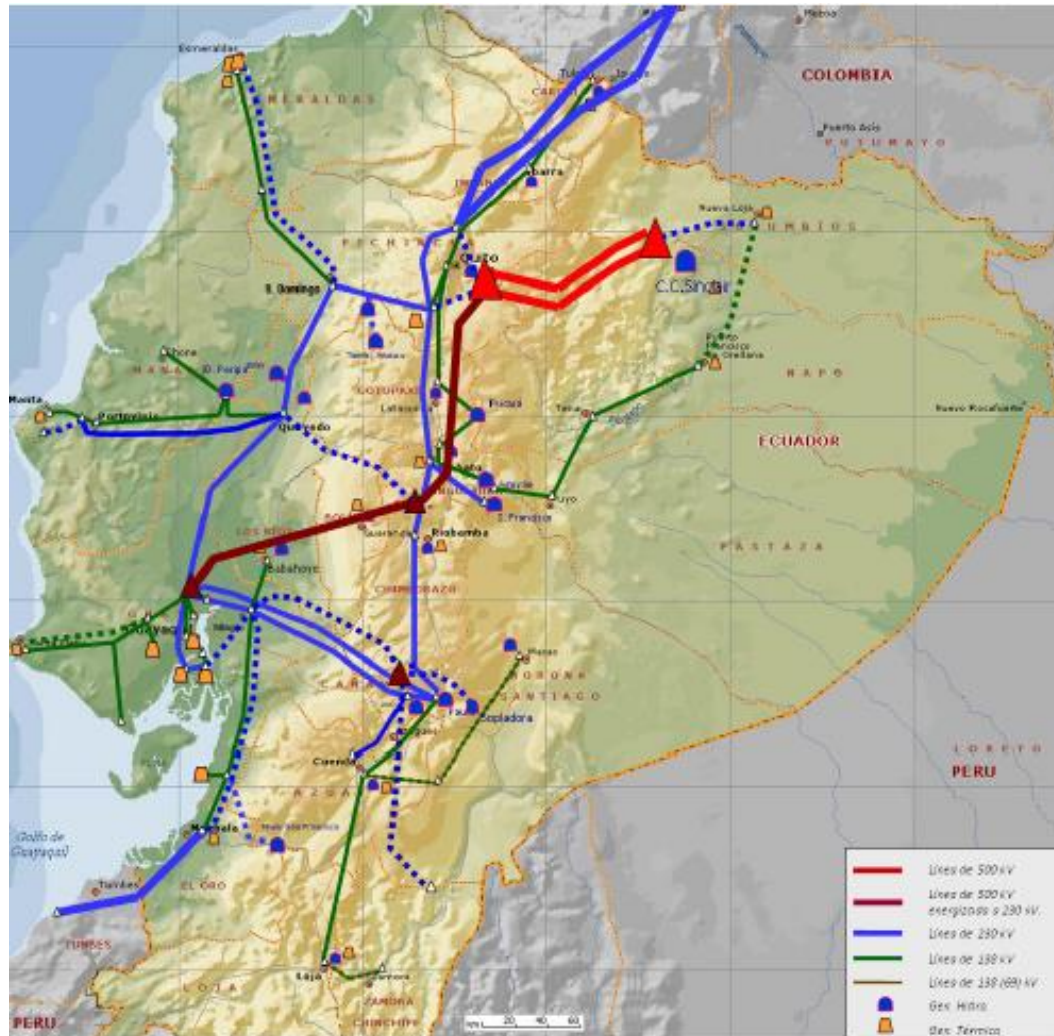
1. Overview of the current energy situation in Ecuador

Structure of the electricity sector:

- Ministry of Electricity and Renewable Energy
(Ministerio de Electricidad y Energía Renovable – MEER)
- Regulation and Control Agency Electricity
(Agencia de Regulación y Control de Electricidad – ARCONEL)
- National Electricity Operator
(Operador Nacional de Electricidad – CENACE)
- Electric Companies:
 - Corporación Eléctrica del Ecuador (CELEC EP). Generation and Transmission
 - Corporación Nacional de Electricidad (CNEL EP). Distribution
 - 9 other public Distribution Companies (Quito, Cuenca, Galápagos, etc.)
 - Private Generators (little installed capacity)
 - Self-generating: public (oil) and private (oil, industry).


1. Overview of the current energy situation in Ecuador

Power Generation-Transmission System. Current and planned



1. Overview of the current energy situation in Ecuador

Electrical Power Supply. July 2016

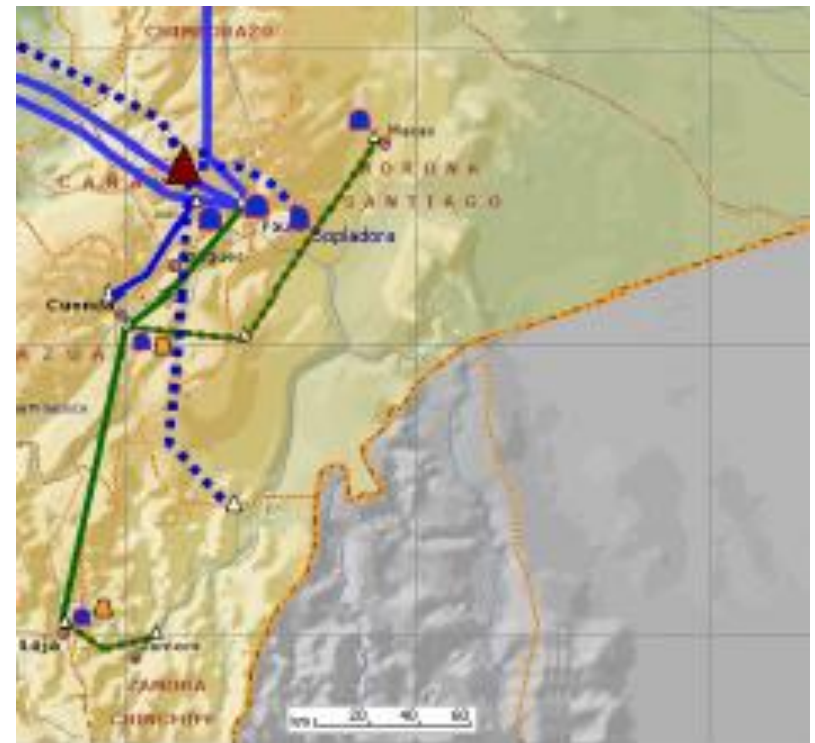
1. Potencia nominal en generación de energía eléctrica		MW	%
Energía Renovable 	Hidráulica	2,416.01	39.74%
	Eólica	21.15	0.35%
	Fotovoltaica	26.48	0.44%
	Biomasa	144.30	2.37%
	Biogas	2.00	0.03%
Total Energía Renovable		2,609.94	42.93%
No Renovable 	Térmica MCI	1,902.36	31.29%
	Térmica Turbogas	1,105.29	18.18%
	Térmica Turbovapor	461.87	7.60%
Total Energía No Renovable		3,469.51	57.07%
Total Potencia Nominal		6,079.44	100.00%

Interconexiones		MW	%
Interconexiones	Colombia	540.00	83.08%
	Perú	110.00	16.92%
Total Interconexiones		650.00	100.00%

2. Major mining projects; and options for efficient energy supply



CELEC-TRANSELECTRIC IS BUILDING THE LINE 230 kV Taday – Bomboiza – VIEWPOINT, to supply up to 100 MW



2. Major mining projects; and options for efficient energy supply

PROYECTO MIRADOR




DATOS GENERALES

LOCALIZACIÓN: Tundayme / El Pangul / Zamora Chinchipe
CONSESIONARIO: Ecuacorriente S.A.



RECURSOS MEDIDOS + INDICADOS: Cobre – Cu: 2,96 millones de toneladas
 Plata - Ag: 26,08 millones de onzas troy
 Oro – Au: 3,22 millones de onzas troy

TIPO DE MINA: Cielo abierto - minería a gran escala
FASE: Explotación. Etapa: Construcción de la mina
VIDA DEL PROYECTO: 27 años a partir del inicio de producción
INICIO CONSTRUCCIÓN: Diciembre de 2015
INICIO DE PRODUCCIÓN: Primer trimestre de 2018



#MineríaResponsable

PROYECTO FRUTA DEL NORTE


DATOS GENERALES

LOCALIZACIÓN: Los Encuentros / Yantzaza / Zamora Chinchipe
CONSESIONARIO: Lundin Gold (Aurelian Ecuador S.A.)

RESERVAS: Oro - Au: 4,82 millones onzas troy
 Plata - Ag: 6,34 millones onzas troy

TIPO DE MINA: Subterránea - minería a gran escala
FASE: Explotación (Negociación de contrato)

VIDA DEL PROYECTO: 13 años desde inicio de producción
INICIO CONSTRUCCIÓN: Segundo trimestre de 2017
INICIO DE PRODUCCIÓN: Primer trimestre de 2020



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2. Major mining projects; and options for efficient energy supply

PROYECTO LOMA LARGA



DATOS GENERALES

LOCALIZACIÓN: Victoria del Portete / Cuenca / Azuay
CONSESIONARIO: INV Metals (INV Minerales Ecuador S.A.)

RESERVAS:
 Oro - Au: 1,135 millones de onzas troy
 Cobre - Cu: 21.160 toneladas
 Plata - Ag: 5,680 millones de onzas troy

TIPO DE MINA: Subterránea – minería a mediana escala
FASE: Exploración Avanzada
VIDA DEL PROYECTO: 27 años estimados desde inicio de producción

Au

Ag

Cu



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PROYECTO MINERO SAN CARLOS PANANTZA



DATOS GENERALES

LOCALIZACIÓN: San Miguel de Conchay, Santiago de Panantza / San Juan Bosco, Limón Indanza / Morona Santiago

CONSESIONARIO: Explorcobres S.A. (Exsa)

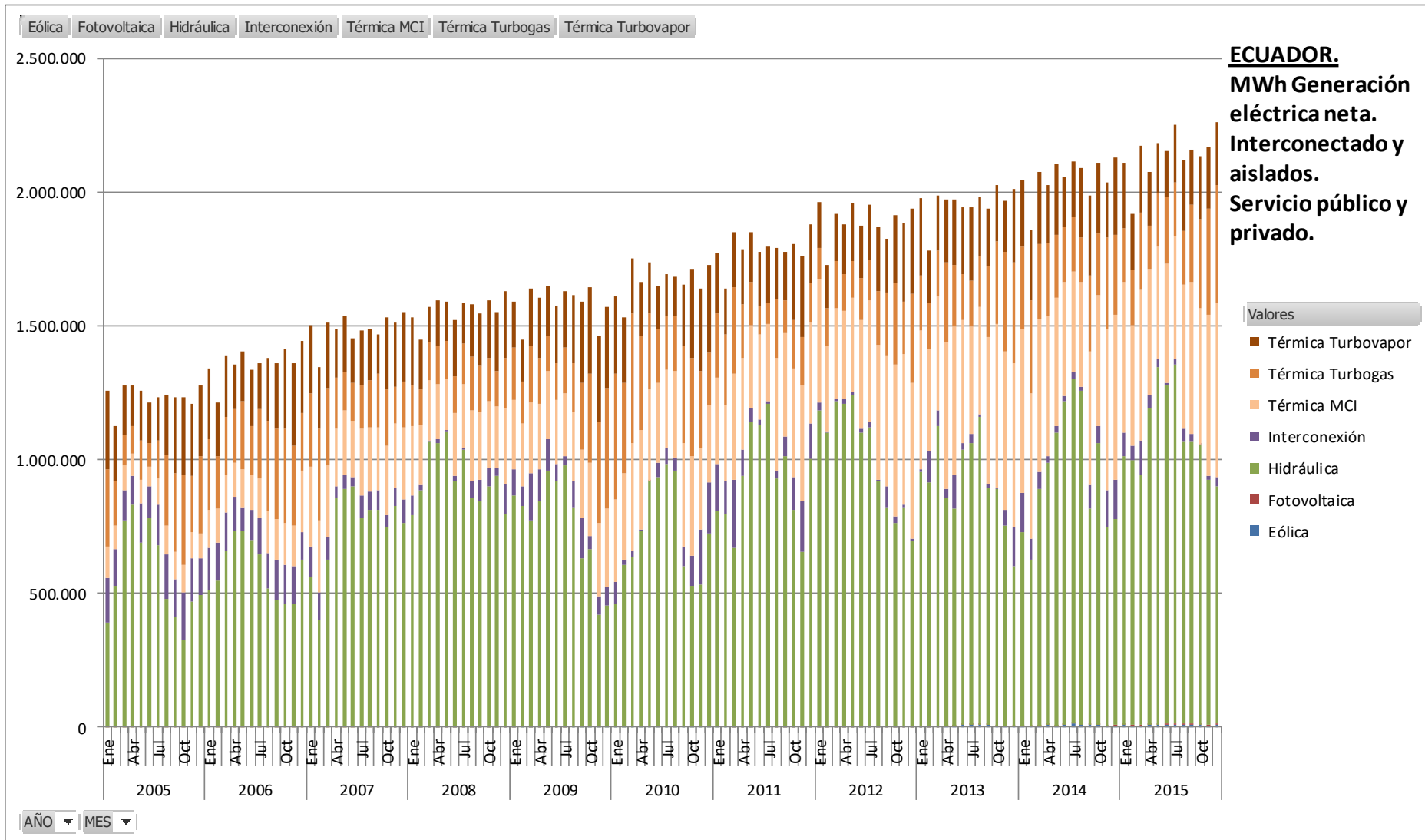
TIPO DE MINA: Cielo Abierto – minería a gran escala
FASE: Exploración Avanzada
VIDA DEL PROYECTO: 25 años estimados

Cu

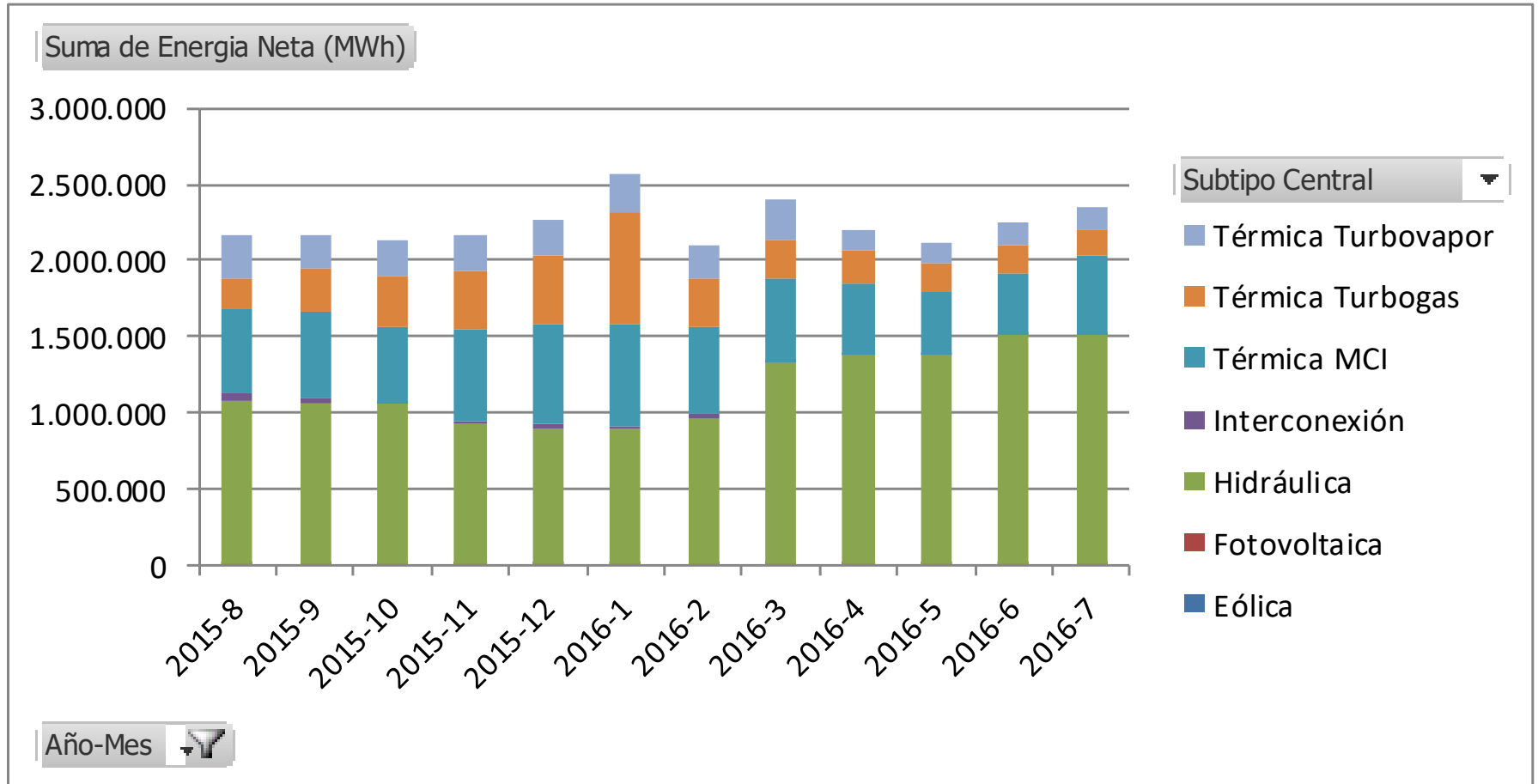


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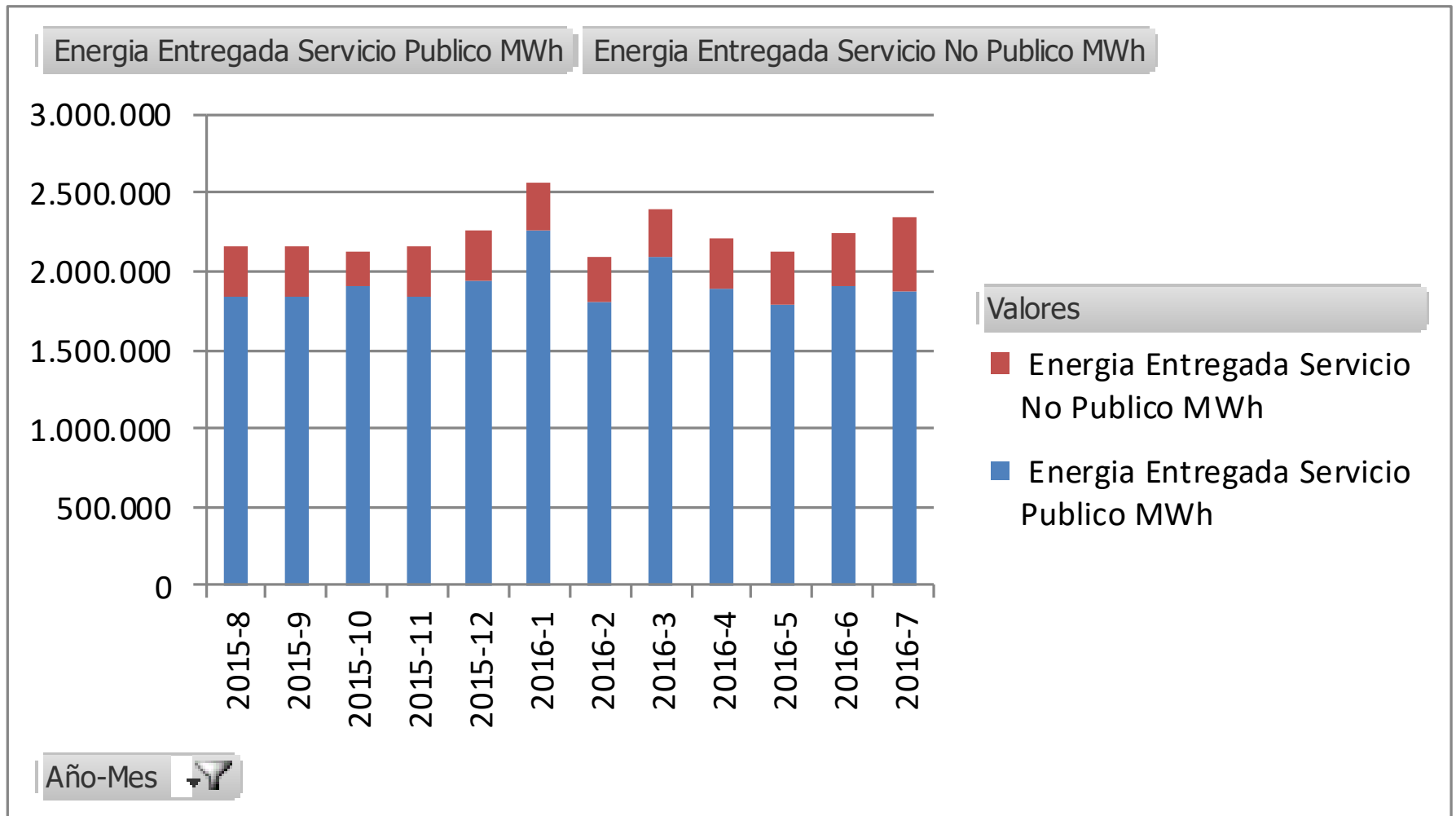
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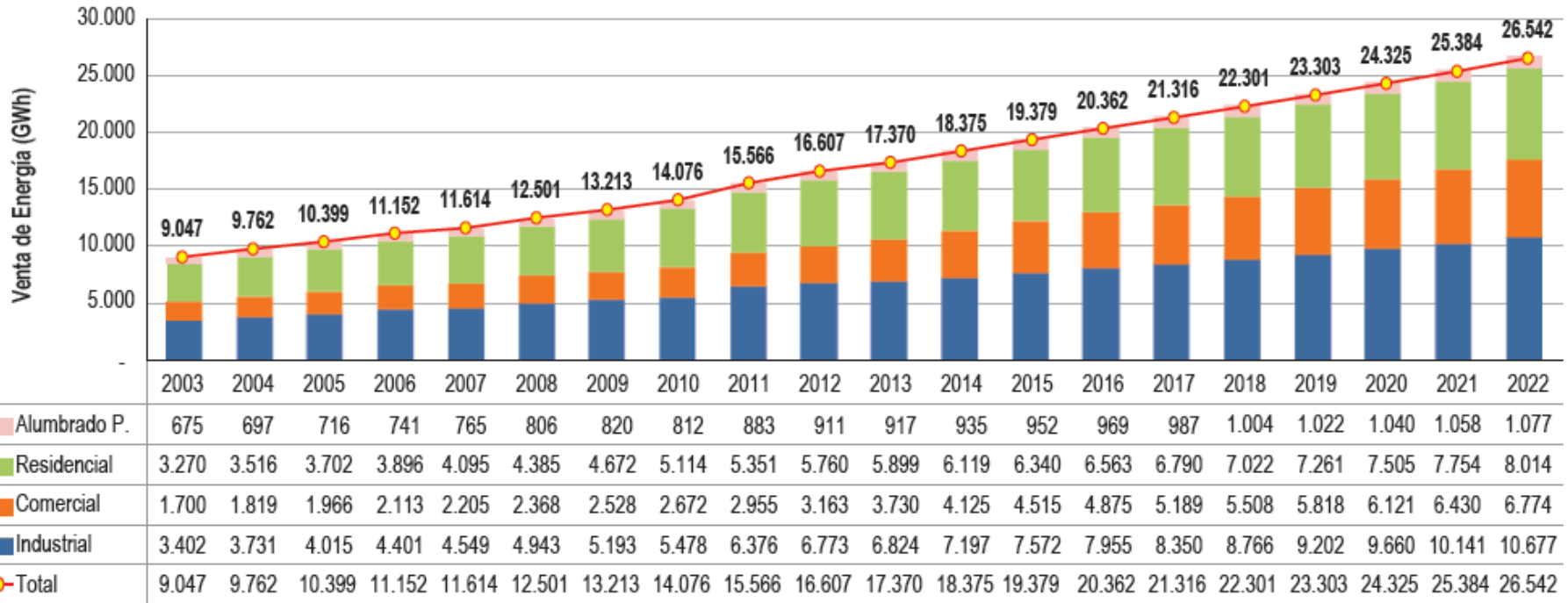
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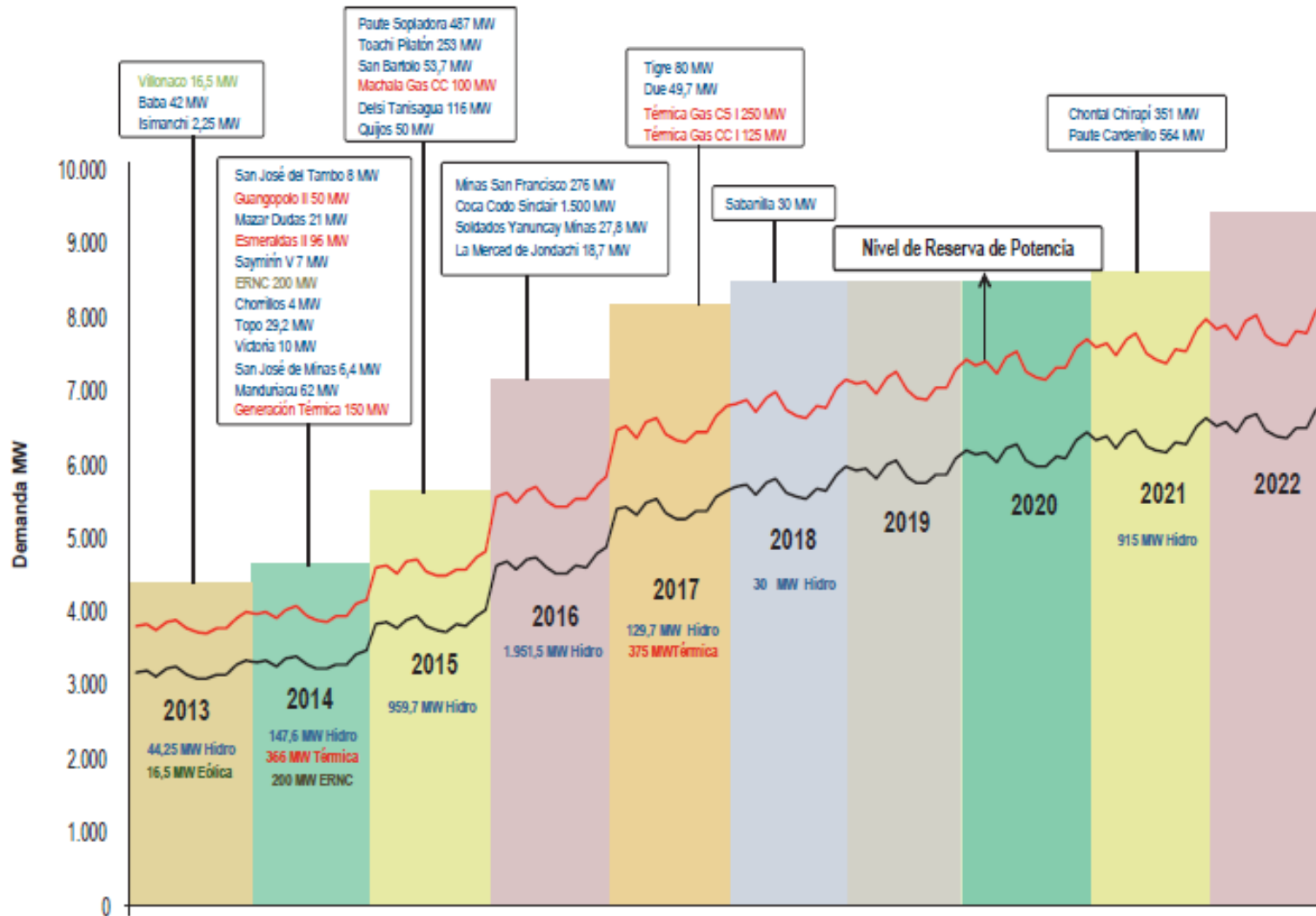
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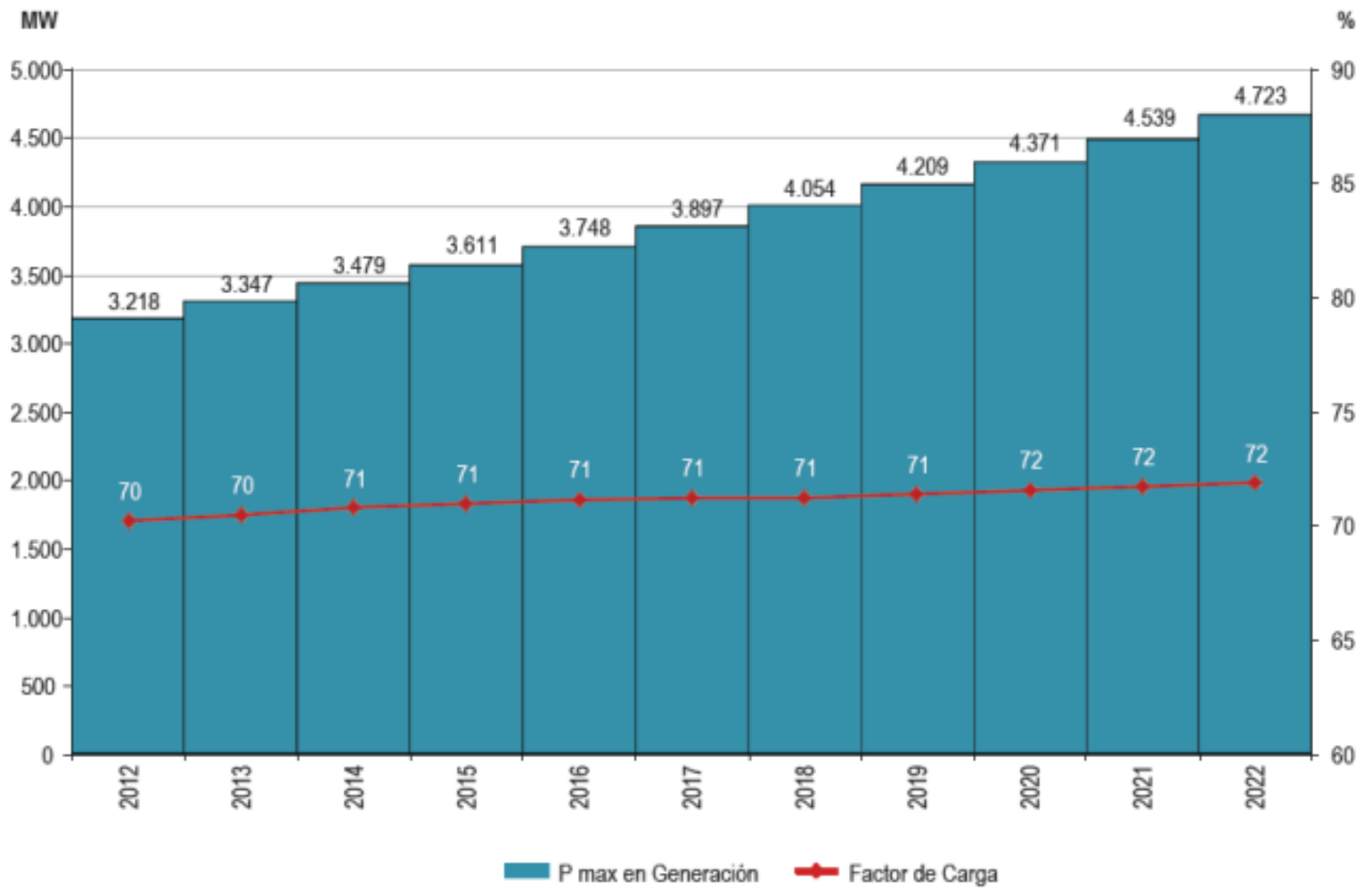
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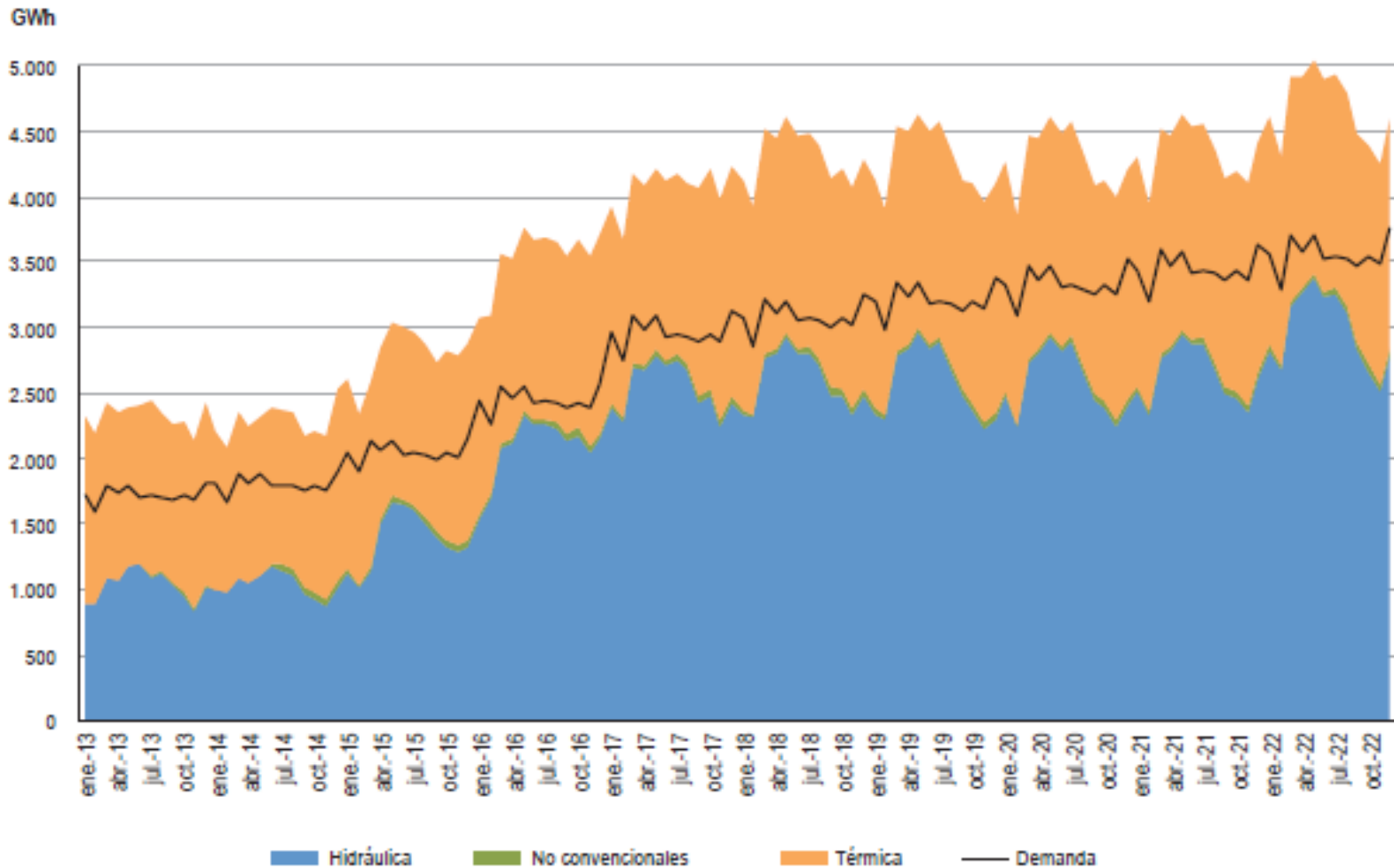


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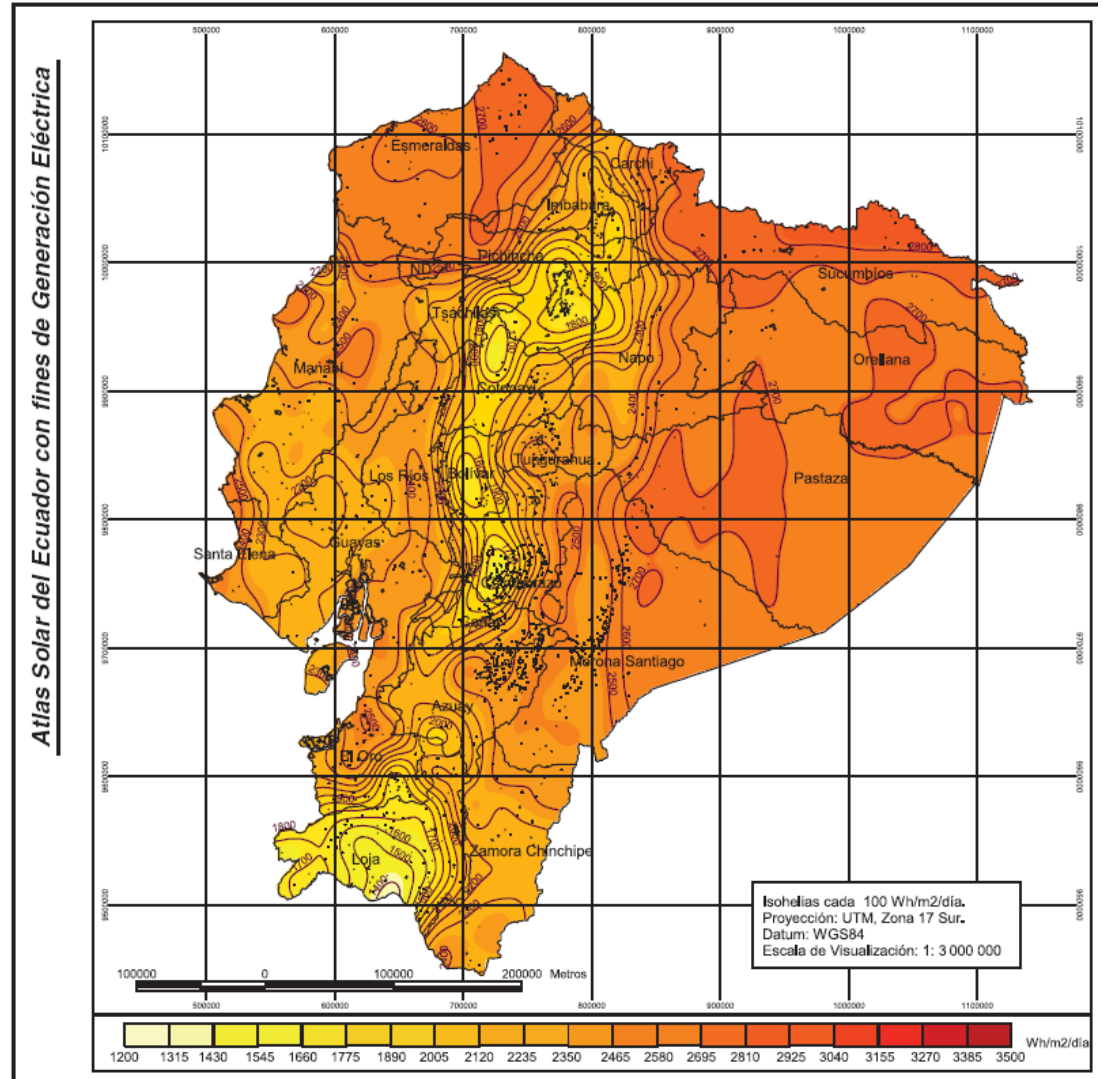
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OFFER OF GENERATION vs. DEMAND. 2013-2022 Master Plan



4. Prospects for Non-Conventional Renewable Energy

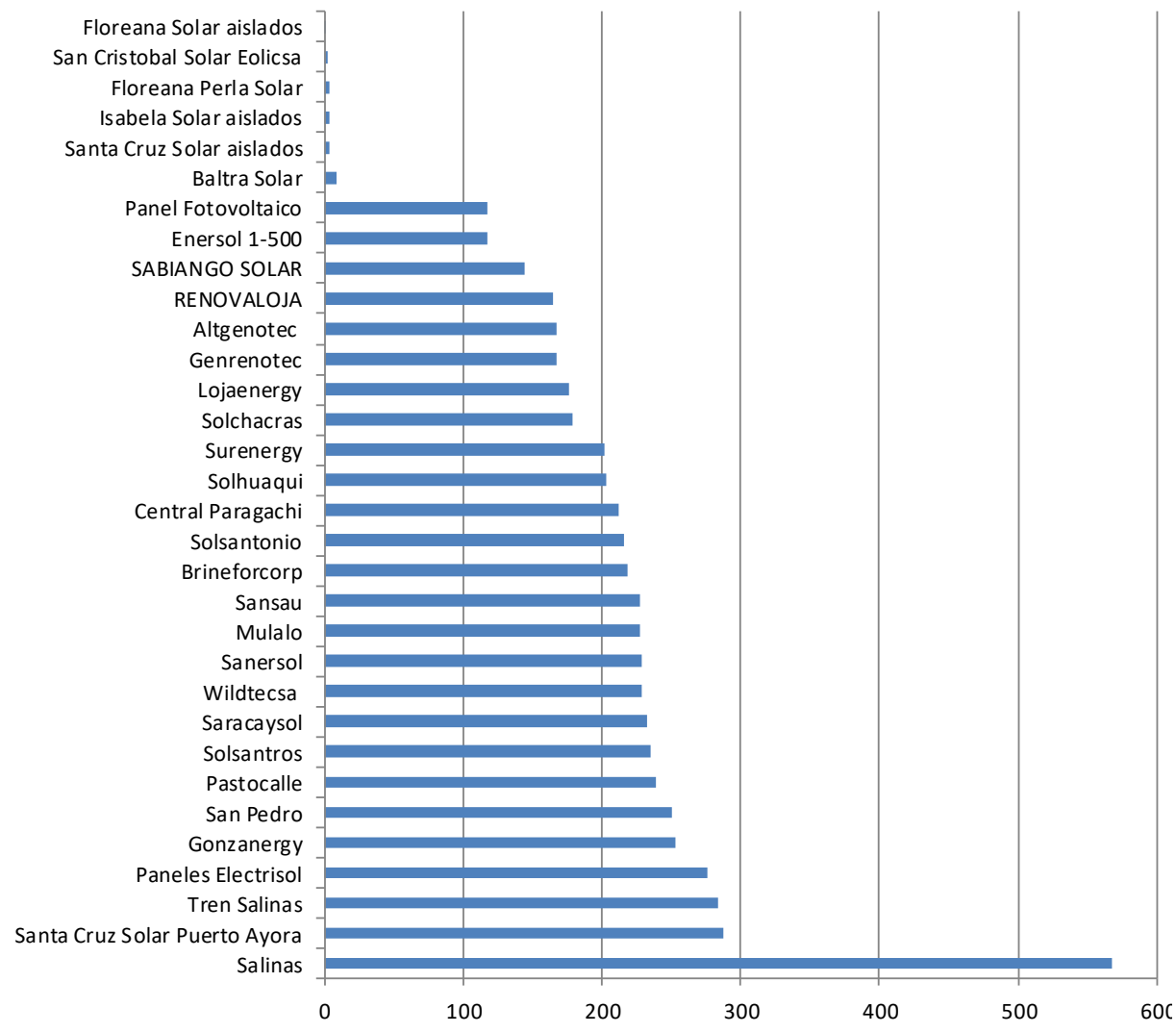
Excellent solar resource.
Mitad del Mundo



4. Prospects for Non-Conventional Renewable Energy

Photovoltaic:

MWh generated
Jun-2016

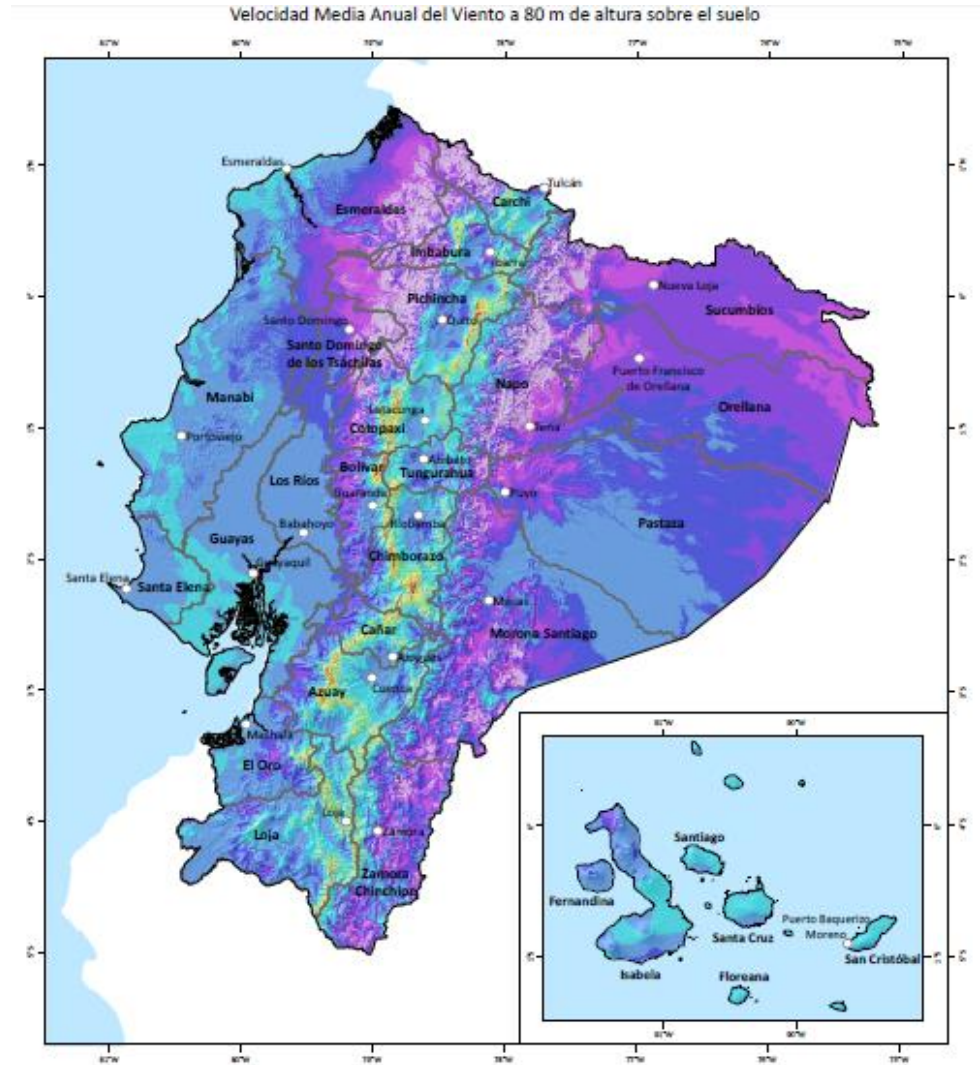


4. Prospects for Non-Conventional Renewable Energy

Main wind resources in the Andes

They operate only 3 plants:

- San Cristóbal - Galápagos
- Villonaco - Loja
- Baltra - Galápagos

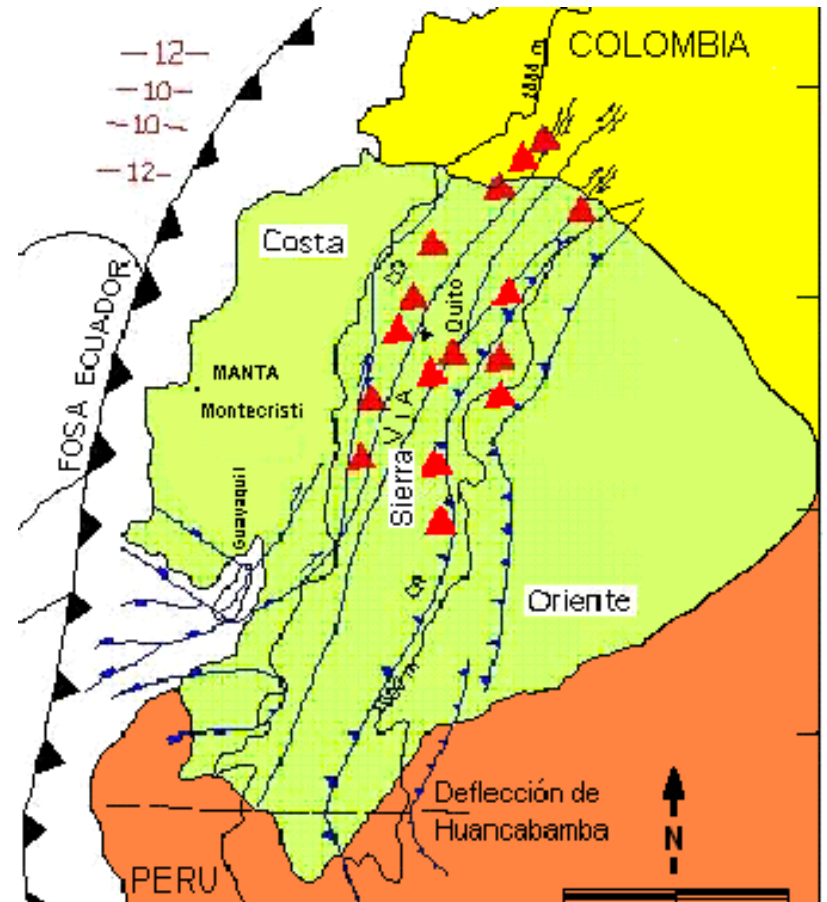


4. Prospects for Non-Conventional Renewable Energy

Geothermal prospects with low levels of study:

- Tufiño Chiles
- Chachimbiro
- Chalupas
- Chacana
- Oyacachi
- Baños-Tungurahua
- Guapán
- Baños-Azuay

MANY ACTIVE VULCANOS



4. Prospects for Non-Conventional Renewable Energy

- Ecuador has vast solar and hydroelectric potential that can be used for electricity and other uses.
- There were several changes in the regulation that encouraged the generation of non-conventional renewable energy sources. Today this is no longer in force.
- They may request titles for new projects, but would delay the authorization process for the regulation of the electricity law, which became effective in January 2015.
- One kWh costs about 10 USDC / kWh, and in medium-sized homes, businesses and industries it represents 1 % below the costs. An average family spends \$ 1.60 / month on liquefied petroleum gas. This makes it difficult to compete with Non-Conventional Renewable Energies.
- A project of solar water heating would be very good.
- Many Amazonian communities cut off from the network, who have potential for ecotourism, require microgrids and isolated PV systems.
- There are successful experiences of off-grid electrification from EEQ and EERCS.
- Some possibilities for wind generation.

5. Possibilities of private participation

Some generation projects are run by private companies; and surely there will be an opening for new, especially renewable energy projects.

Año operación	Inversión	Tipo	Estado	Central	Potencia [MW]	Energía [GWh/año]
2016	Privada	Biogás	Ya opera	El Inga I	2	16
		Hidroeléctrico	En pruebas	San José del Tambo	8	45
			En construcción	Topo	29	222
	Pública	Hidroeléctrico	En construcción	Chorrillos	4	23
			En construcción	Mazar-Dudas: San Antonio	7	45
			Ya operan 4 de 8 grupos	Victoria	10	64
			Ya opera	Coca Codo Sinclair	1.500	8.743
			Termoeléctrico	En construcción	Mazar-Dudas: Alazán	6
				Paute - Sopladora	487	2.800
				Machala Gas Tercera Unidad	77	510
2017	Privada	Biogás	En construcción	El Inga II	3	23
		Hidroeléctrico		Due	50	421
				Río Verde Chico	10	83
				San José de Minas	6	37
	Pública	Hidroeléctrico		Delsitanisagua	180	1.411
				Minas - San Francisco	275	1.291
				Palmira Nanegal	10	77
				Quijos	50	355
				Toachi - Pilatón	254	1.120
				Termoeléctrico	Machala Gas Ciclo Combinado	110
2018	Privada	Hidroeléctrico	En construcción	Normandía	48	351
				Pusuno	40	217
				Sabanilla	30	194
				Sigchos	19	126
2022	Privada y/o pública	Renovables	Esperados	Proyectos con Energías Renovables	200	876
2023	Privada	Hidroeléctrico	Autogeneración minera	Santa Cruz	138	964
	Privada y/o pública		Priorizado	Paute - Cardenillo	596	3.409

5. Possibilities of private participation

Due to the crisis MPE projects (Master Plans of Electrification, PME in Spanish) have been authorized to private and other proposed stakeholders – especially those for autogeneration.

Projects that support social projects financially, such as ecotourism and communities in the Amazon.



5. Possibilities of private participation

Wind projects such as:

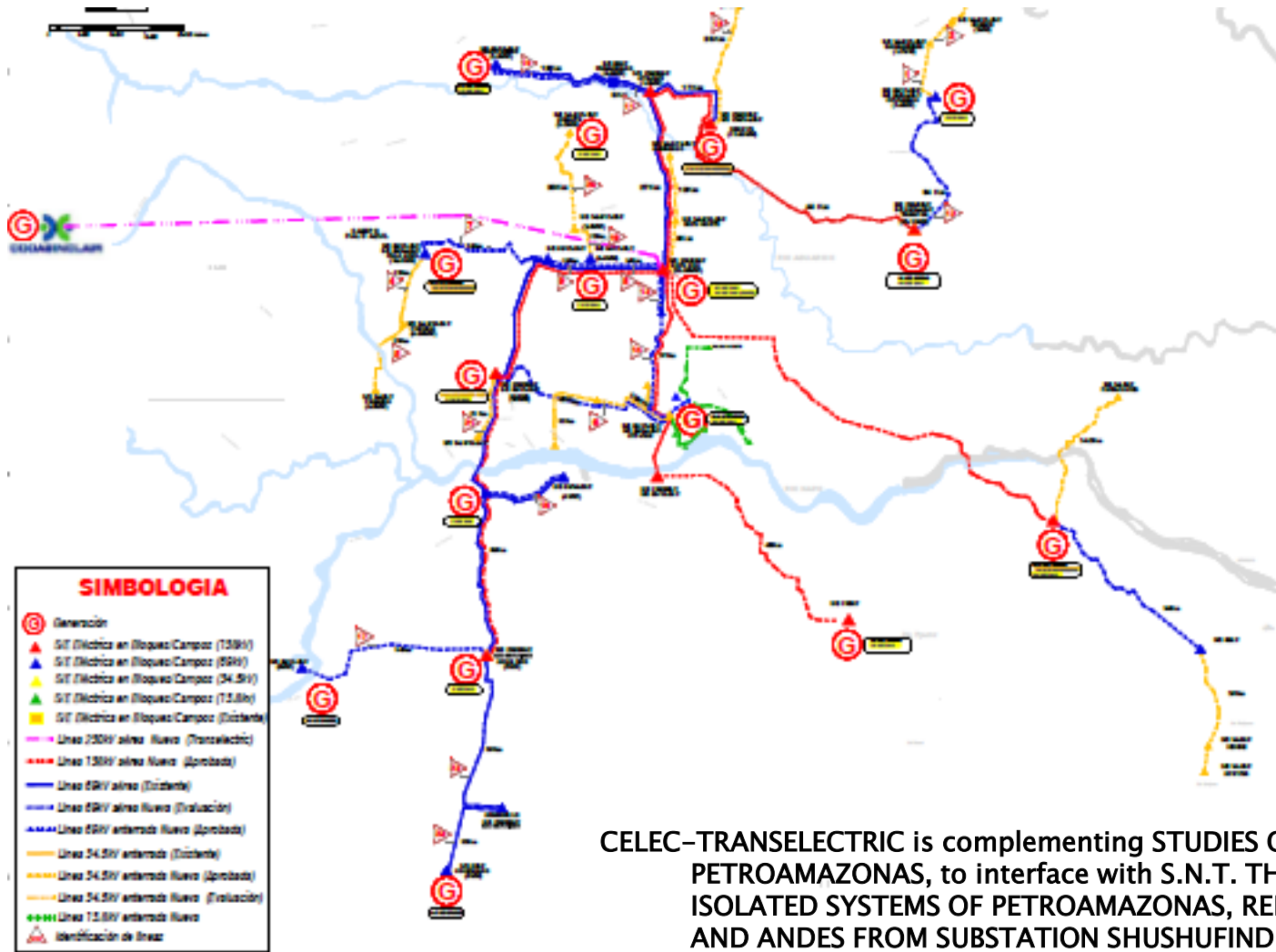
- Huascachaca (25 x 2 = 50 MW, 123 GWh / year), with completed studies, Licencia Ambiental y Título Habilitante, which ensures sales up to 11 USDc/kWh.
- Salinas de Imbabura.
- Etapas adicionales en Villonaco.
- La Paz, Azuay.
- Etapa adicional en Isla Baltra.

5. Possibilities of private participation

Projects of Petroamazonas EP: OGE&EE (Optimización Generación Eléctrica y Eficiencia Energética, Optimization Power Generation and Energy Efficiency)

- Optimize the use of associated gas for power generation.
- Reduce the use of diesel for power generation.
- Reduce CO2 emissions into the atmosphere.
- Generating electric power at lower cost for the communities within the area of influence.
- Change of the Energy Matrix of the Oil Sector in Ecuador.
- **Electrical interconnection of oil operations.**

5. Possibilities of private participation



Vielen Dank für Ihre Aufmerksamkeit!
Thank you very much for your attention!

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