

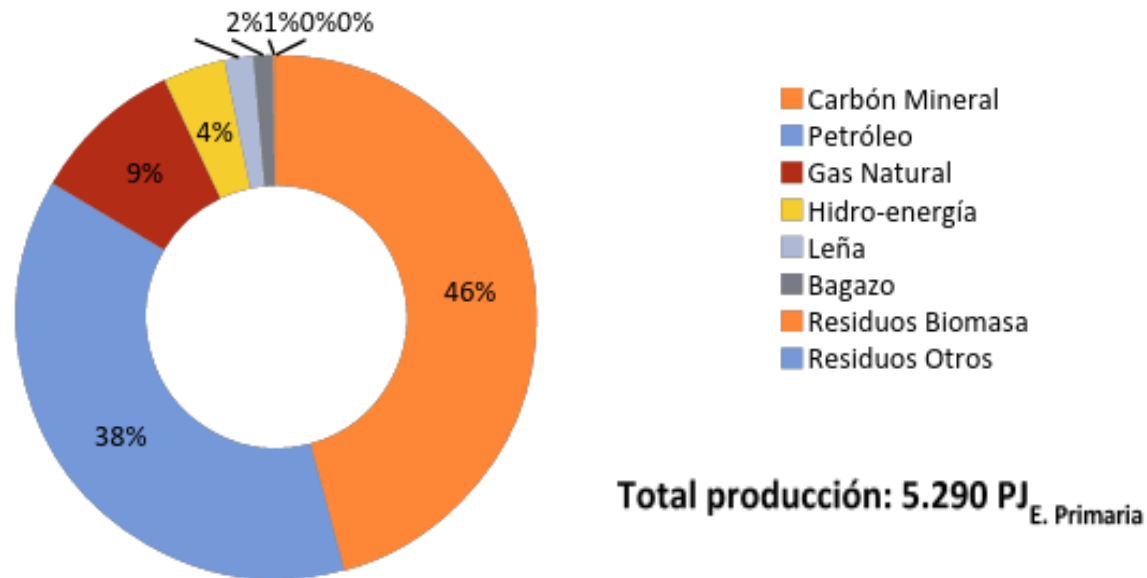
Geothermal energy: challenges and opportunities

Global Geothermal Alliance – Stakeholders Meeting

United Nations Office at Nairobi (UNON), Nairobi, Kenya
June 15-16, 2015

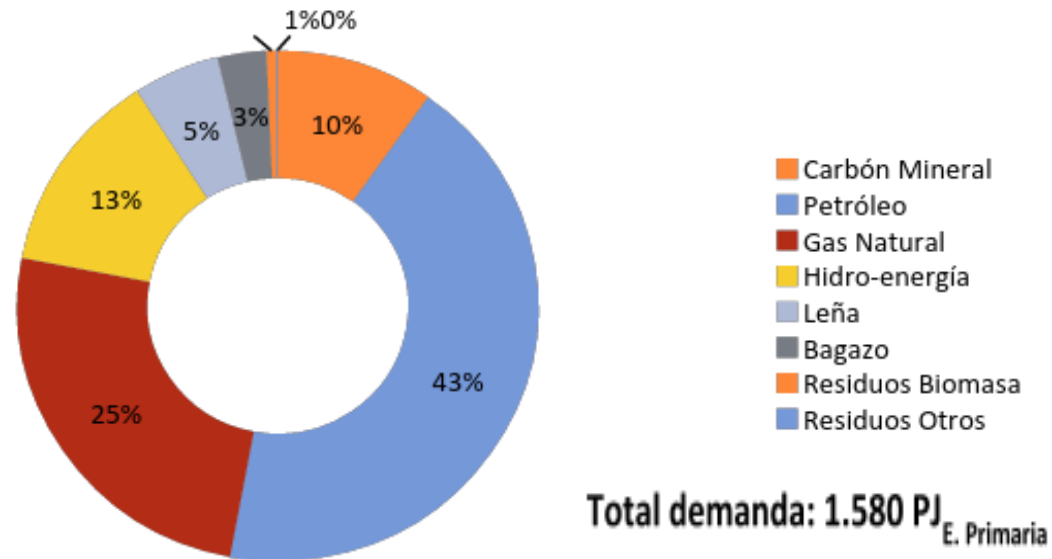
- Background and energy context in the country
- Objectives of the National Energy Plan - 2050
- Key issues for geothermal development in Colombia

Primary energy sources and share in Colombia (2012)



- 93% of primary fossil resources, 4% of hydropower, and 3% biomass, waste and others

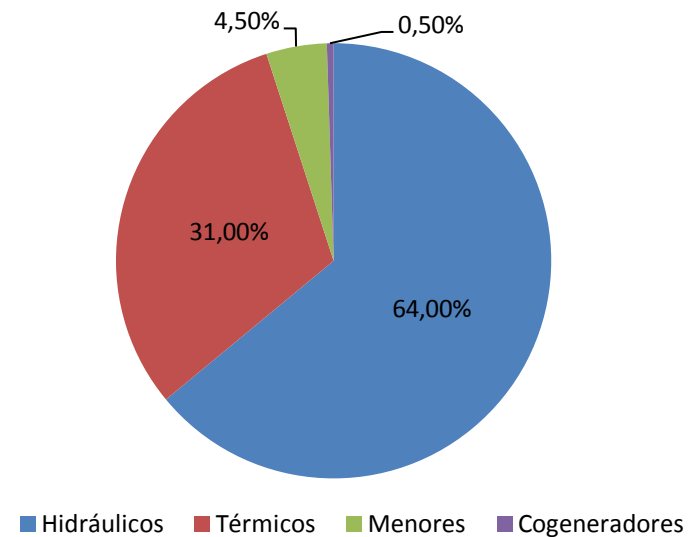
Primary energy demand and share in Colombia (2012)



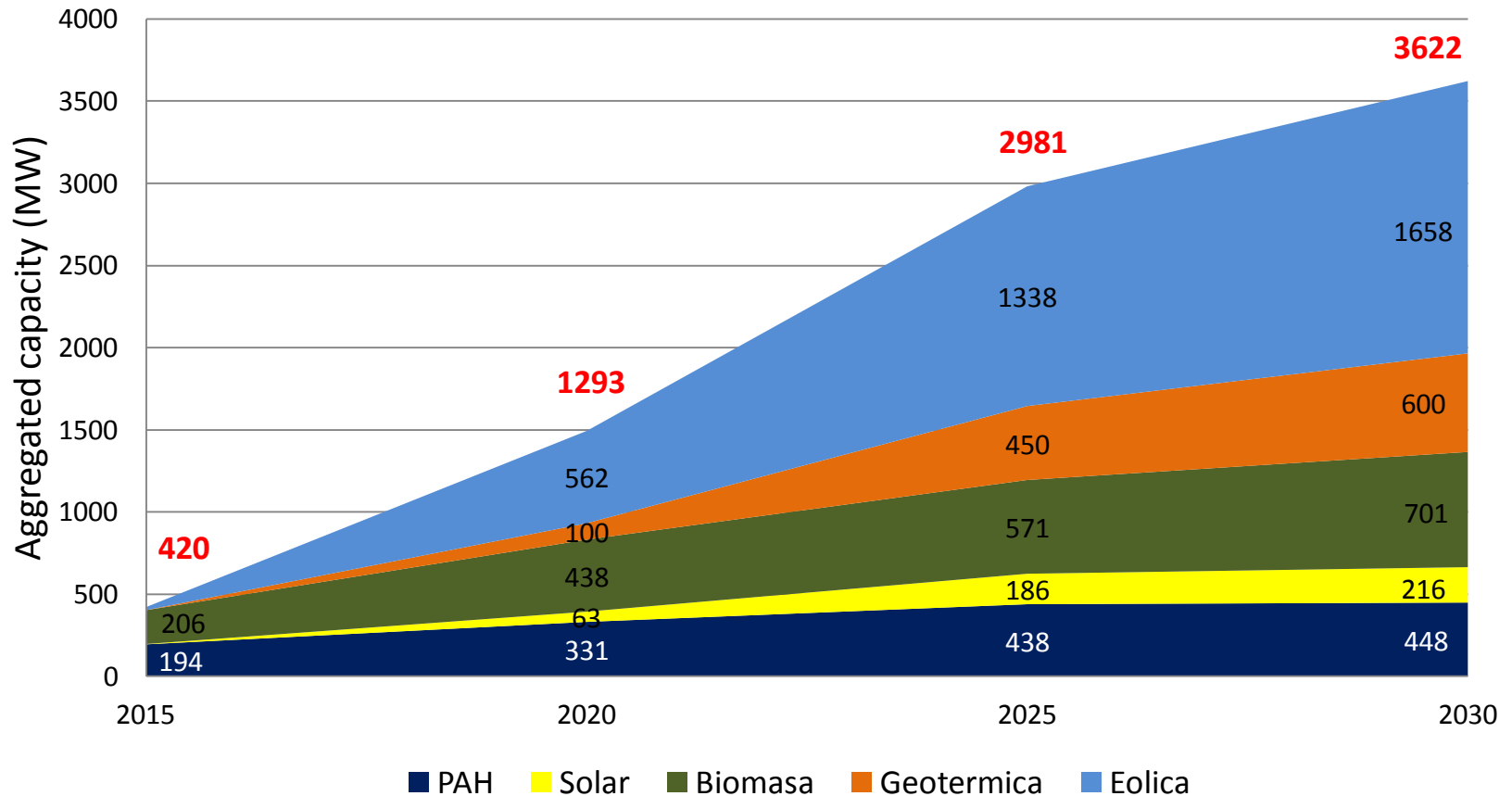
- About 78% come from fossil fuels and 22% from renewable sources.

Power system – Installed capacity (2013)

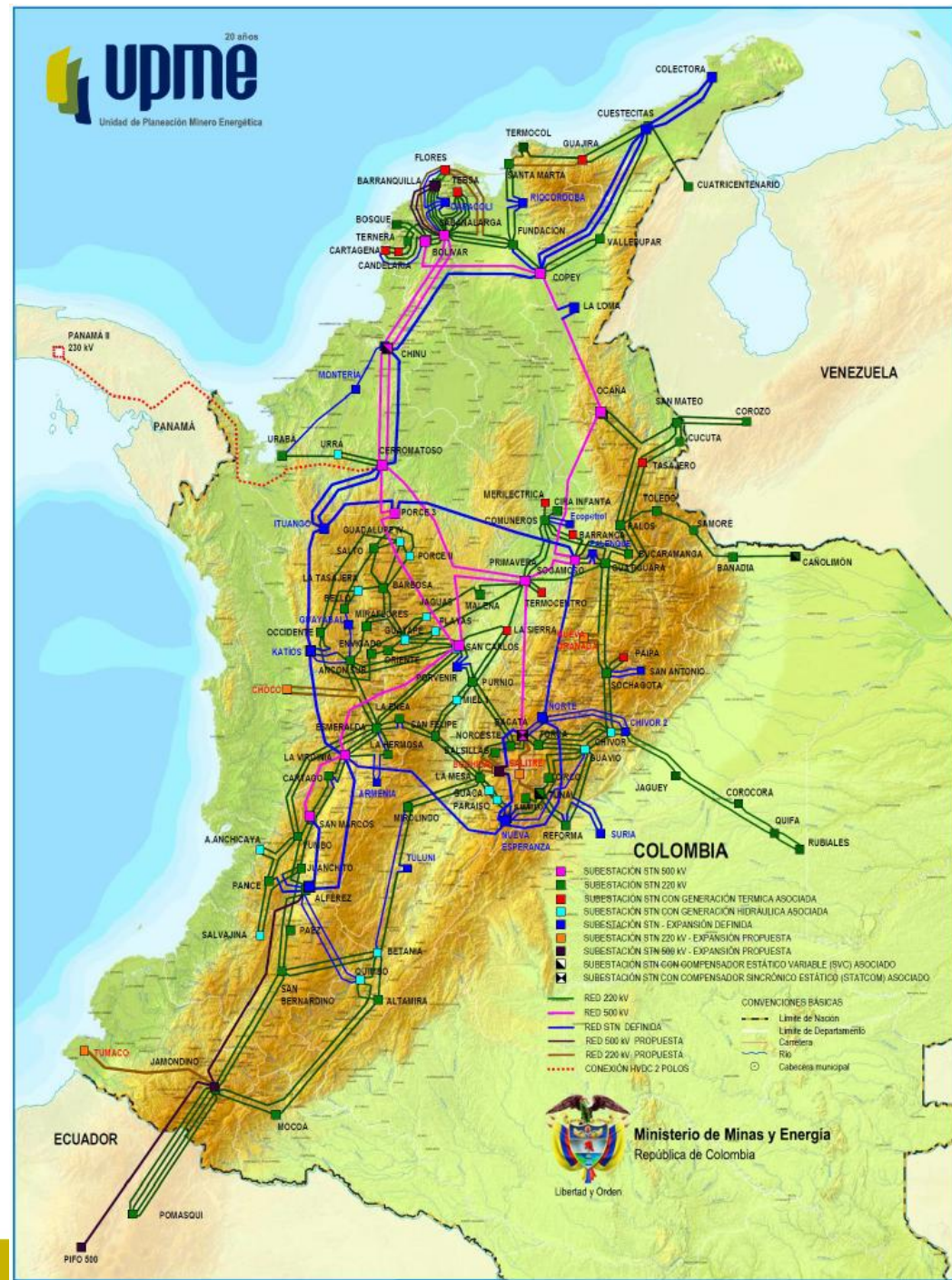
Installed capacity (2013)				
Source	2012 MW	2013 MW	Share %	Change (%) 2013 - 2012
Hydropower	9,185	9,315	64.0%	1.4%
Thermal	4,426	4,515	31.0%	2.0%
Natural Gas	2,122	1,972		
Coal	997	997		
Fuel - Oil	0	0		
Combustóleo	307	307		
ACPM	678	917		
Jet1	46	46		
Gas-Jet A1	276	276		
Small power plants	693	662	4.5%	-4.4%
Hydro	591	560		
Thermal	83	83		
Wind	18	18		
CHP (most biomass)	57	66	0.5%	15.7%
Total	14,361	14,559	100.0%	1.4%



Renewables forecast (expected after Law 1715)



Transmission system – Vision 2028



Objectives of the National Energy Plan - 2050

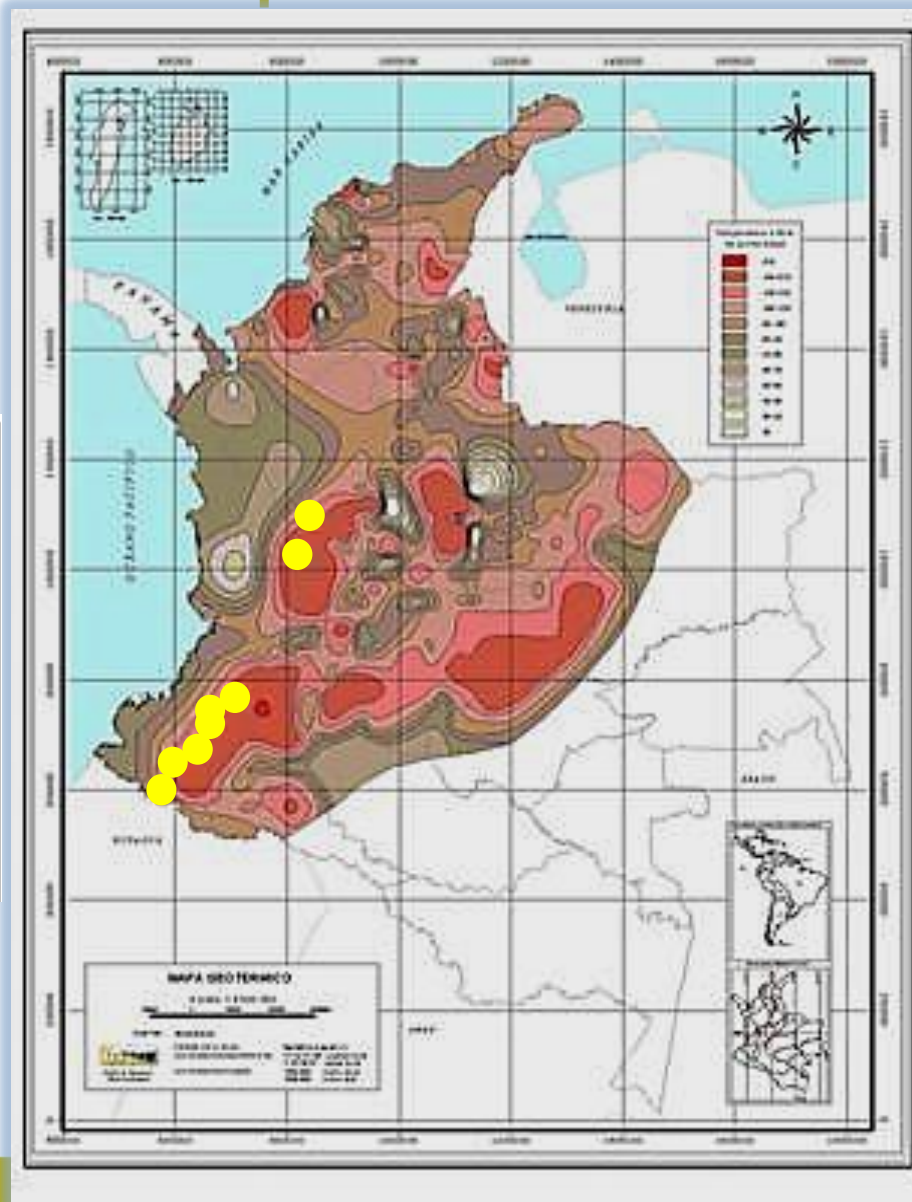


- Main goal: To achieve internal and external efficient energy supply, with minimum environmental impact, and creating value for regions

Key issues for geothermal development in Colombia

Potential areas

Área	Departamento	Potencial
Chiles-Cerro Negro	Nariño	Alto
Azufral de Túqueres	Nariño	Alto
Doña Juana	Nariño	Desconocido
GrupoSotará	Cauca	Desconocido
Puracé	Cauca	Desconocido
Machía	Huila	Alto
Cerro Bravo	Nariño	Alto
Nevado del Ruiz-Santa Isabel	Caldas	Alto
Cerro España	Caldas	Alto
Machía	Huila	Alto



Key issues for geothermal development in Colombia

Potentials

	Potential (MW)	Installed capacity (MW)	% used
Argentina	2,010	0	0%
Bolivia	2,490	0	0%
Brasil	115	0	0%
Chile	2,350	0	0%
Colombia	2,210	0	0%
Costa Rica	2,900	166	5.7%
Ecuador	1,700	0	0%
El Salvador	2,210	204	9.2%
Grenada	1,110		0%
Guatemala	3,320	49	1.5%
Honduras	990		0%
Jamaica	100		0%
México	6,510	965	14.8%
Nicaragua	3,340	88	2.6%
Panamá	450	0	0%
Perú	2,990	0	0%
Venezuela	910	0	0%
Total LA&C	35,705	1,472	4.1%

Key issues for geothermal development in Colombia

- Suitable areas for exploration and use of geothermal resource (e.g. If protected areas such as national parks and its limits)
- Maximum extension of the areas to be concessioned
- Procedures for licencing (exploration and production) – granting concessions (production)
- Periods for concessions and licenses
- Enabling conditions for granting and keeping the concessions
- Constraints on resource utilization to ensure sustainability

Key issues for geothermal development in Colombia

- Conditions for development facilities and infrastructure (e.g. access roads, camps, etc.)
- Constraints on the use of water, chemicals and materials (sludge, concrete, steel), noise emissions, affecting the landscape, emissions, treatment and discharge or reinjection of fluids
- Minimum safety requirements
- Social and communities considerations (prior consultation processes)

GRACIAS

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