



El futuro  
es de todos

Minenergía

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# ENERGY TRANSITION IN COLOMBIA

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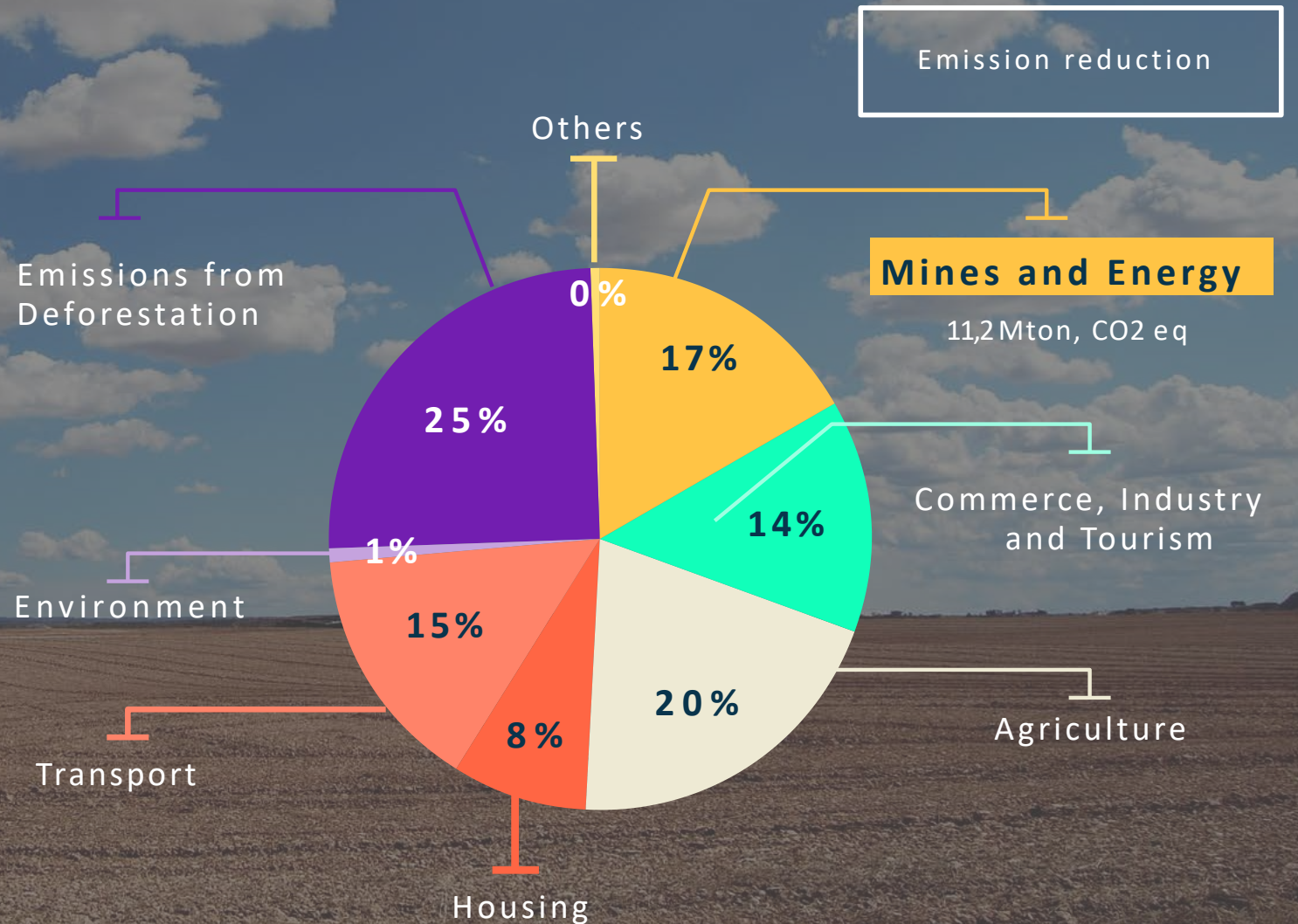
1. Focused on our environmental commitments
2. Electrify the Colombian economy in a sustainable way
3. key factors for Energy transformation in Colombia

**Focused on our environmental  
commitments**

Paris Agreement  
Colombia will reduce 20% its emissions to 2030  
through mitigation actions

▼  
Projection to 2030  
(baseline):  
**332,4 Mton CO2 eq**

▼  
Emission reduction  
goal:  
**66,4 Mton CO2 eq**



Emission reduction

**Mines and Energy**

11,2Mton, CO2 eq

Commerce, Industry  
and Tourism

Agriculture

Emissions from  
Deforestation

Environment

Transport

Housing

Others

Colombia does not move away from the world scene, with transport being the consumer of 40% of energy sources.

Final energy consumption in Colombia

**Transport  
40%**

**Industrial  
24%**

**Residential  
20%**

**Others  
10%**

Source: UPME

We must promote the replacement of liquid fuels  
**Diesel 43%**  
**Gasoline 41%**  
**Jet fuel 8%**  
**Natural gas 3%**

**EV 3430 - January 2020**  
**Cars 1634**  
**Bus 124**  
**Motorcycle 1558**  
**Truck 114**

Source:  
MinTransporte

**“The mining-energy sector Plan for Climate Change Management (PIGCCM-E)”**

**This plan has 3 strategies focused in energy Efficiency 1,21 Mton, electricity Generation matrix 4,74 Mtons demand management 2,01 Mtons and other. COMPROMISE 11,2 MTONs**

# Air Quality

in Colombia

**8.052** Deaths per year

**3,4** Billions of Dollars  
for morbidity and mortality costs

**1,5%** of GDP 2015

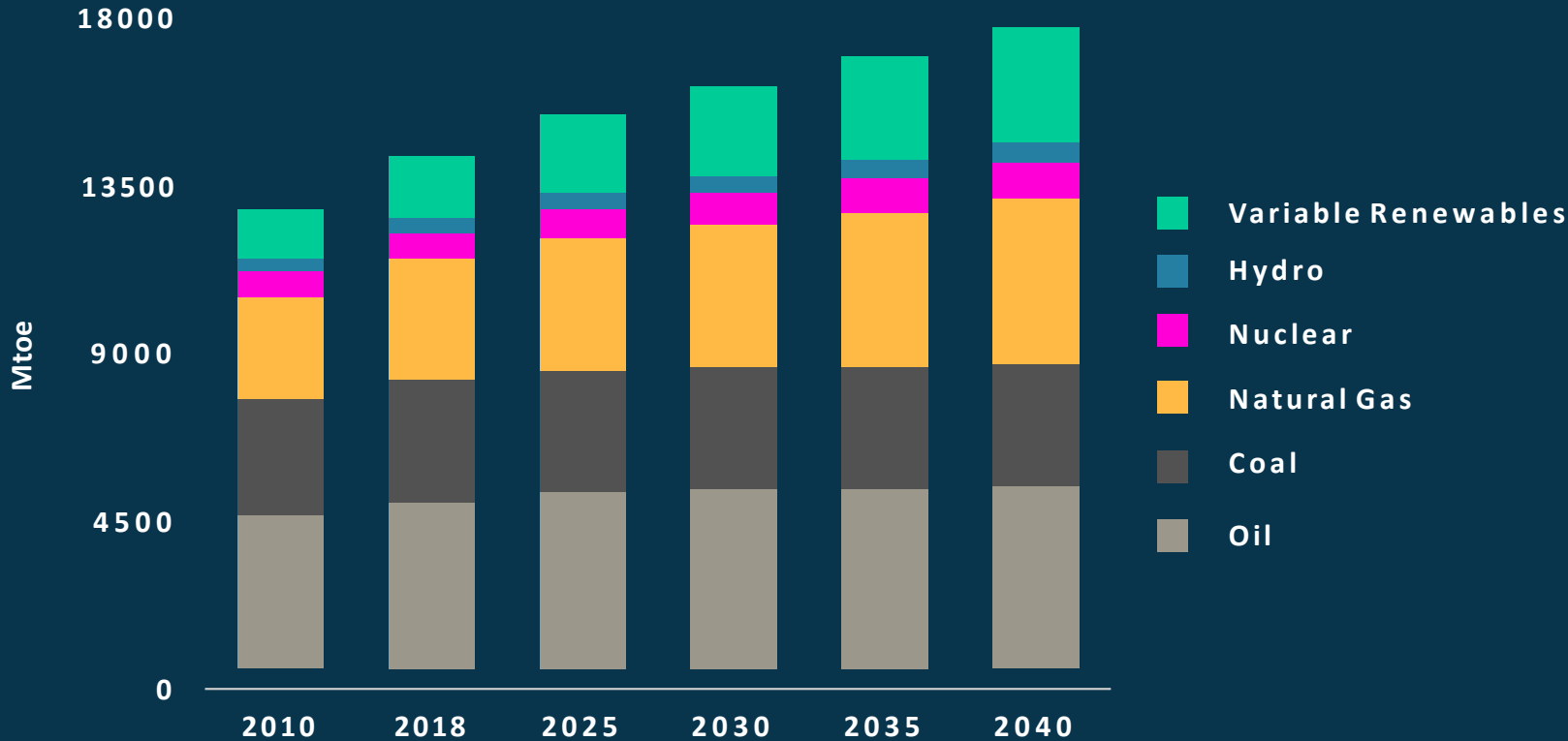
Source: DNP 2017



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# The world's energy demand is changing



**80%**

Growth of variable  
renewables (2018-2040)

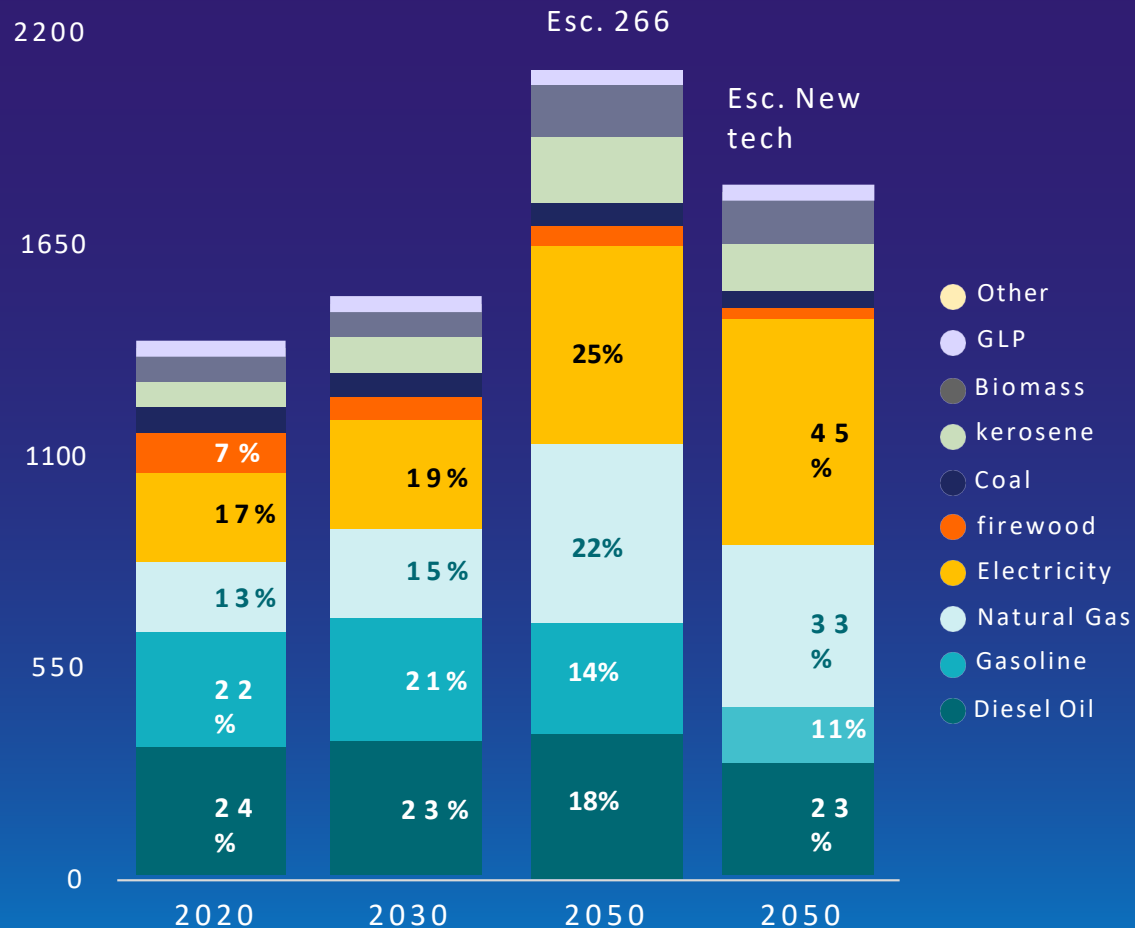
Getting to represent

**17%**

**Of the energy demand**

in 2040 (3,073 Mtoe)

# COLOMBIA WILL TRANSFORM ITS ENERGY BASKET, BUT ALSO WILL REQUIRE AN ENERGY MIX



## IN 2050

- ★ Electricity and natural gas will add 47%, surpassing liquid fuels
- ★ The transport sector will be the great driver for changes in demand. 30% of the country's vehicles, including motorcycles, will be electric
- ★ The big drivers, at the supply level, will be electricity, natural gas and jet fuel





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# Our goal



Electrify the Colombian economy in a sustainable way

# Energy Strategic Pillars

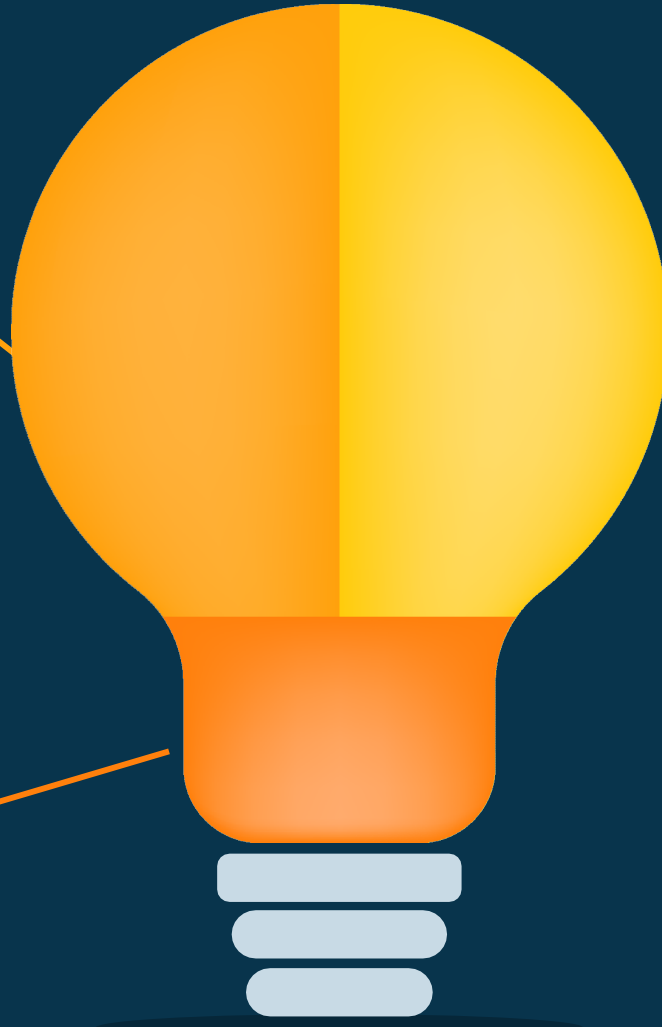



Efficiency

Reliability  
and Coverage



Sustainability





During this four-year period  
we will give access to  
electric power to

**500** thousand  
— Colombians —

**97%**

Rural and urban  
coverage index

Today

**2million**

Colombians without  
access to electricity

Our Progress

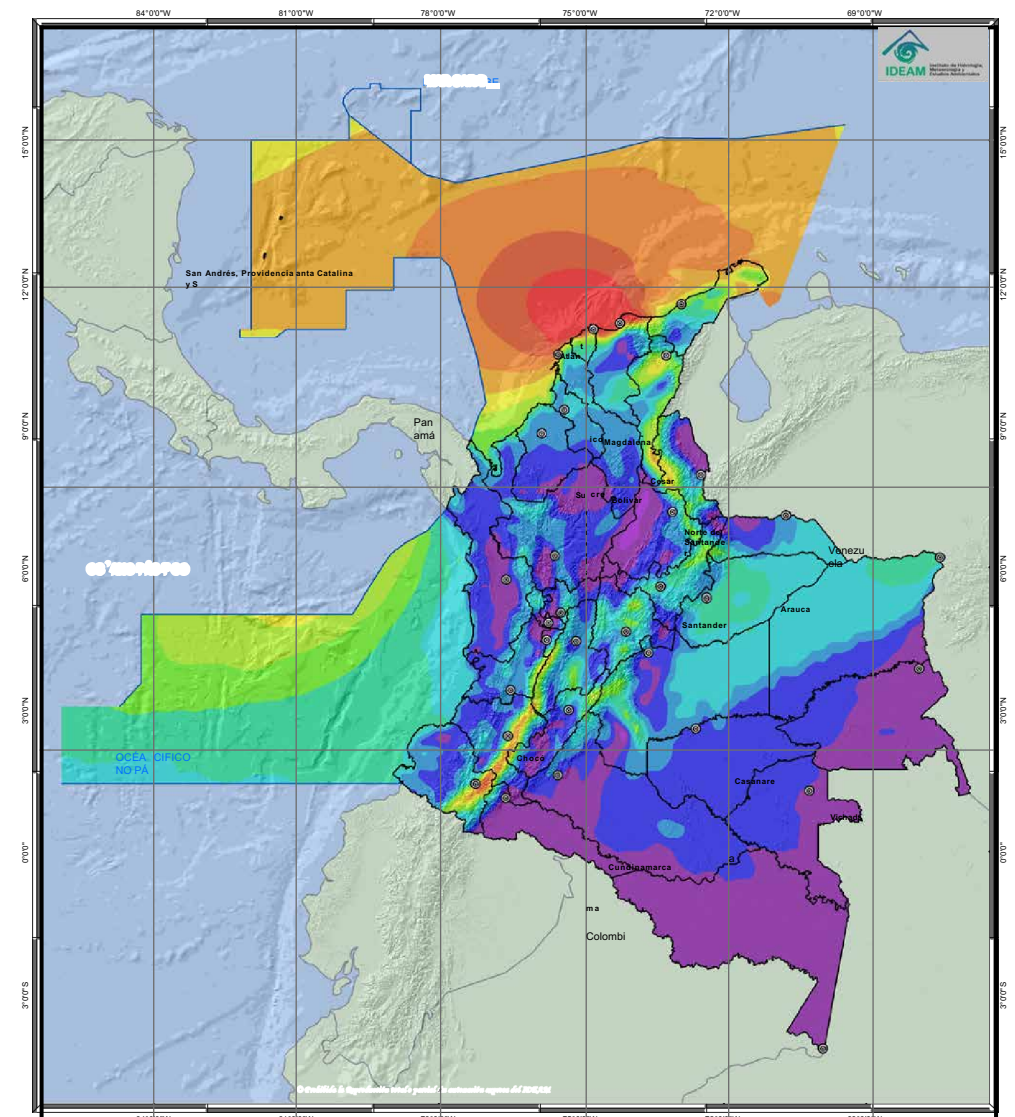
**16,034**

Families with electricity  
in our first year



# High potential for wind power generation

Wind speed in La Guajira is two times faster than the world average - 9 meters/second at a height of 80 meters

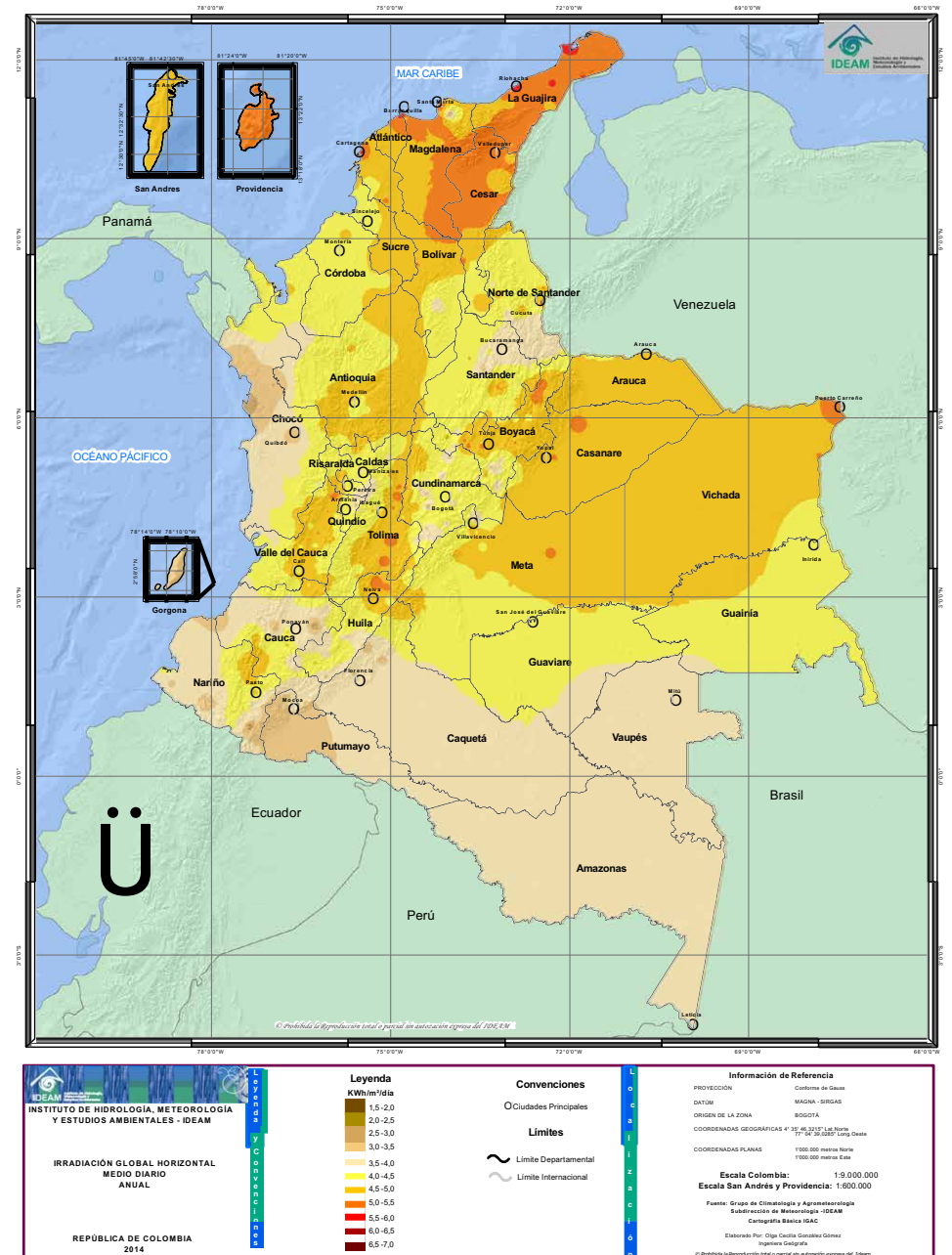


Leyenda		Con convenciones		Información de Referencia	
	VELOCIDAD DEL VIENTO DE MÁXIMA ENERGÍA (m/s)		Ciudades Principales	PROYECCIÓN	Coordenada de Gauss
	ENERO		Valle del Cauca Límites	DATUM	MAGNA - SIRGAS
	REPÚBLICA DE COLOMBIA 2015		Límite Internacional	ORIGEN DE LA ZONA	BOGOTÁ
			Límite Marítimo	COORDENADAS GEOGRÁFICAS	4° 35' 48" 2015 Lat Norte 77° 37' 38" 2015 Long Oeste
				COORDENADAS PLANAS	1000 000 metros Norte 1000 000 metros Este
				Escala Colombia:	Guajira 1:12.000.000
				Escala San Andrés y Providencia:	1:12.000.000
				Fuente: Grupo de Modelamiento de Tiempo y Clima Subdirección de Meteorología - IDEAM Cartografía Básica ISAC	
				Elaborado Por: Juleta Santa Cecilia Cartografía SIG - Meteorología	
				© Prohibida la Reproducción total o parcial sin autorización expresa del IDEAM	

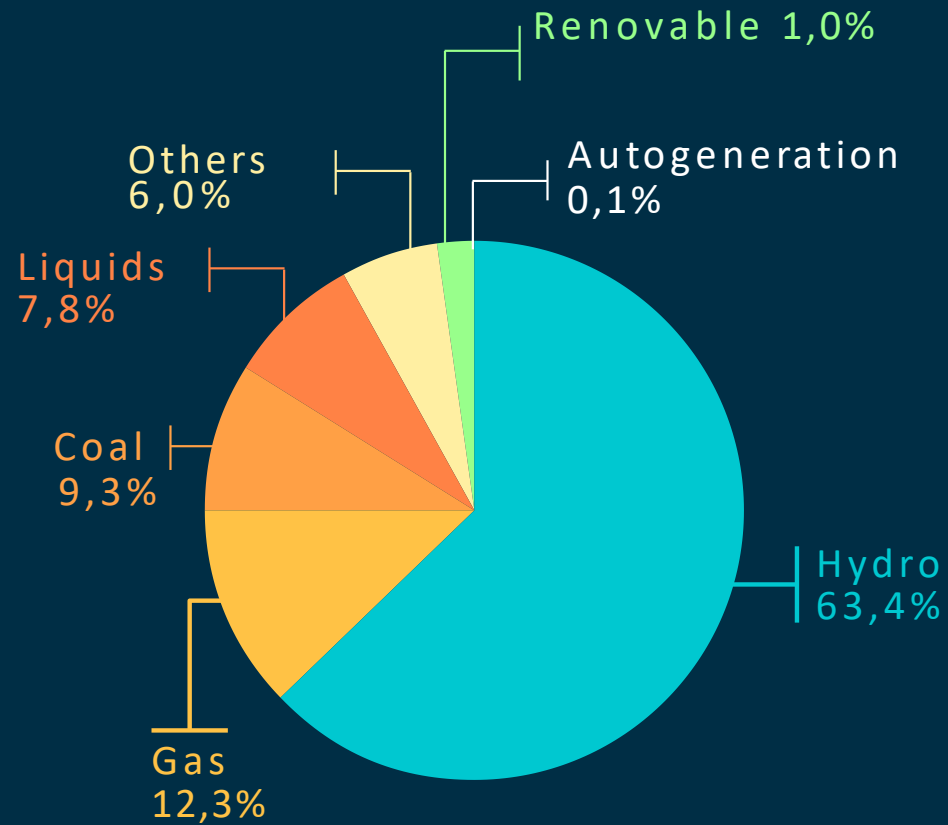


# High potential for solar energy

Solar radiation in La Guajira is 60% above world average



# Our electric generation matrix in 2019



2018

## High dependence on water sources

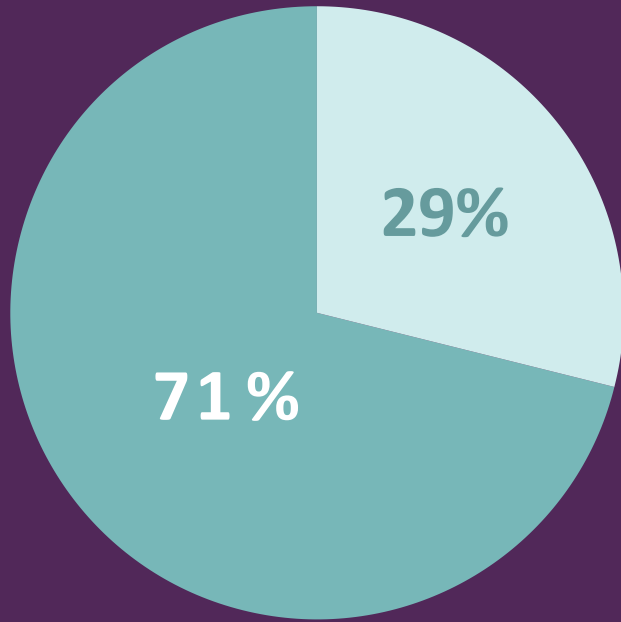
Vulnerability during "El niño" Phenomenon

PND goal

Pass from **50 MW**  
to **1500 MW**

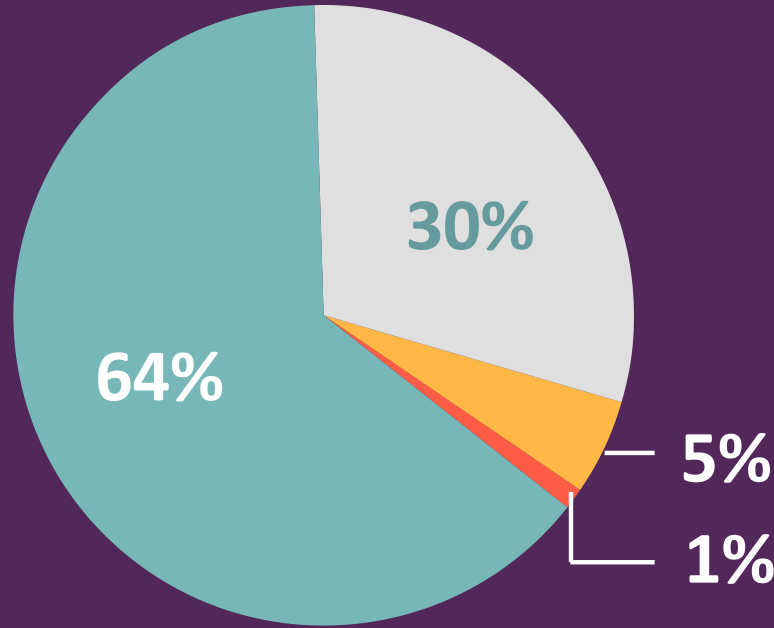
of installed capacity in alternative resources sources

# Our Power Generation Mix



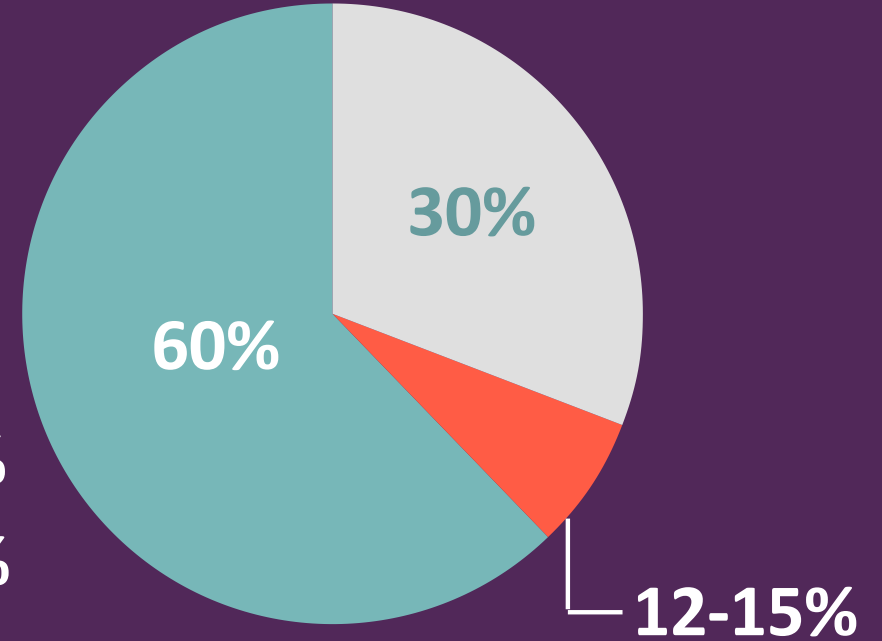
● Hydro      ● Thermal

2018



● Hydro      ● Thermal  
● Wind      ● Solar

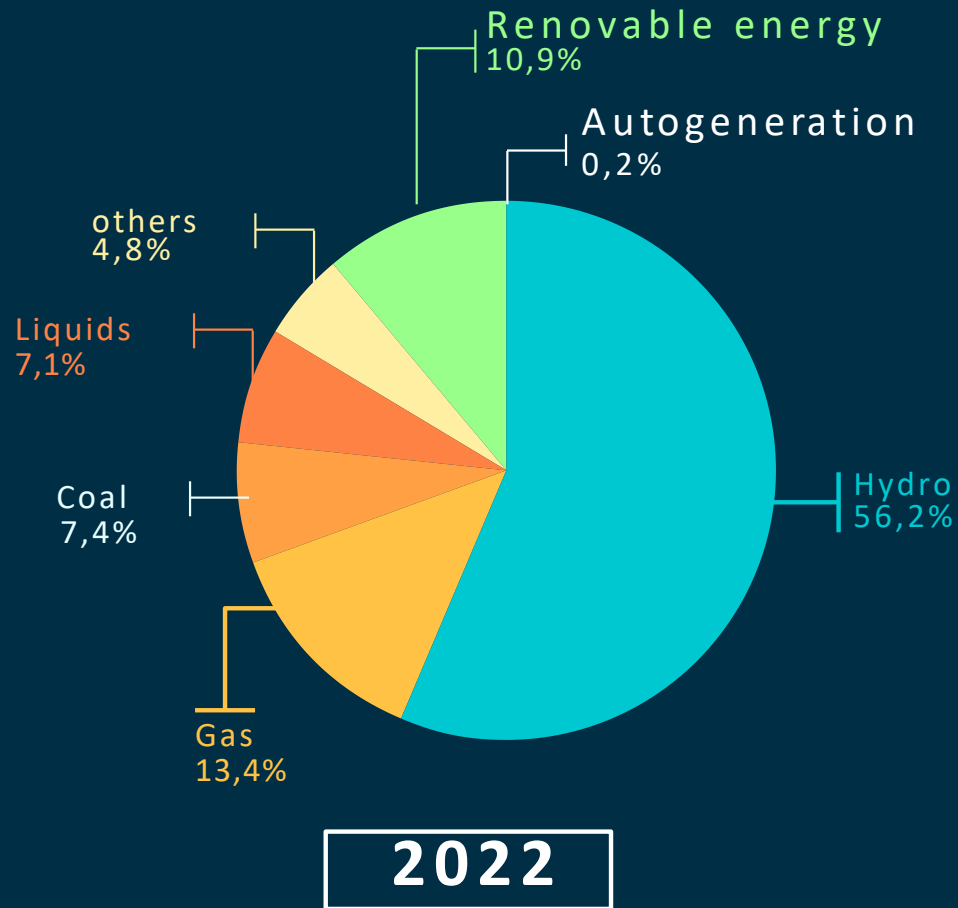
Reliability Charge  
Projects



● Hydro      ● Thermal  
● Solar & Wind

2022

# Our electrical matrix in 2022



With the results of market mechanism Auction, we exceed the proposed goal

We reach **2200 MW**

of installed capacity in 2022 equivalent to ~10.9% of the electric matrix



### National Development Plan 2018-2022

**Extension of 50% income tax reduction** on investments made in renewable energy projects from 5 to 15 years. Removal of the authorization process at the environmental agency (ANLA).

**Automatic exclusion of VAT in the acquisition of solar panels and electric equipment for solar systems.** Speeds up the process to harness the benefits established in Renewable Energy Law (1715-2014).

**Electricity project's contribution to communities:** 1% of the gross sales from renewable energy projects will be destined to improve the community's life standards.

**Renewable Energy purchase:** 8%-10% of the energy purchases of retailers must come from renewable energy projects.

### Exclusion of Environmental Procedure

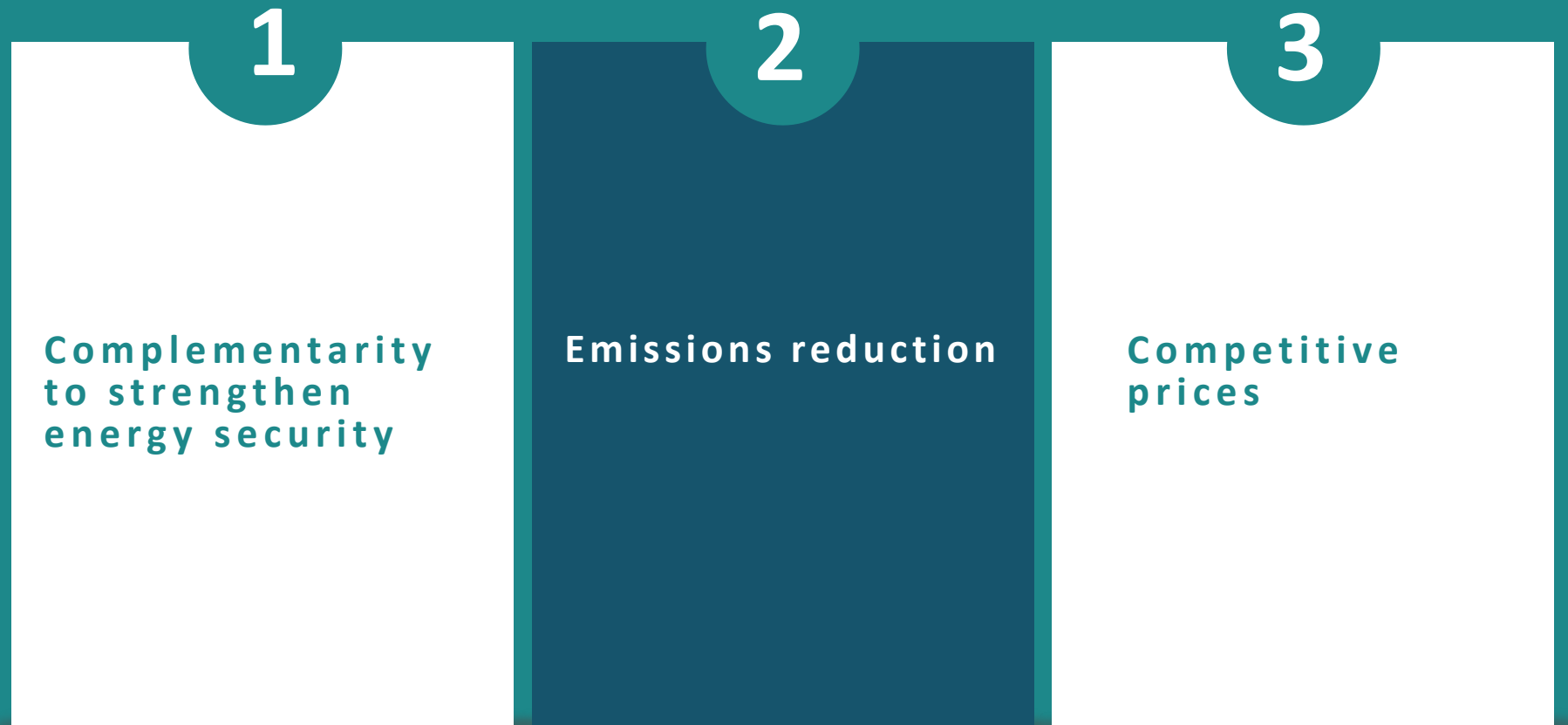
**Decree 2462 - 2018** excludes renewable energy projects with capacity higher than 10 MW of carrying out the Alternative Environmental Assessment (DAA) process.

### Electric Vehicles Tariff

**0% Tariff for electric vehicles:** This incentive will be extended indefinitely.

# Renewable Energy Auctions Program

The long-term contract auction program seeks:



In the second half of 2019 we will have the second auction

# Power Sector \* 7700 MW

\* In renewable Energy Projects (129)  
with approved grid connection

A close-up, low-angle shot of a white wind turbine against a dark blue sky. The blades are partially visible, extending from the central hub.

2531 MW

Wind

A perspective view of a large array of solar panels stretching into the distance under a clear sky. The panels are dark with a grid pattern.

5177 MW

Solar

A pile of light-brown biomass pellets in the foreground, with a small green plant growing out of the center. The background is a soft, light green.

48 MW

Biomass

We have

**2.500 MW**

Of install capacity in  
2022, this represents  
near

**12%**

Of electricity matrix

Through two auctions, self-generation  
projects of Ecopetrol and the Alliance  
between EPM and Invenergy

Reduction of  
**9 millions**  
of CO2 tons

**¡WE ALREADY HAVE RESULTS!**

14 projects + self-generation projects!





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The National Strategy for  
Electric Mobility will provide  
an additional reduction of  
3.7 Mton of CO<sub>2</sub> by 2030



El ambiente  
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Minambiente



La movilidad  
es de todos

Mintransporte



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DNP  
Departamento  
Nacional de Planeación



Cooperation:





# Ministry of Mines and Energy Actions

1



Definition of Strategy for low and zero emission fuels in transport sector

2



Energy efficiency and labeling regulations

3



Analysis of charging infrastructure for electric vehicles

Hourly rate

4



Technical regulations for chargers



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# ¿How are we going to make it?

## National Development Plan (NDP) 2018 - 2022

Promote sustainable transport

Official fleet replacement program

Regulations for energy labeling and EE

## Electric Mobility Strategy – August 2019

Promote the transition to zero emission technologies.

Facilitate the entry of electric vehicles to the market.

Create and strengthen the regulatory, political and institutional framework.

Develop recharge infrastructure

## Law 1964 – July 2019

### Promote use of electric vehicles

Our goals

**6600**  
Electric vehicles 2022

**600 mil**  
Electric vehicles 2030

# Law 1964 – July 2019

## Promote use of electric vehicles



Tax: 5 %  
Customs Tariff: 0 %  
Consumption tax : 0 %



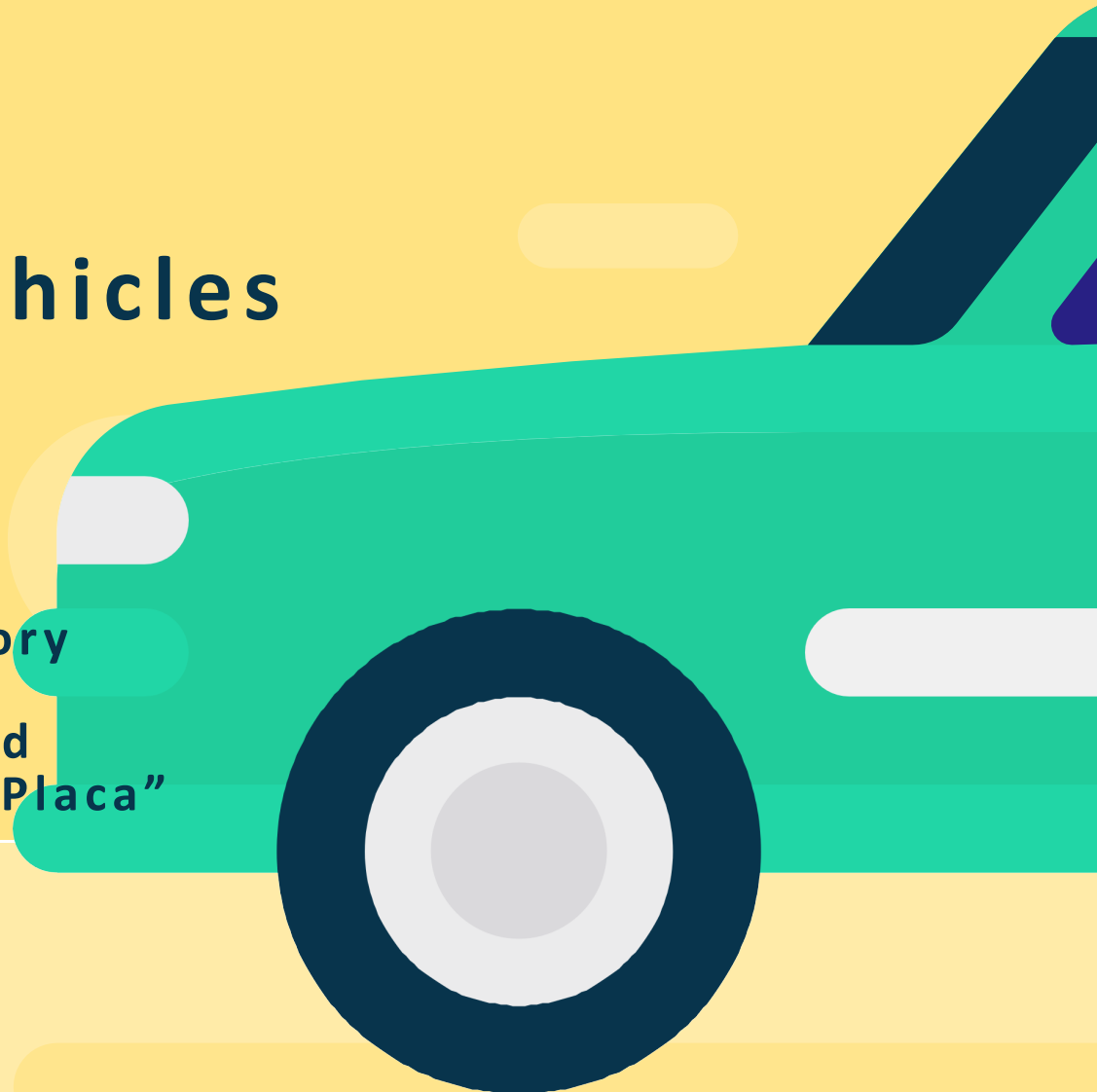
Discounts on mandatory insurance, technical mechanical review and exemption of “Pico y Placa”



By 2035 all new buses will be electric or zero emissions  
Preferential parking



Bogota 20 EV charging stations  
Other cities 5 EV charging stations





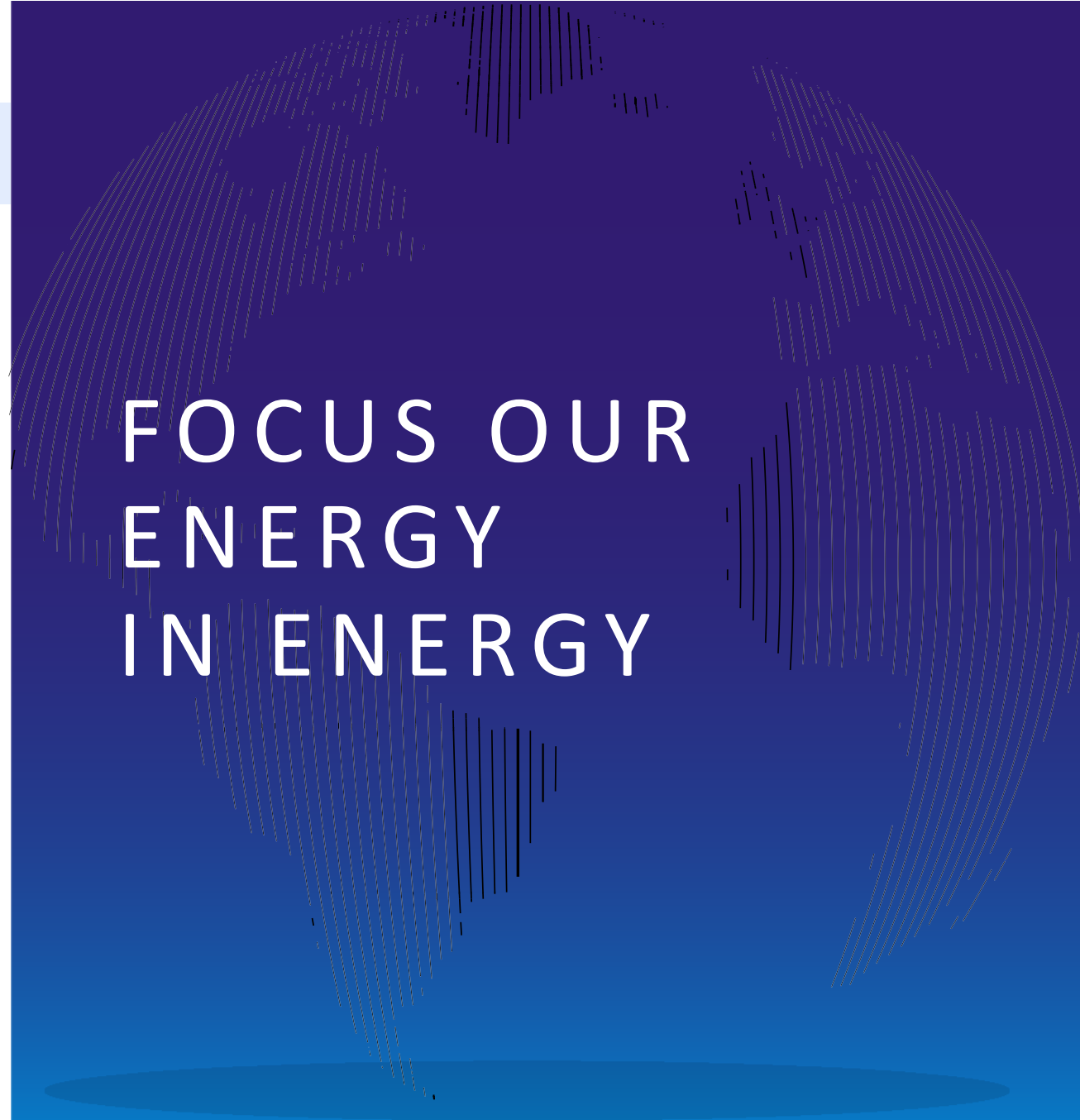


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# Key factors





# FOCUS OUR ENERGY IN ENERGY

The energy  
sector  
represents

80%

Global emissions  
of CO<sub>2</sub> de las  
emisiones

# 90%

of the necessary CO<sub>2</sub>  
emissions reduction for 2050  
would be achieved with

- ★ Renewable energy
- ★ Energy efficiency
- ★ Electrification

Alternative energy cost:  
competitive with other  
technologies



Solar Energy

**78% less**

in 2018 than 2010



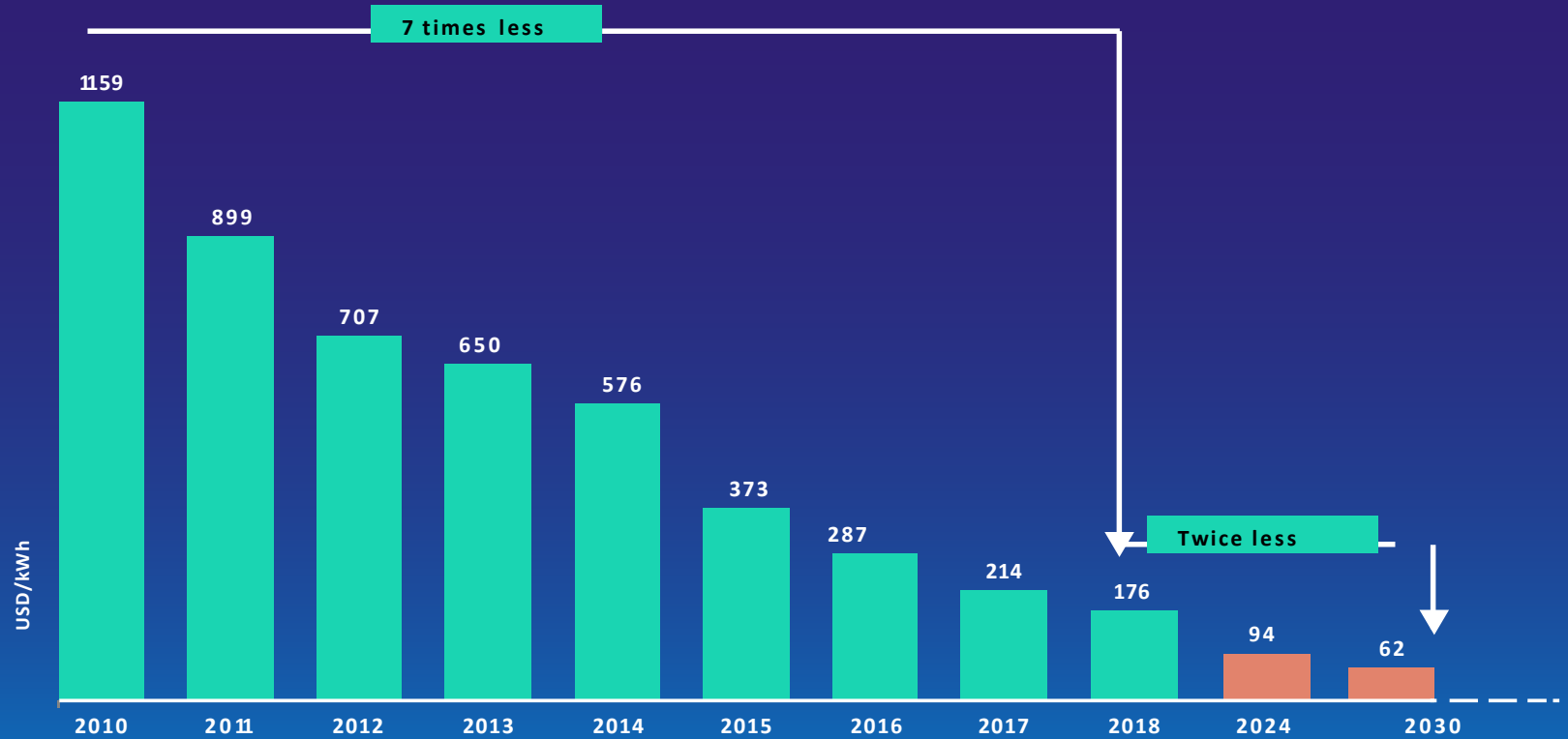
Wind Energy

**24% less**

in 2018 than 2010

## BARRIERS TO GO THROUGH

The cost of batteries is decreasing  
at a rapid rate



Fuente: BloombergNEF.

# Renewable Energy Auctions Program

The long-term contract auction program seeks:

1

Complementarity to strengthen energy security

2

Emissions reduction

3

Competitive prices

Second auction: October 22nd



**Regulatory Agenda:** competitiveness,  
efficiency and transparency in the power  
sector

**Energy Restrictions**

**Grid Connections**

**Self Generation with Renewable Energy**

**Market Behavior Rules**

**Geothermal**

**And we are working on other elements...**

- ▶ Gas transport
- ▶ Analysis of regulated demand limits



## Energy Transformation Mission

Through the Mission we will develop the roadmap for the energy of the future, with 5 strategic focuses:

1



Competition, participation and structure of the electricity market

2



The role of gas in energy transformation

3



Decentralization, digitalization and efficient management of demand

4



Electric power coverage and efficient targeting of subsidies

5



Review of the institutional and regulatory framework



Ángela Inés Cadena



Frank Wolak



Udi Helman



Diego Jara



Pablo Corredor



David Madero



Ana María Ferreira



Carmenza Chahín



Fernando Barrera Rey



Hugh Rudnick



Andrés Escobar



Manuel Maiguashca



Rutty Paola Ortiz



Miguel Juan Révolo



Marcela Eslava



Miguel Vázquez



Carlos Battle



Thomas Mach



Andrei Romero Grass



Luiz Barroso



Ignacio Pérez

## Experts



Manuel Baritaud



Juan Pablo Zárate



Luisa Lafaurie



Andrés Romero



Janice Lin



David Coady



Juan Ricardo Ortega

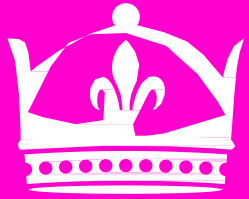


Jean Michel Glachant



Luis Ernesto Mejía

## Peer Reviewers



KEEP  
CALM  
WE STILL  
HAVE  
OIL

5 %

Of national  
GDP

Comes from  
Oil & Gas  
Industry

Oil & Gas  
Represented

18 %

Of foreign  
investment  
(II quarter 2019)

Earnings from  
Oil industry  
represented nearly

12 %

Of the nation's  
current  
revenues  
2015-2018

Oil & Gas Industry  
will contribute

15

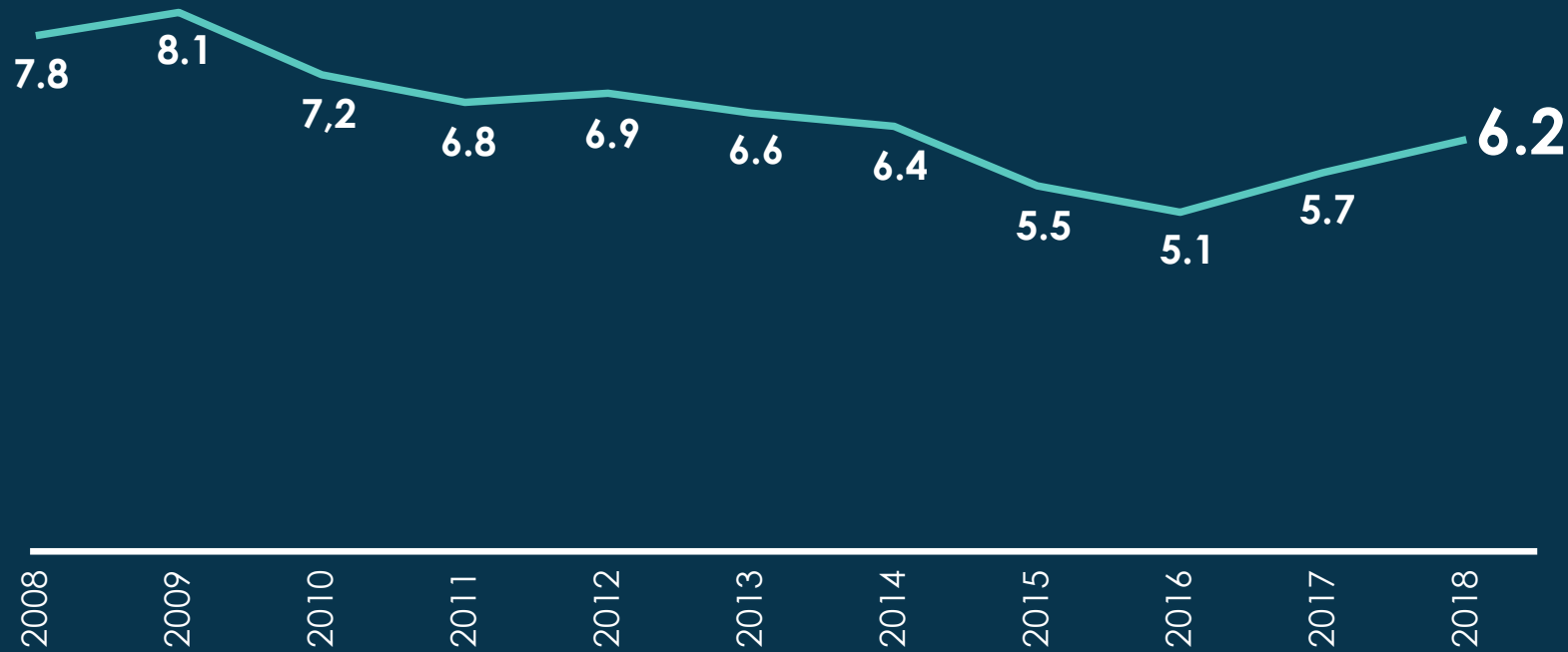
Billion COP

Of royalties  
between  
2019-2020



Colombia has oil reserves that represent **6.2 years of self-sufficiency**

Years of self-sufficiency of oil reserves



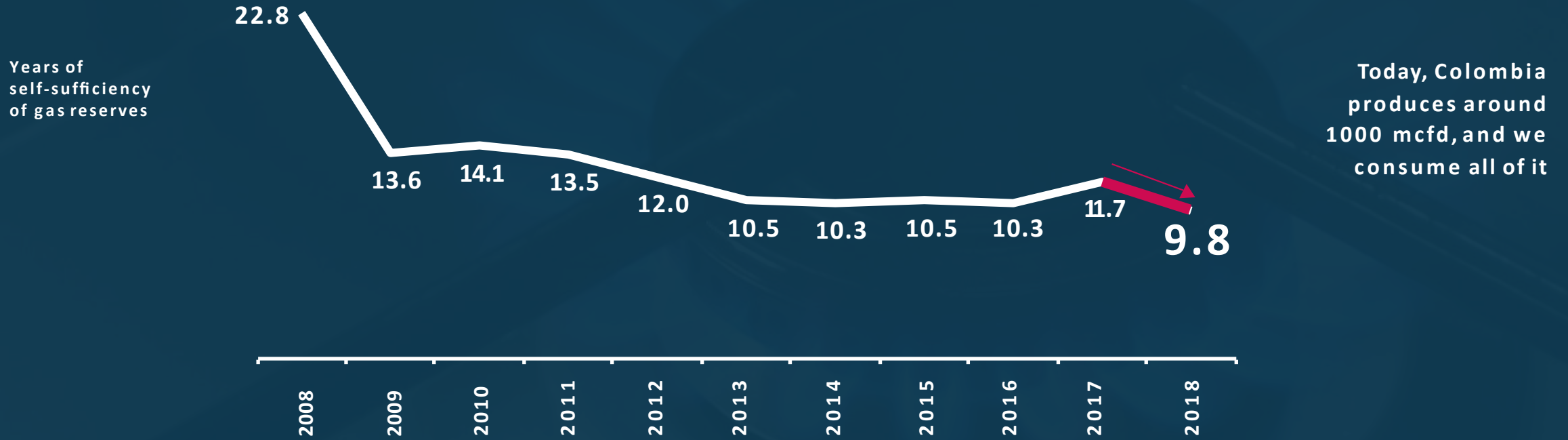
Today, Colombia produces 900 kbpd, we consume 40% for refineries, and the rest is exported

# The role of natural gas



Energy transition

Gas reserves are at 3.8TCF  
and represent **9.8 years**  
of self-sufficiency



Source: MME, ANH

To expand hydrocarbon self-sufficiency we have established four strategic axes

1

Exploration of continental basins

▶ 11 contracts

▶ 500 million USD Investment

2

Enhance oil recovery in existing fields

3

Development of offshore potential

▶ 5 contract conversions to E&P

▶ 900 million USD Investment

4

Possibility of exploring and producing unconventional

▶ Committee of Experts

▶ Pilot /Investigation projects

# Unconventional Deposits

Represent a huge opportunity for our energy security

GDP could grow

10%

Foreign Investment could grow

40%

Our reserves would increase between

Years/Oil

8-22

Years/Gas

35-50

450

k b d

68

Thousand  
New Jobs



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