

***Presentation to the  
IFP Energies Nouvelles***

***Peru's Energy Policy  
and Climate Change***

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Paris, March 2025

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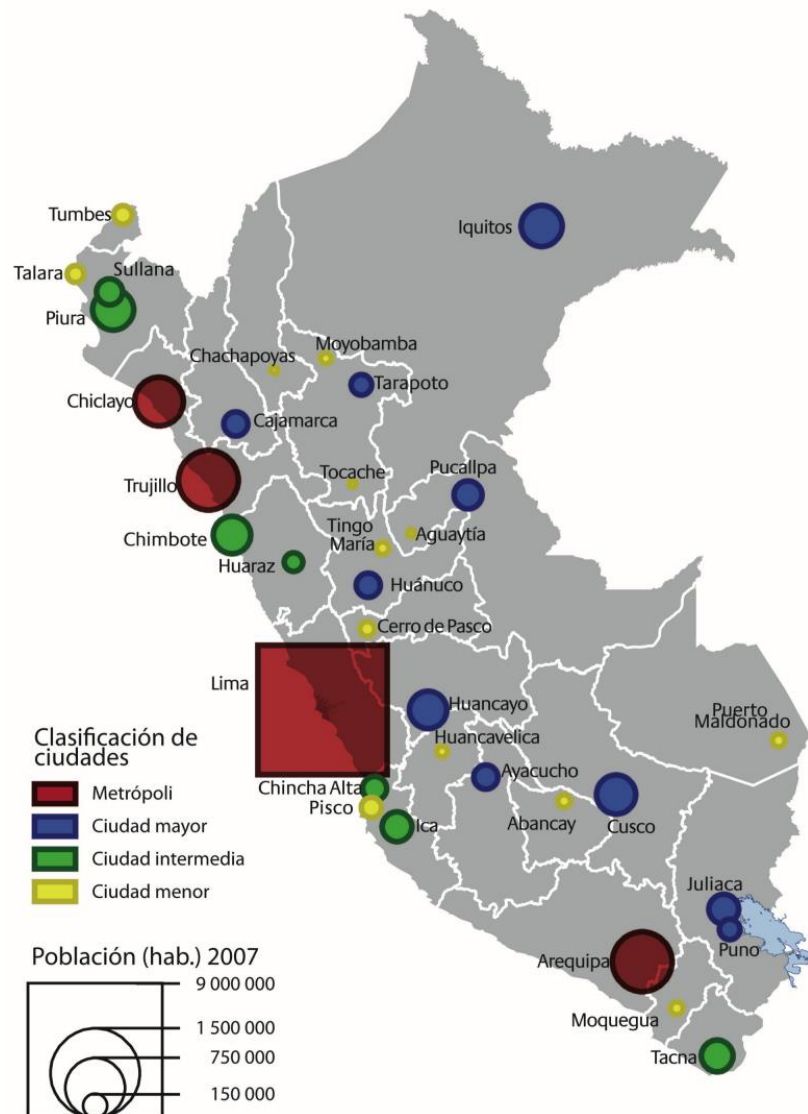
***3- Main Challenges & Conclusions***

# Section # 1

## ***Peru in Numbers***

# Basic information

- **Population: +30 million**
  - **Annual change: 1.1%**
  - **Urban population: 75%**
  - **Coastal area: 52%**
- **High degree of economic concentration in Lima.**
- **High economic disparity between Lima and provinces.**

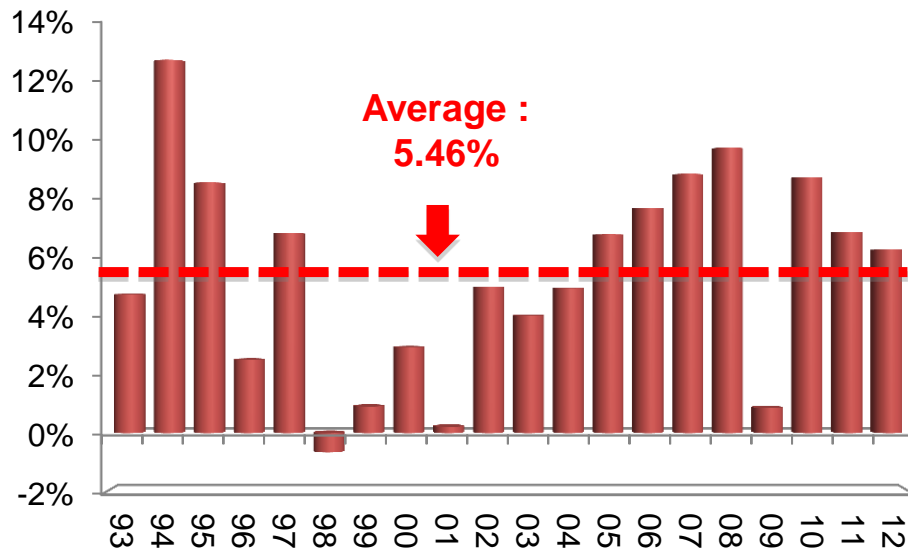


Source: INEI and Geo Graphos.

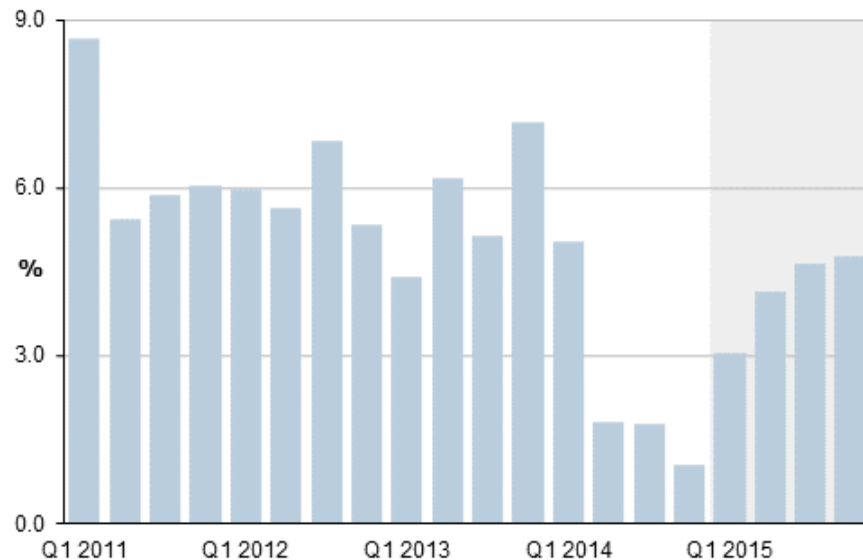
# Stable economic model for 20 years

- The strong state intervention in the economy that prevailed in the 70's and 80's was replaced by:
  - ✓ Privatization and concession programs.
  - ✓ Regulatory agencies (Osiptel, Ositran, Osinergmin, others).
  - ✓ A dual currency system (Soles and USD), with Central Bank autonomy and free capital mobility.
- Now Peru is an open economy:
  - ✓ There are 20 free trade agreements, which account for 95% of exports.
  - ✓ Non-discriminatory treatment of foreign investors.

# Economic indicators

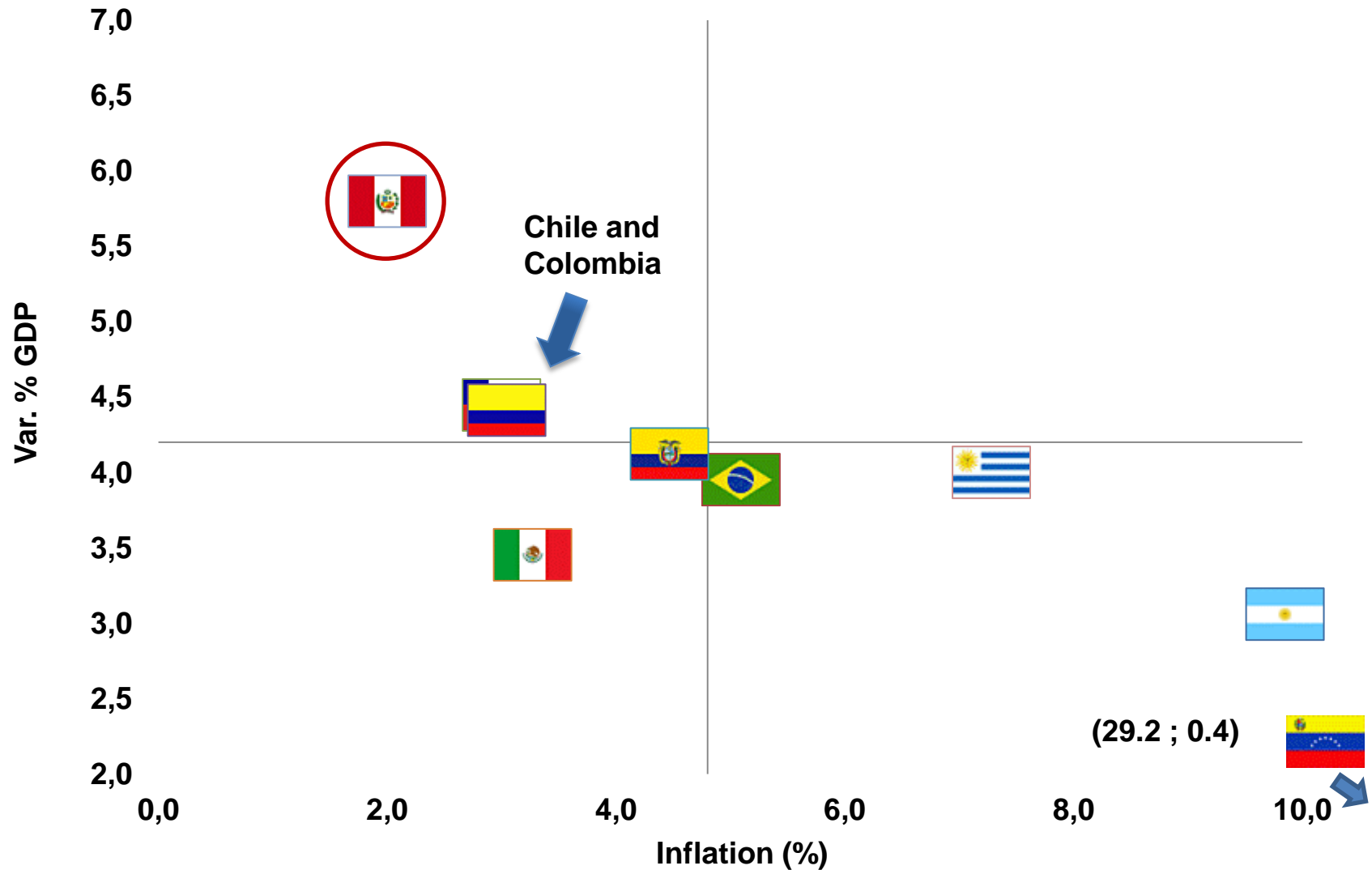


**Sustained growth  
1993-2012 (annual  
change %)**



**In 2014, the drop of  
commodity prices  
impacted Peru GDP**

# Growth and inflation in Latin America



# Mining Production in Peru

Mineral	Global Ranking 2002	Global Ranking 2014
Silver	1	2
Copper	5	2
Zinc	3	2
Lead	4	4
Tin	2	3
Gold	7	6

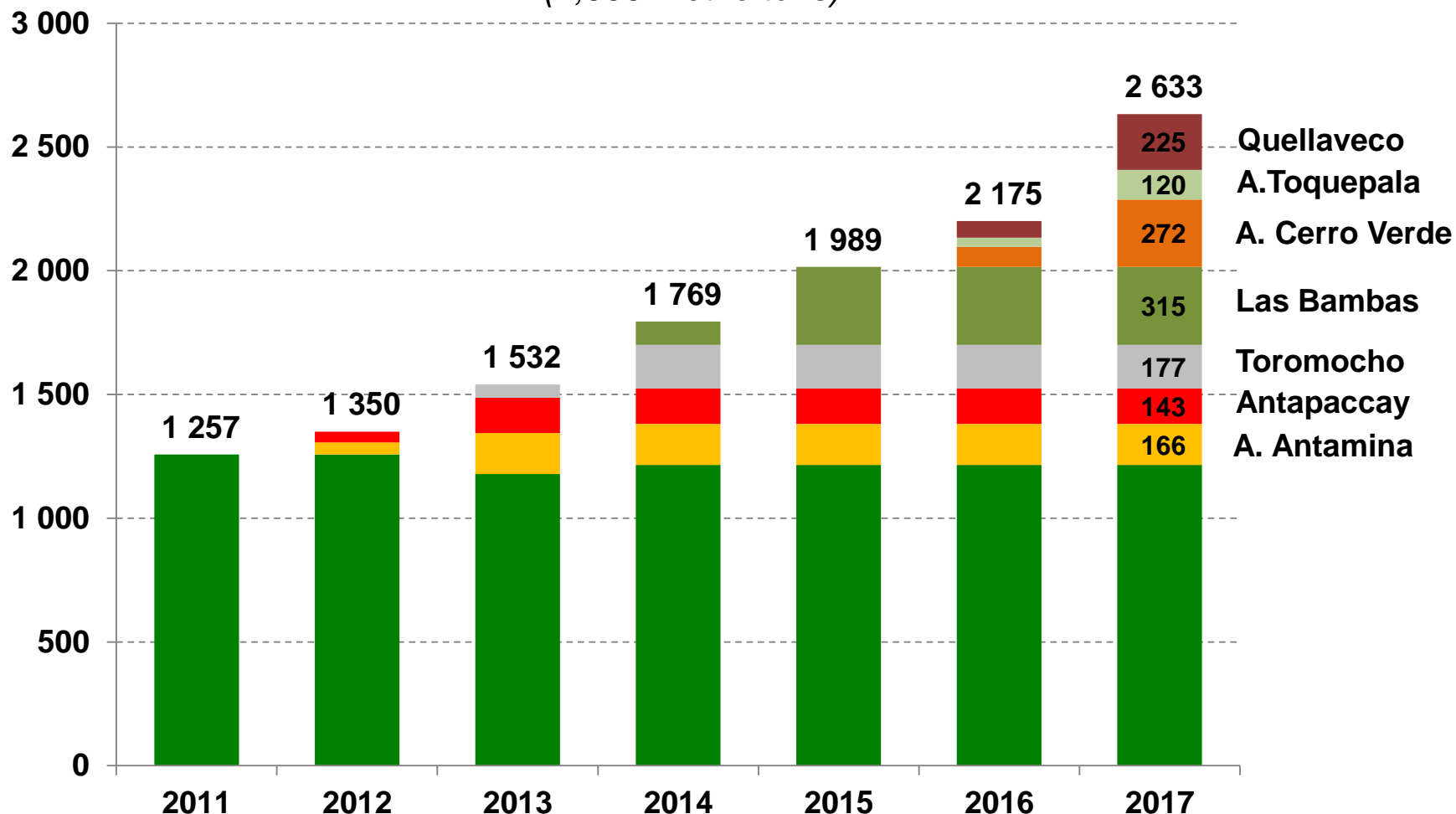
Mining exports account for more than half of total commercial trade balance



# Mining sector projected growth

## Copper exports and mega projects

(1,000 metric tons)



# Portfolio of mining projects

US\$ 61,278 MILL

Ampliaciones



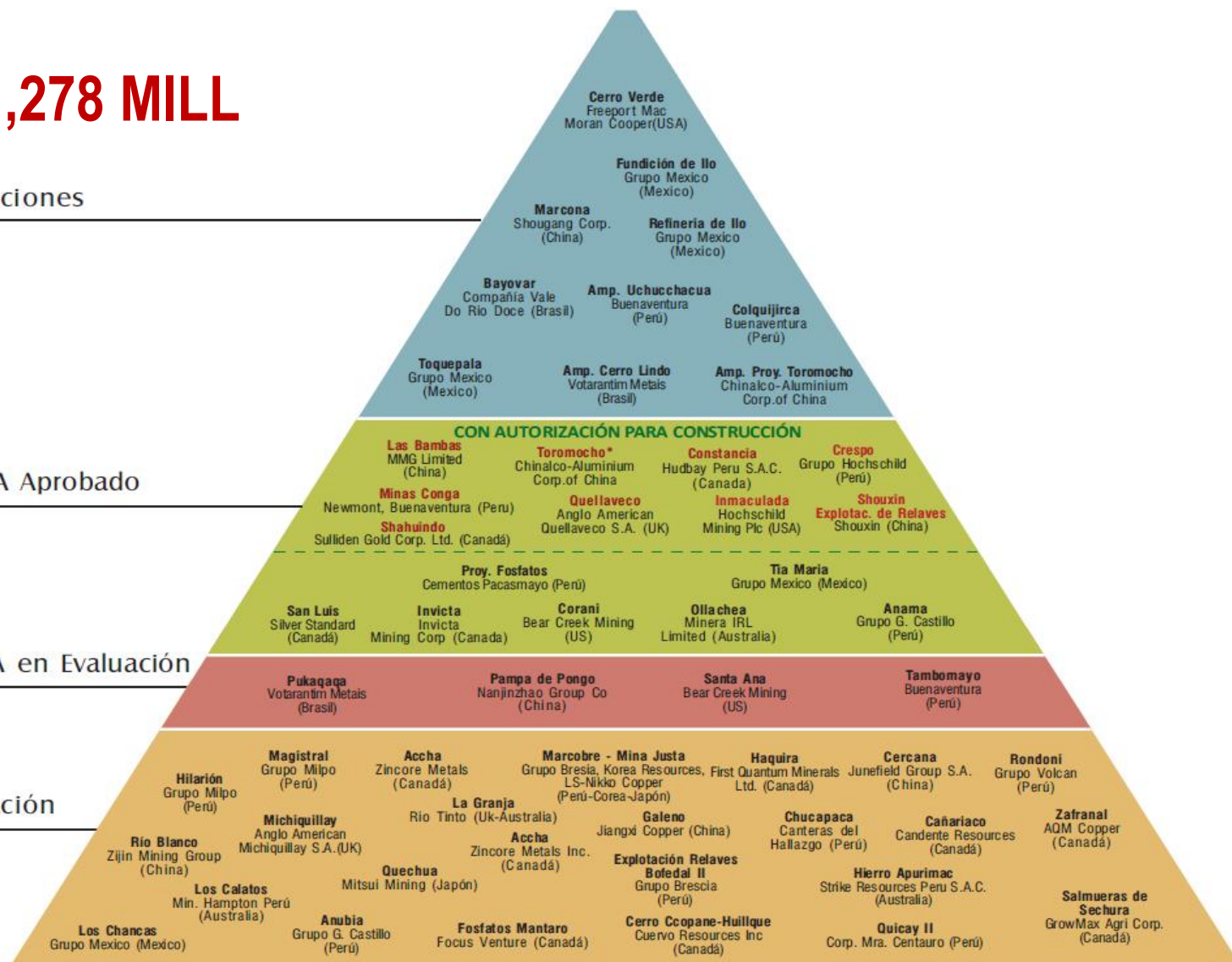
Con EIA Aprobado



Con EIA en Evaluación



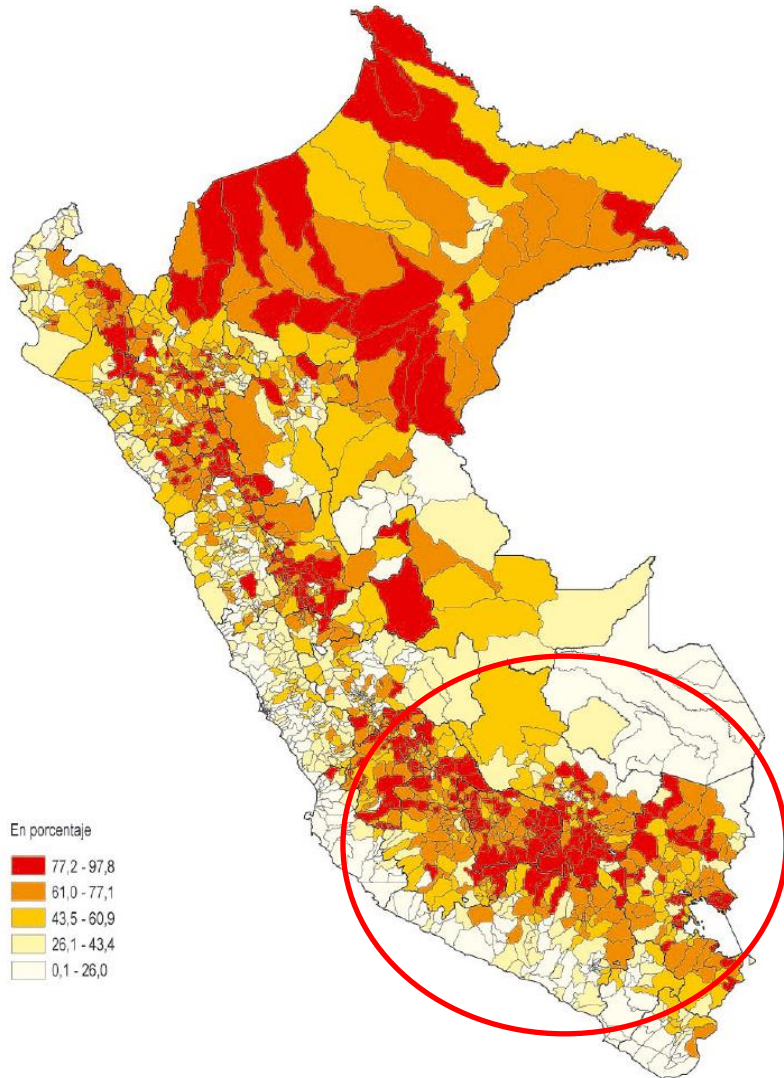
Exploración



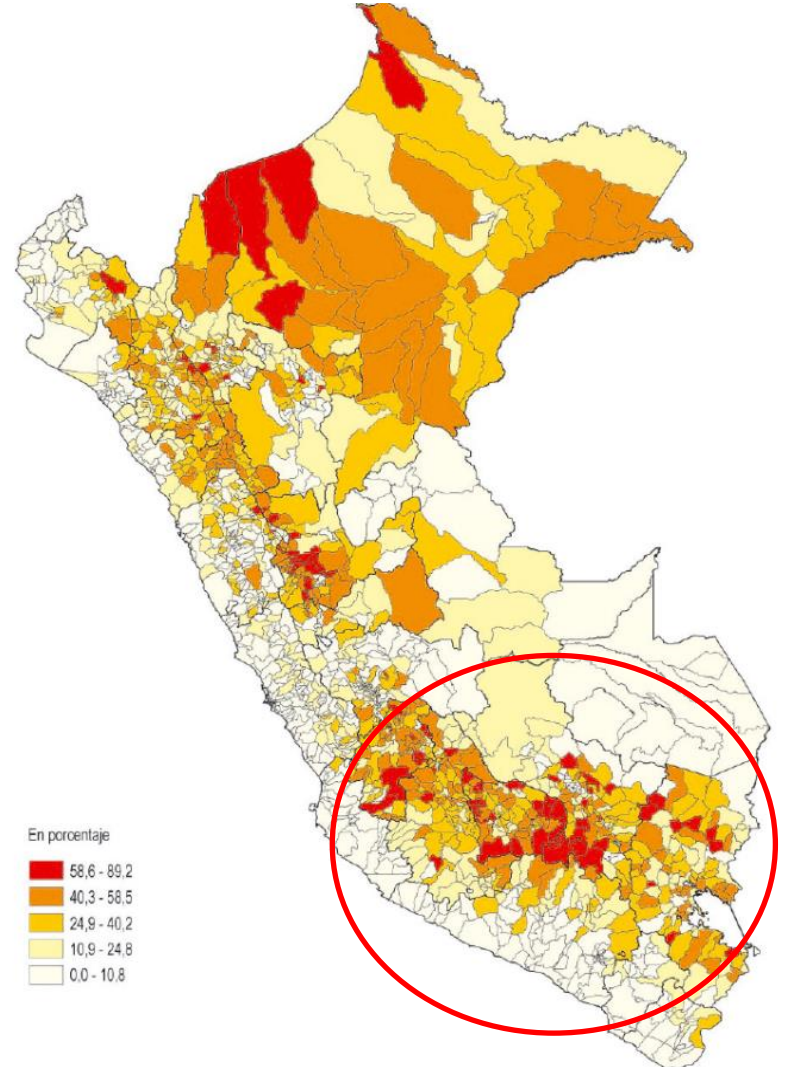
- \* En etapa de comisionamiento minero.
  - Los proyectos han sido ordenados de manera aleatoria
- MINISTERIO DE ENERGIA Y MINAS

# Distribution of wealth

>>> Poverty



>>> and Extreme Poverty

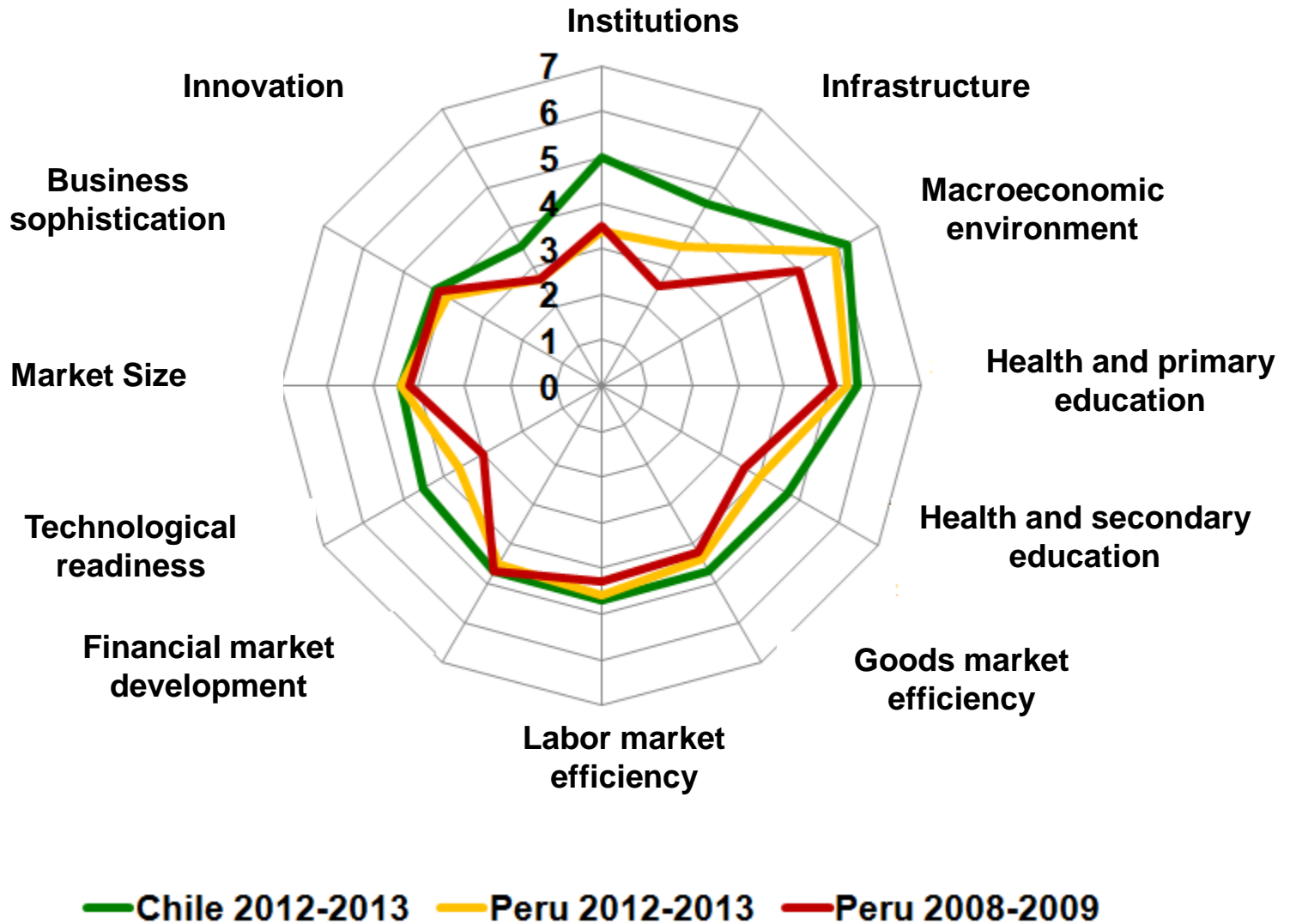


# Important structural weaknesses

- Weak institutional framework.
- Social conflicts in some regions.
- **The infrastructure gap remains important (million US\$):**

Infrastructure investment gap, 2012-2021		
Sectors	Gap (million US\$)	% of total
<b>Hydraulic infrastructure</b>	<b>8,682</b>	<b>26.2</b>
<b>Water and Sanitation</b>	<b>5,335</b>	<b>16.0</b>
Drinking water	1,569	4.7
Sanitary sewer and treating blackwater	3,766	11.3
<b>Telecommunications</b>	<b>19,170</b>	<b>57.8</b>
Broadband	11,852	35.7
Mobile Phones	4,973	15.0
Fixed	2,345	7.1
<b>Total</b>	<b>33,187</b>	<b>100.0</b>

# Competitiveness (WEF)



# Section # 2

## ***Peru's energy sector Outlook to 2025***

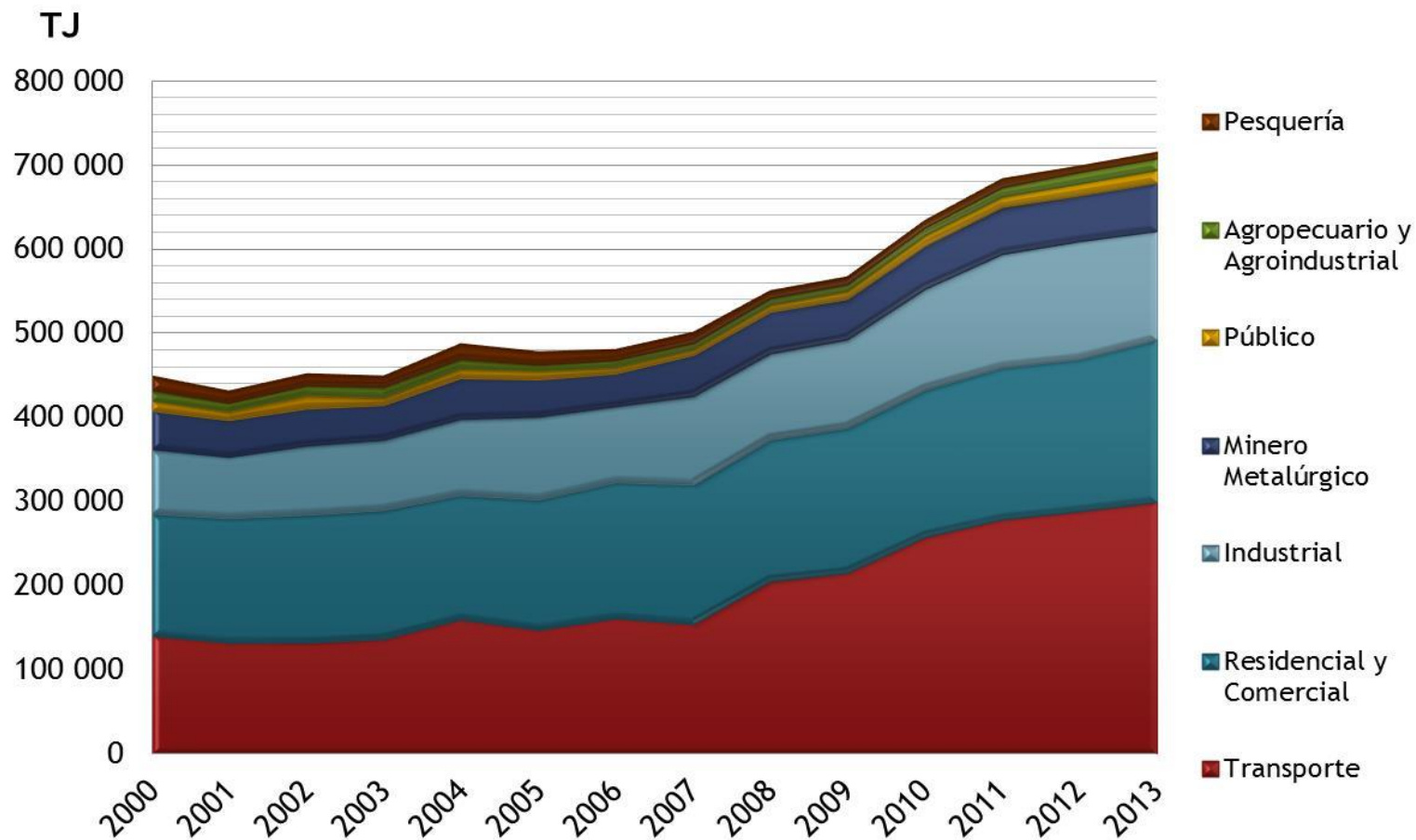
# The last 10 years:

- The development of domestic natural gas has allowed Peru to dispose of sufficient energy for achieving high rates of economic growth.
- The electricity generation mix has incorporated up to 50% of modern gas thermal units.
- The consumption of traditional biomass fuels has declined (charcoal, wood,...) whereas the demand for gas and LPG has increased significantly.
- The consumption of diesel for transport has continued to grow in spite the starting in Lima of the operation of a first mass transport system.
- Hydroelectricity is a key energy source whereas the production of non-conventional renewables sources is still at the beginning.



# Final energy consumption

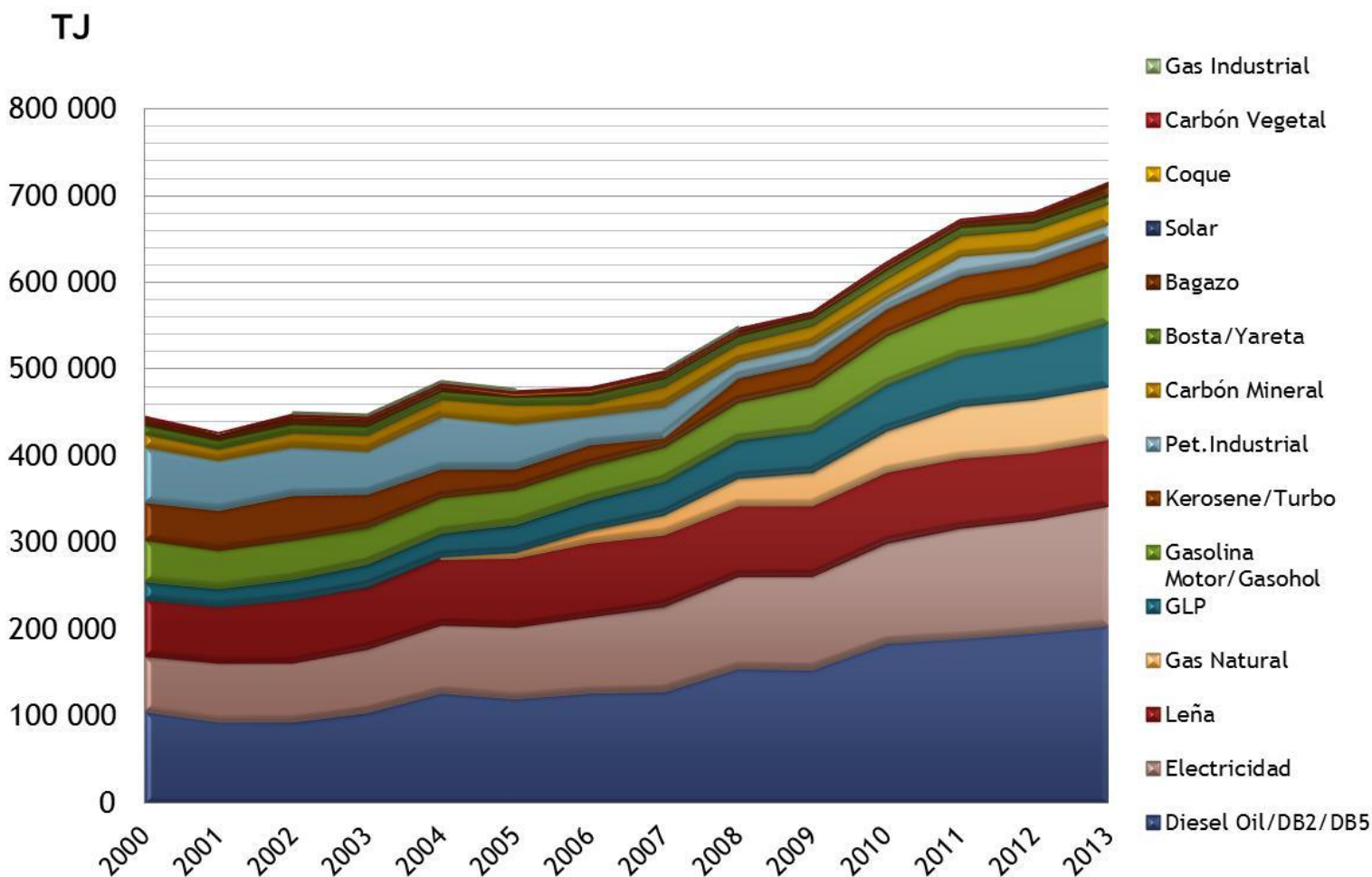
*By economic sector*



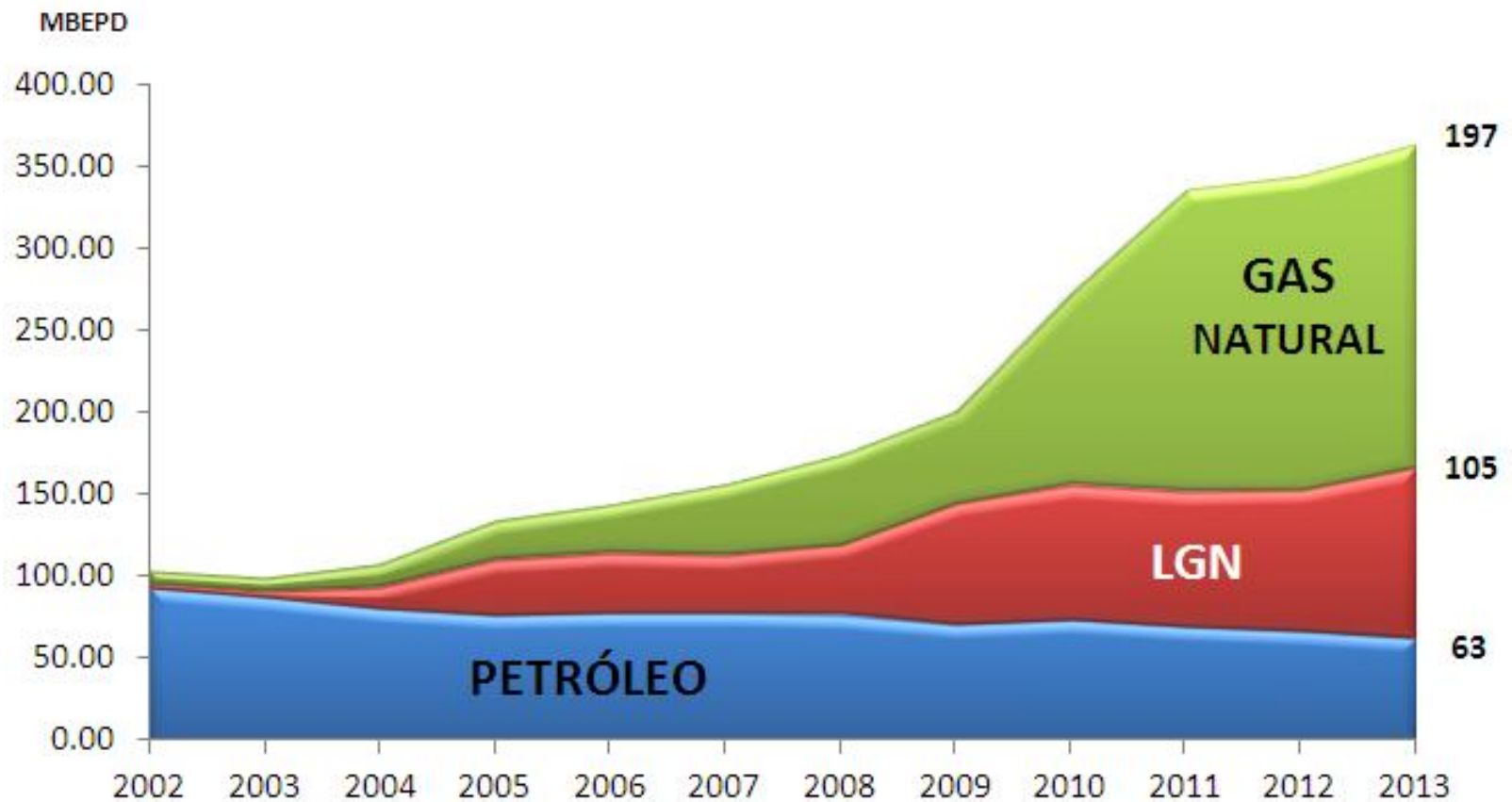


# Final energy consumption

*By energy source*



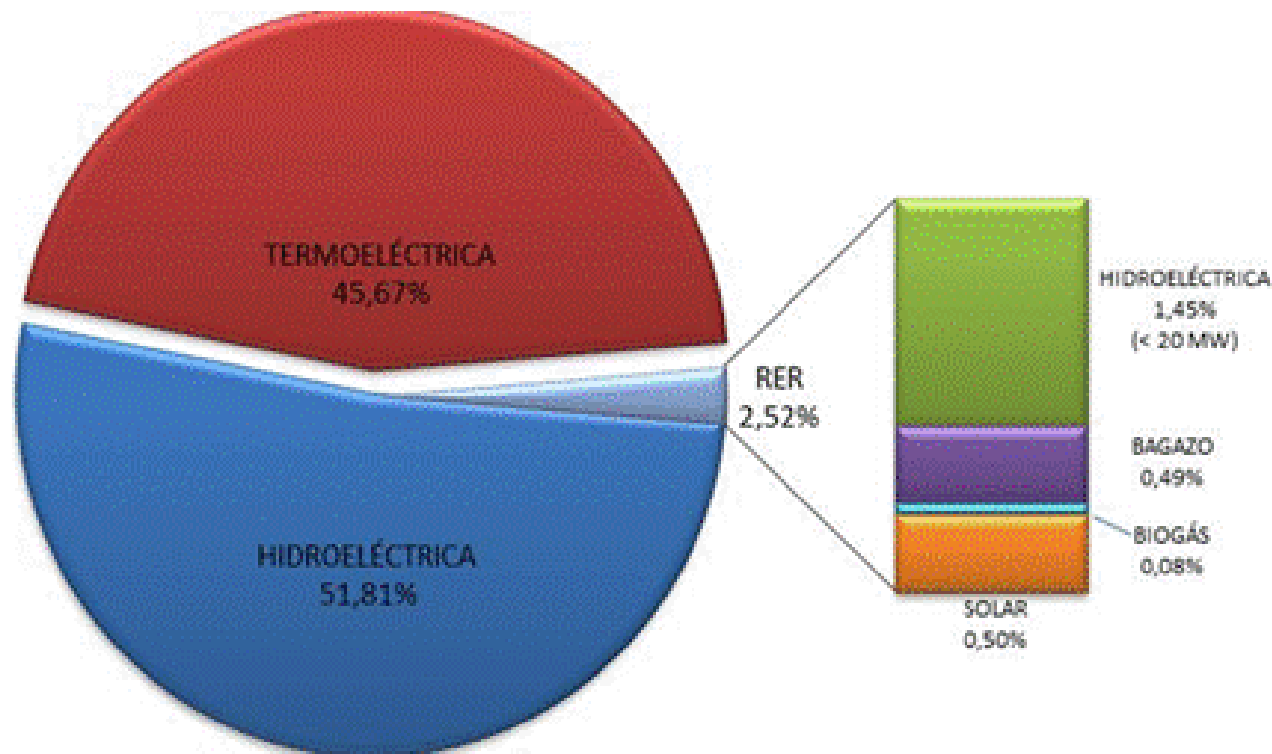
# Production of Hydrocarbons



# Production of electricity

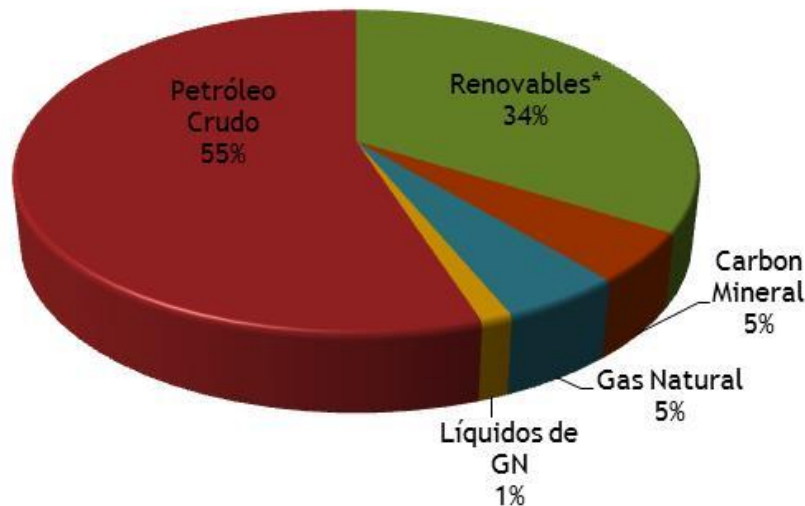
In 2003 hydroelectricity represented 81% of total electricity generation. The difference was thermal generation mainly with diesel and heavy fuels. Since 2004 onwards, gas thermal generation units have covered the demand growth.

2013



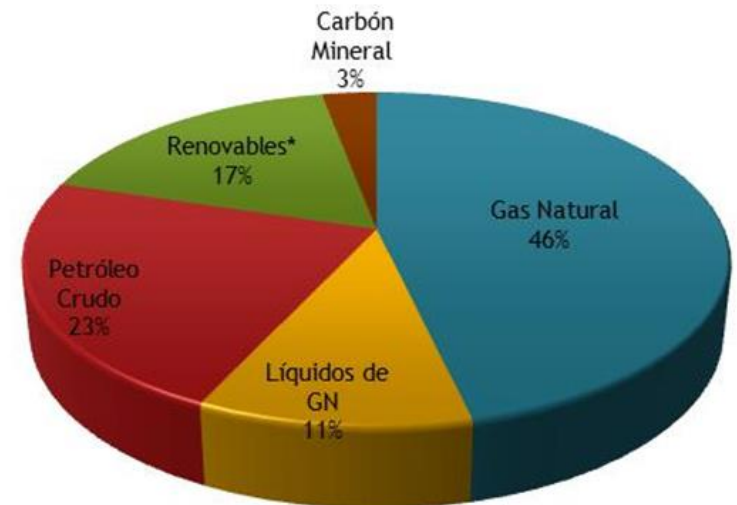
# The supply of primary energy

*Year 2003*



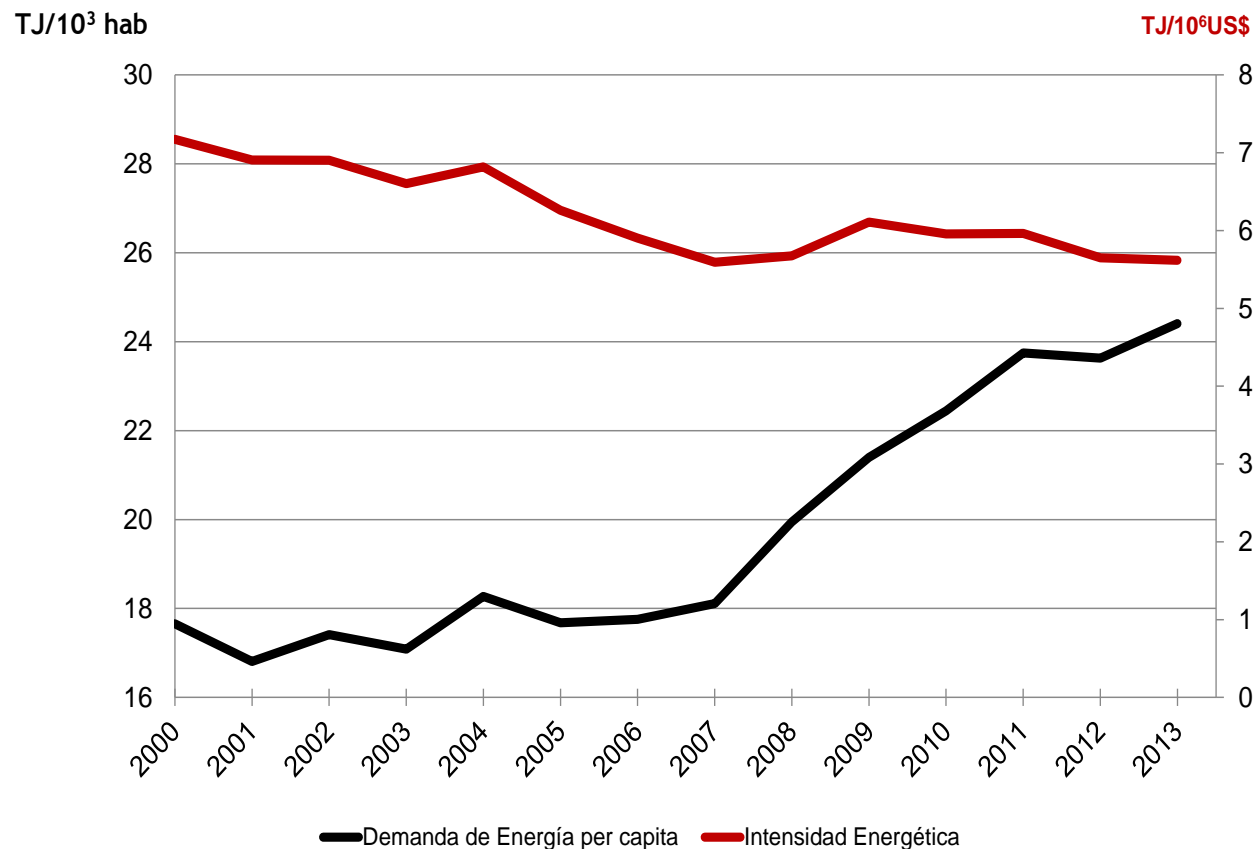
\* inc. Hidroenergía, Eólico, Solar y Biomasa

*Year 2013*



\* inc. Hidroenergía, Eólico, Solar y Biomasa

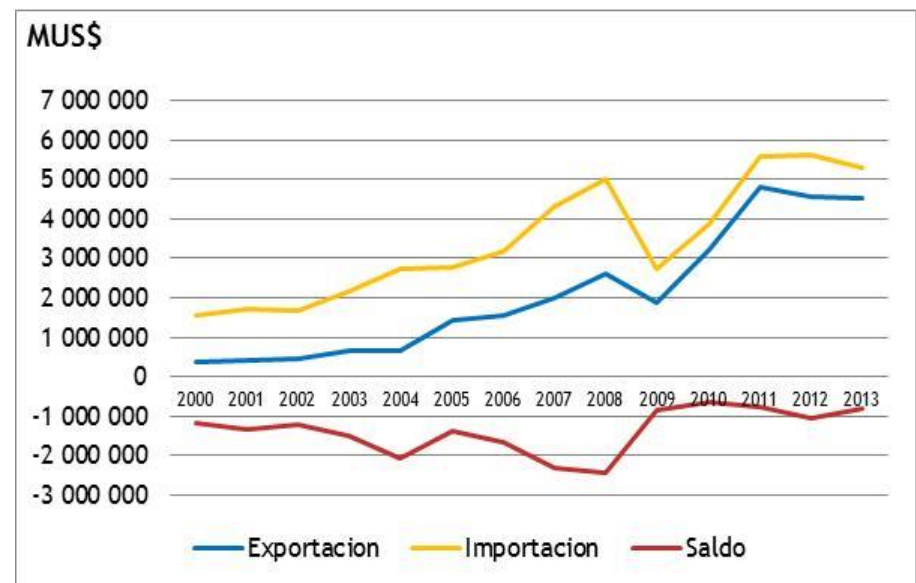
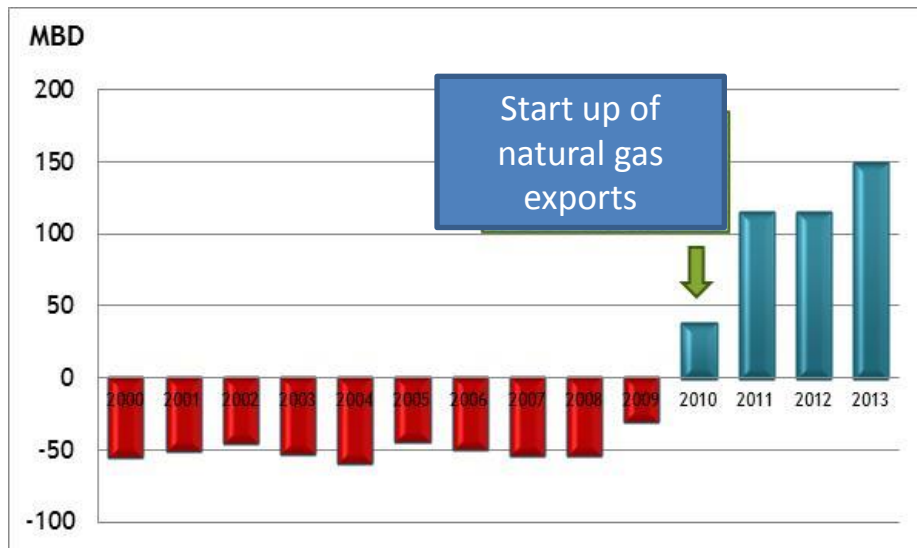
# Energy Intensity and Per capita consumption



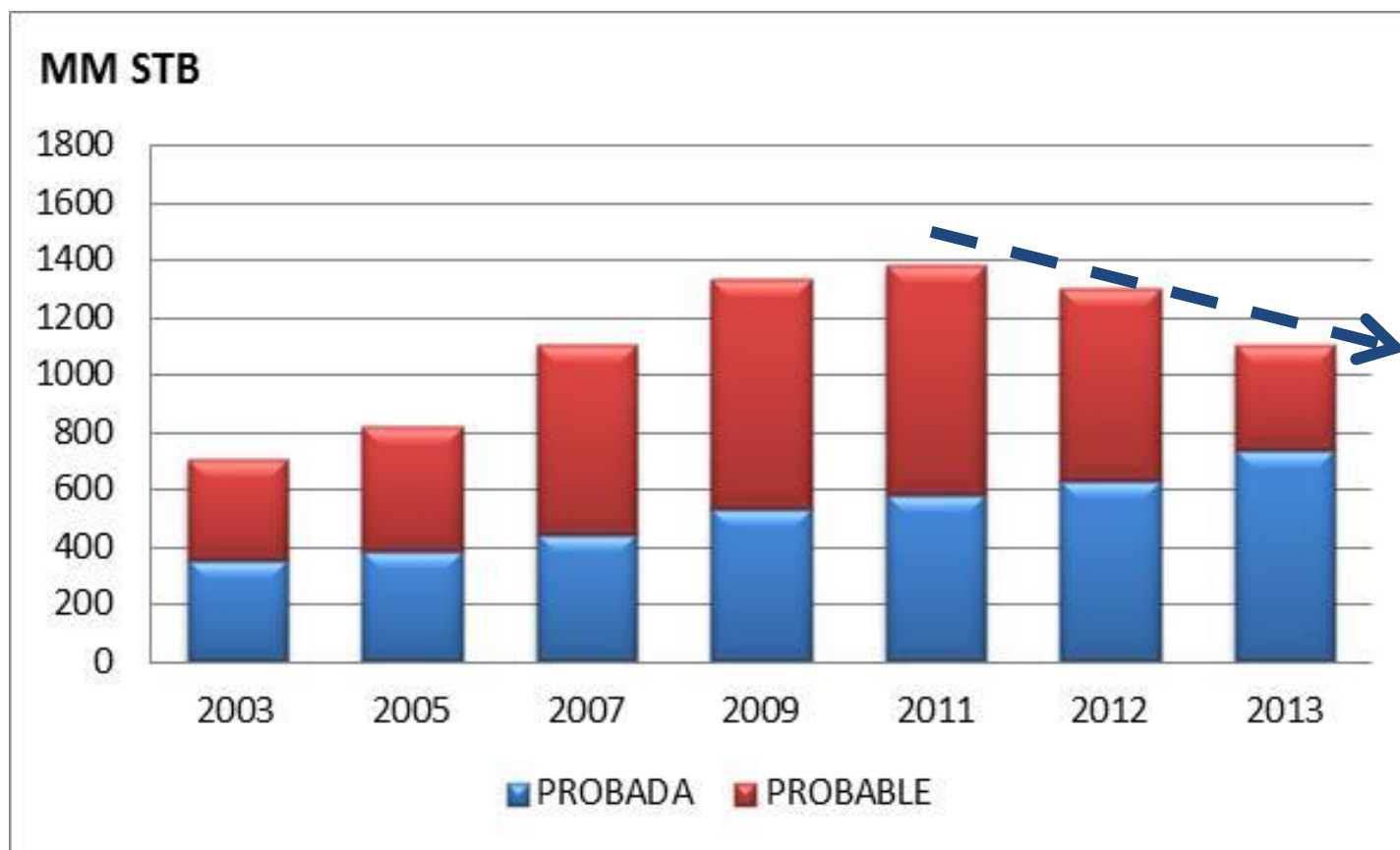
## Per cápita consumption

País	2012
Chile	61,1
Argentina	50,7
Brasil	47,6
Uruguay	46,3
México	44,4
Panamá	42,8
Costa Rica	32,3
Ecuador	31,3
República Dominicana	25,3
Perú	23,6
Colombia	22,7

# The oil and gas trade balance

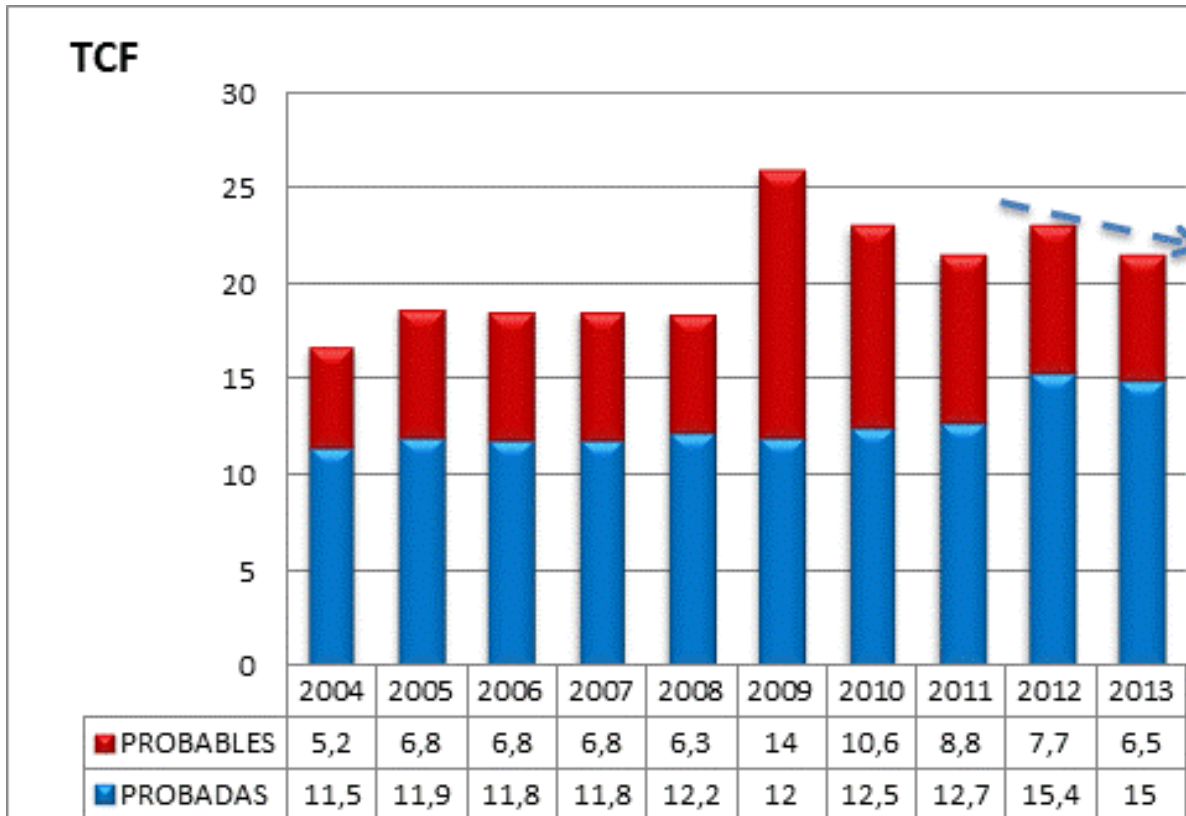


# Crude oil P1 and P2 reserves



There is a number of interesting prospects to be drilled in the coming months

# Natural gas P1 and P2 reserves



There are more than 50 years of domestic consumption

There is a number of prospects that will be drilled in the coming months that could significantly improve the gas reserves of Peru.



# Projection to 2025

## > Key Objectives:

- A competitive energy supply.
- Energy security and universal access.
- A sustainable development of the country's energy resources, with minimal environmental impact and low carbon emissions.

# Main assumptions

## 1. Growth scenarios:

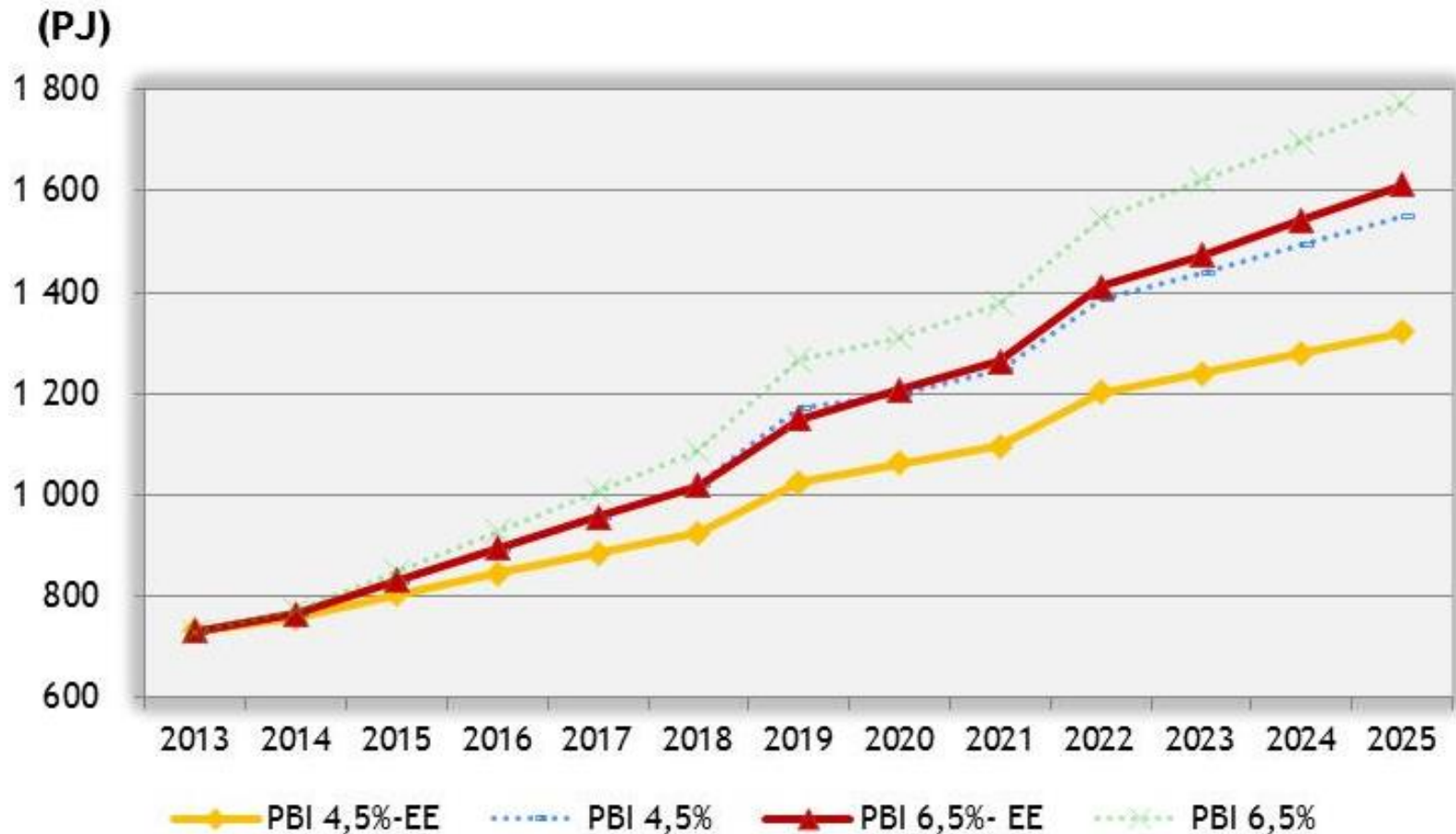
- Base Case: The Peruvian economy grows at an annual rate of 4.5%.
- Alternative Case: The GDP growth rises to an annual average of 6.5%. This case is developed to ensure that energy reserves and infrastructures are compatible to such high growth scenario.

**2. Energy prices:** will continue to follow international trends with the exception of gas from Block 88. The drop of oil prices will mainly impact the development of new oil supply sources.

**3. Resource availability:** Peru disposes of sufficient gas reserves and hydro and renewable energy resources to respond to the growth of its energy demand and to initiate exports to the region.

**4. Renewables in power generation mix:** To increase up to 5%.

# Final energy demand



The EE projections comprise the impact of energy conservation programmes.

# Energy Conservation Policies

## *Residential sector*

- Replacing conventional lightening with more efficient technologies.
- Replacing electric water heaters for solar water heaters.
- Introducing improved cooking stoves.

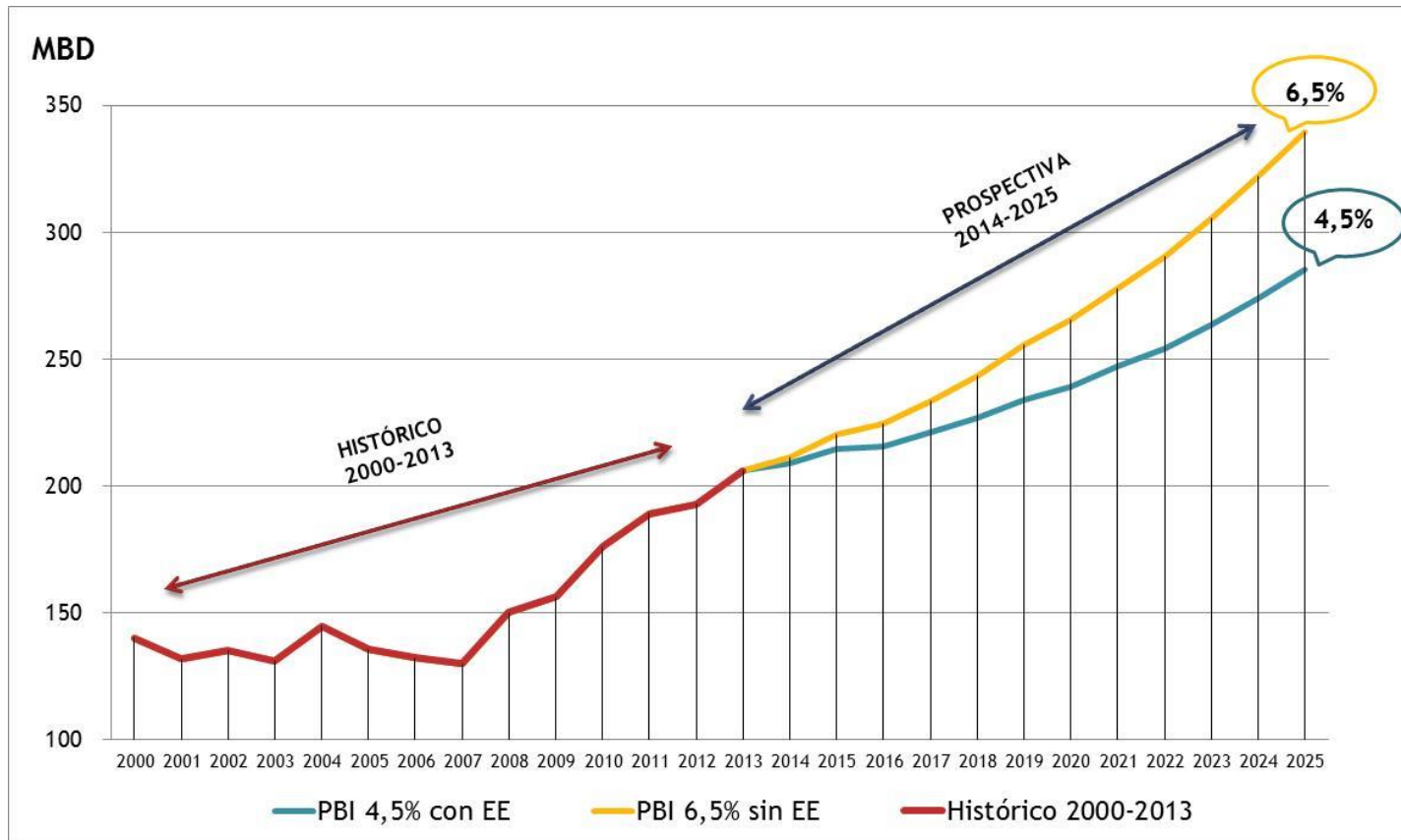
## *Industrial Sector and Services*

- Replacing all industrial furnaces and conventional motors for more efficient units.
- Introducing cogeneration appliances.
- Replacing conventional lightening with more efficient technologies

## *Transport Sector*

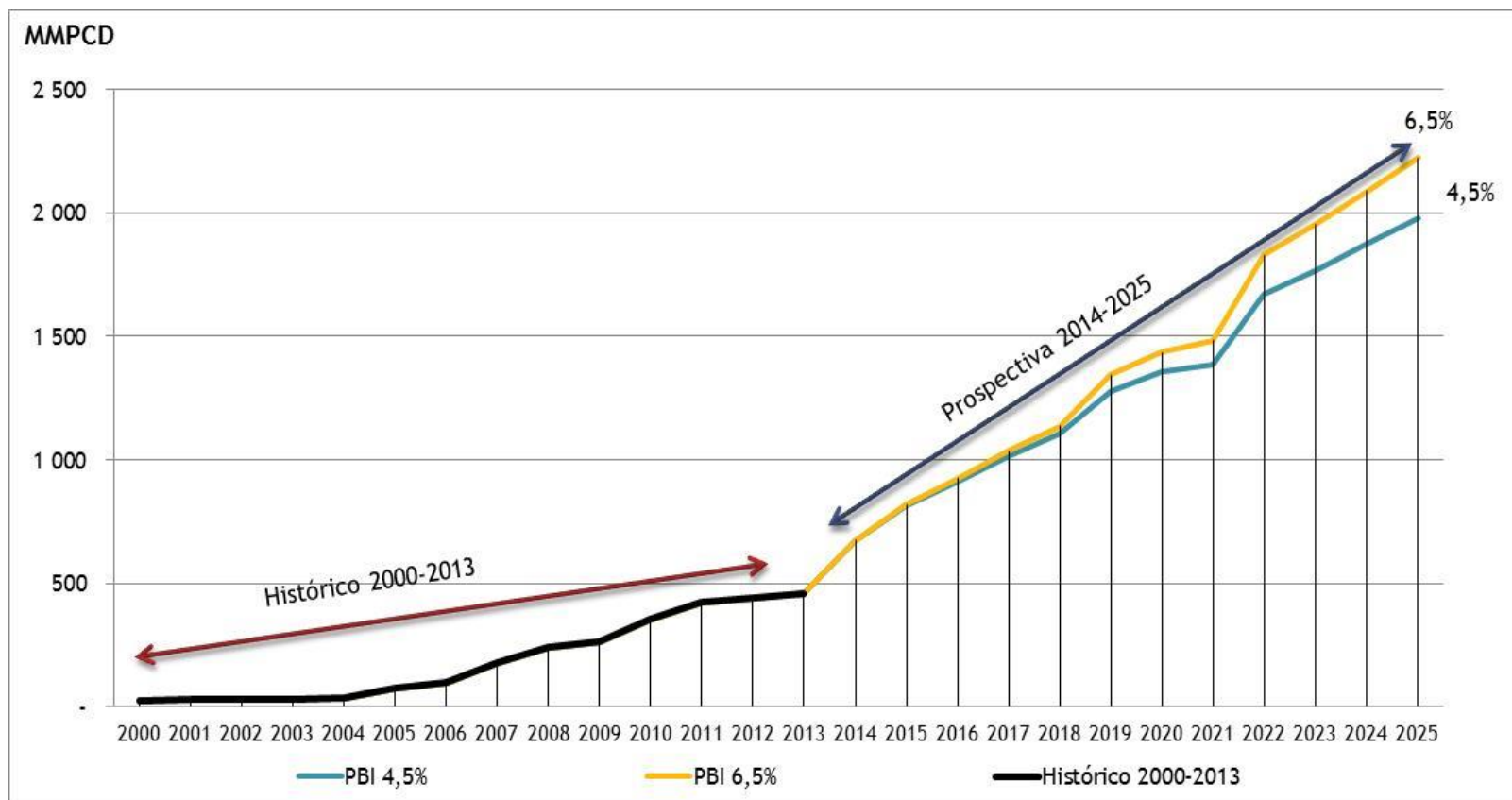
- To develop mass transport electricity or gas based systems in main cities
- To regulate the efficiency in new vehicles.
- To improve the vehicles park incl. more efficient CNG , LNG or electric units.

# Petroleum products demand



*Consumption up to 2025 will increase from 210 thousand barrels per day (MBD) to 285 MBD in the base case and to 339 MBD in the alternative scenario*

# The natural gas demand



The natural gas demand will more than double in the next ten years to achieve the expected economic growth.

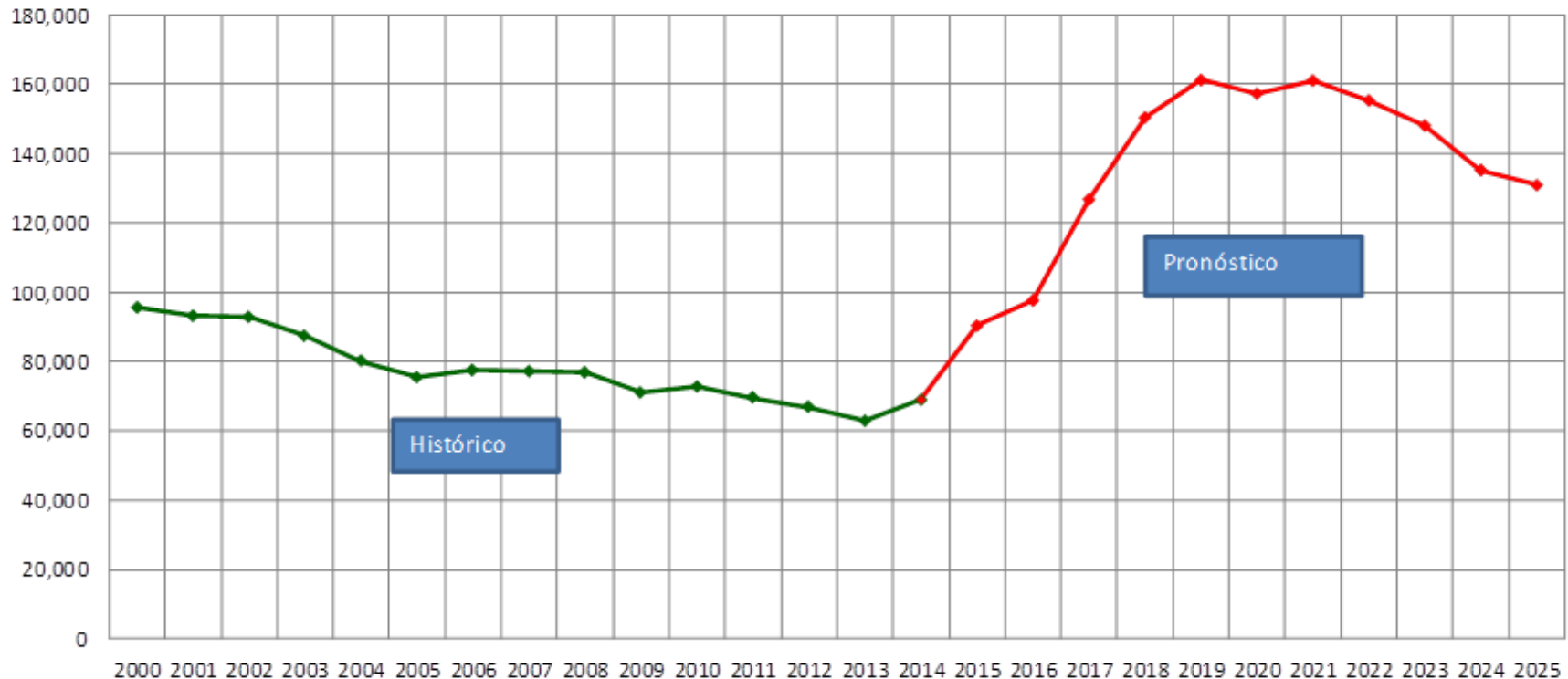
# Projecting final energy consumption

## By energy sources

	2014	2025 GDP 4,5%	2025 GDP 6,5%
Electricity	19%	18%	20%
Natural Gas	13%	35%	35%
Diesel	28%	19%	18%
LPG	10%	12%	12%
Motor Gasolines	8%	4%	4%
Turbo Jet	5%	4%	4%
Industrial fuel oil	2%	0%	1%
Mineral Coal & Derv.	3%	3%	3%
Traditional biomass (*)	12%	5%	3%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

(\*) Includes charcoal, wood, bagasse, etc .

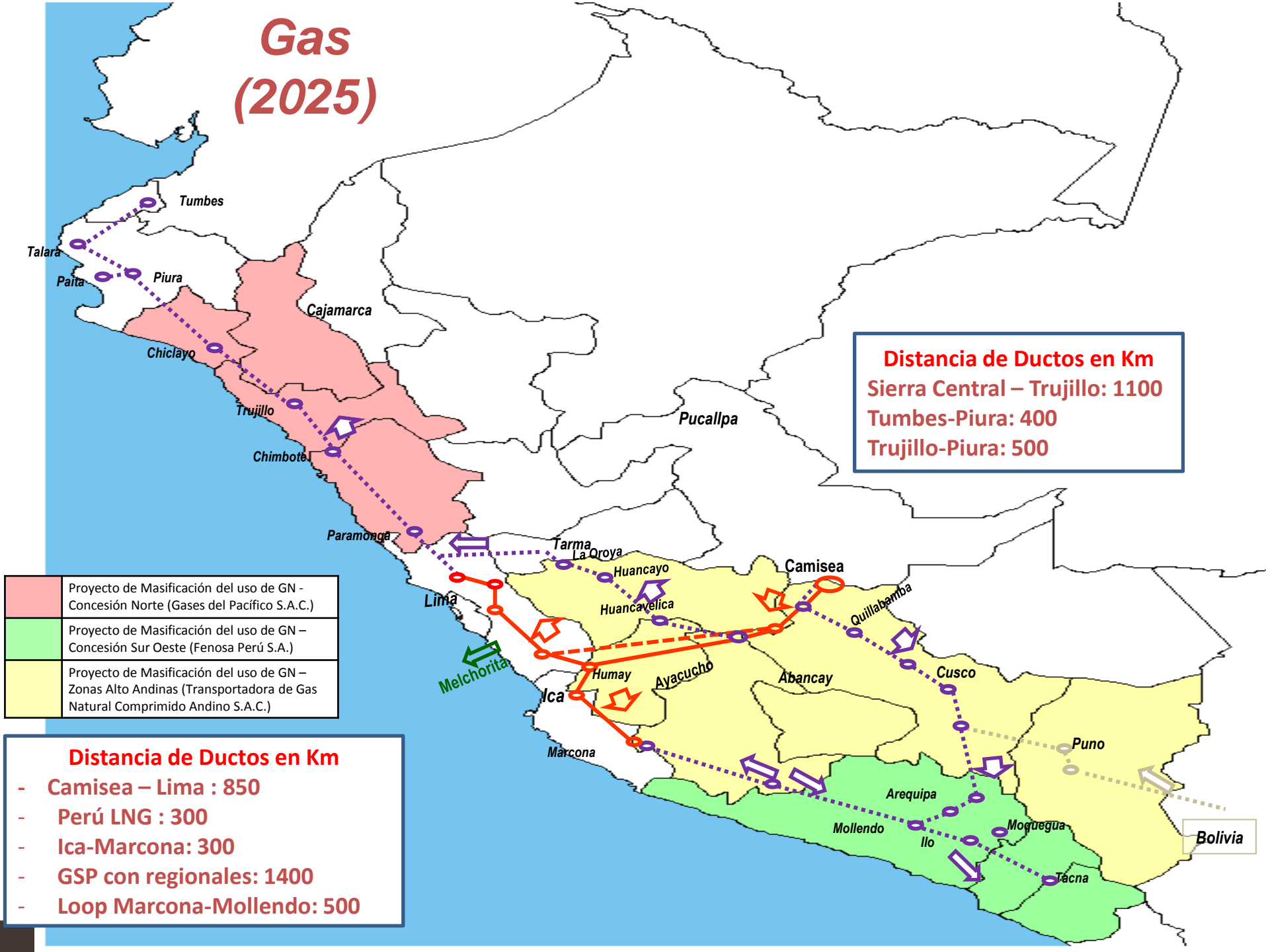
# Projecting the crude oil production



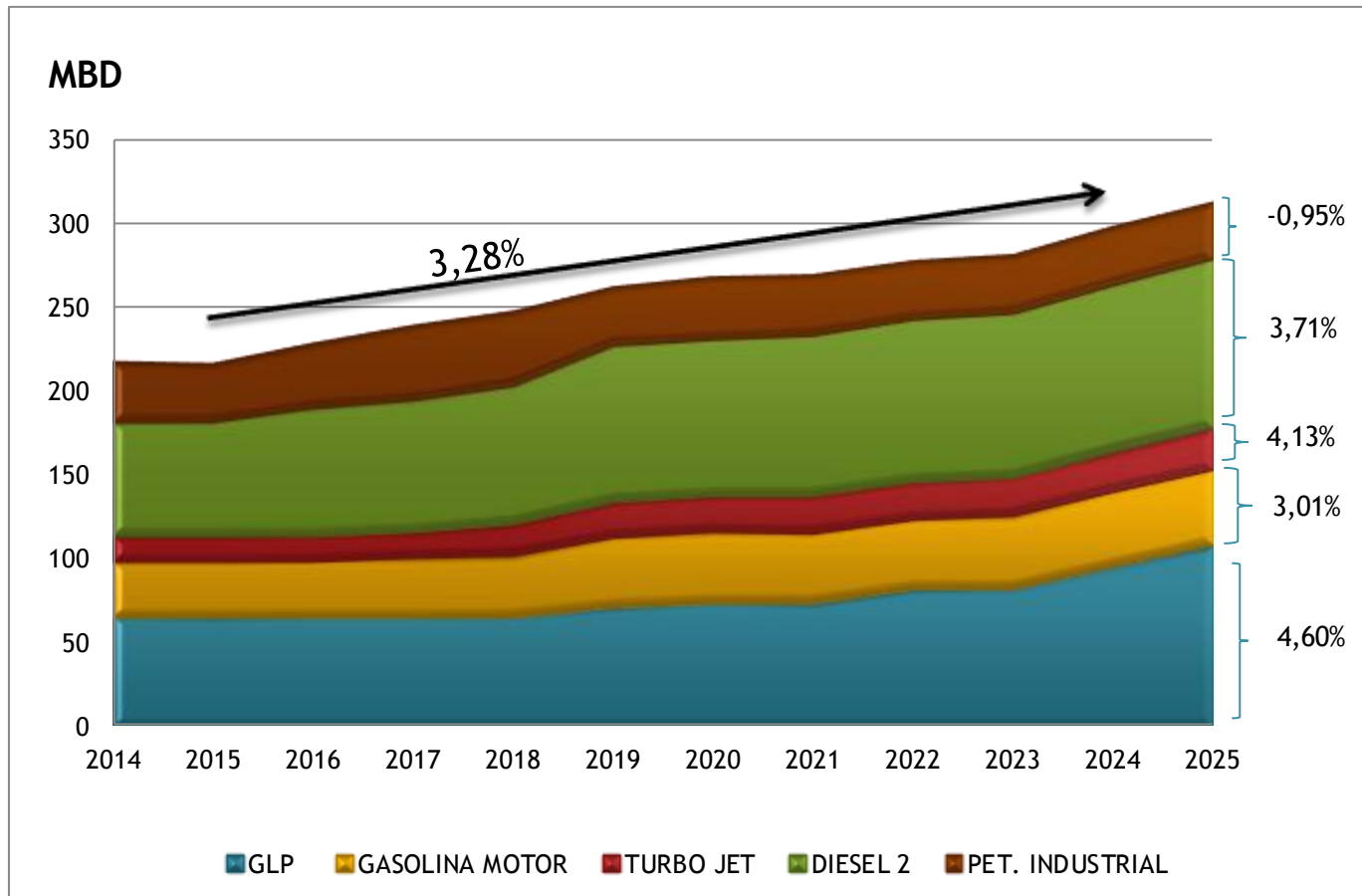
At average crude oil prices of 70-80 USD/barrel, oil production is expected to increase from 62 MBD in 2013 to 153 MBD by 2021. At 40 USD/Barrel it would not reach 100 MBD



# Gas (2025)



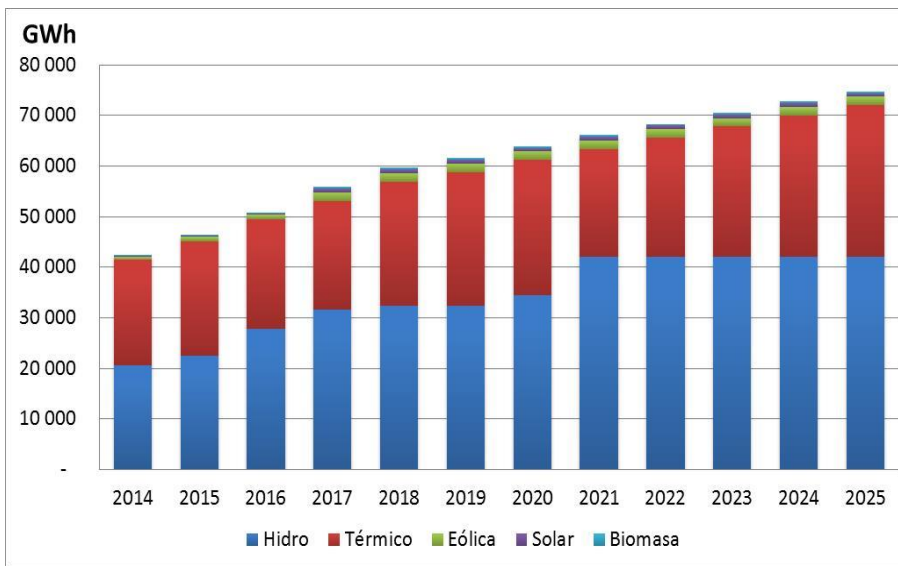
# Projecting the production of liquid fuels



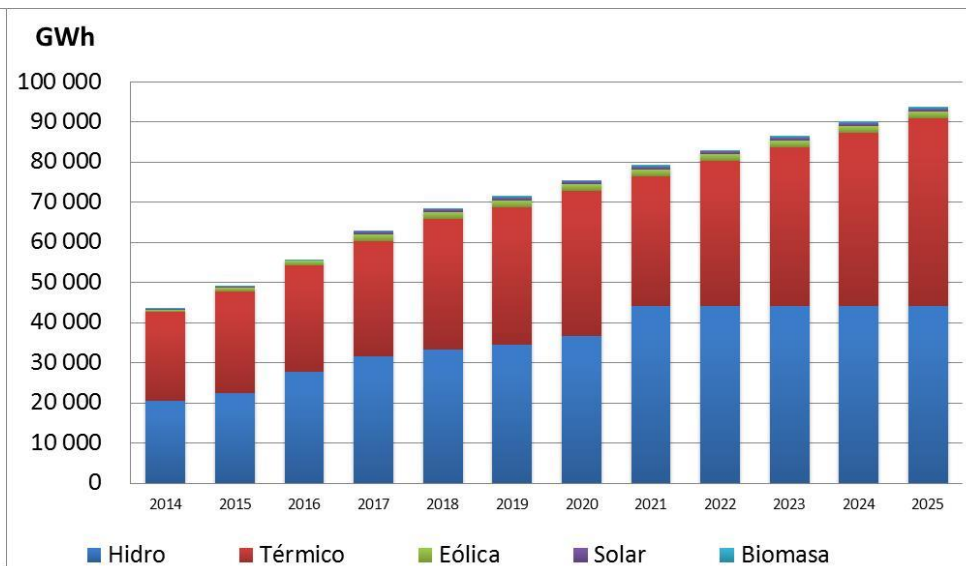
Imports will decrease as the refineries upgradings are completed and the production of condensates increases along with gas production.

# Projecting the electricity production

*PBI: 4,5%*

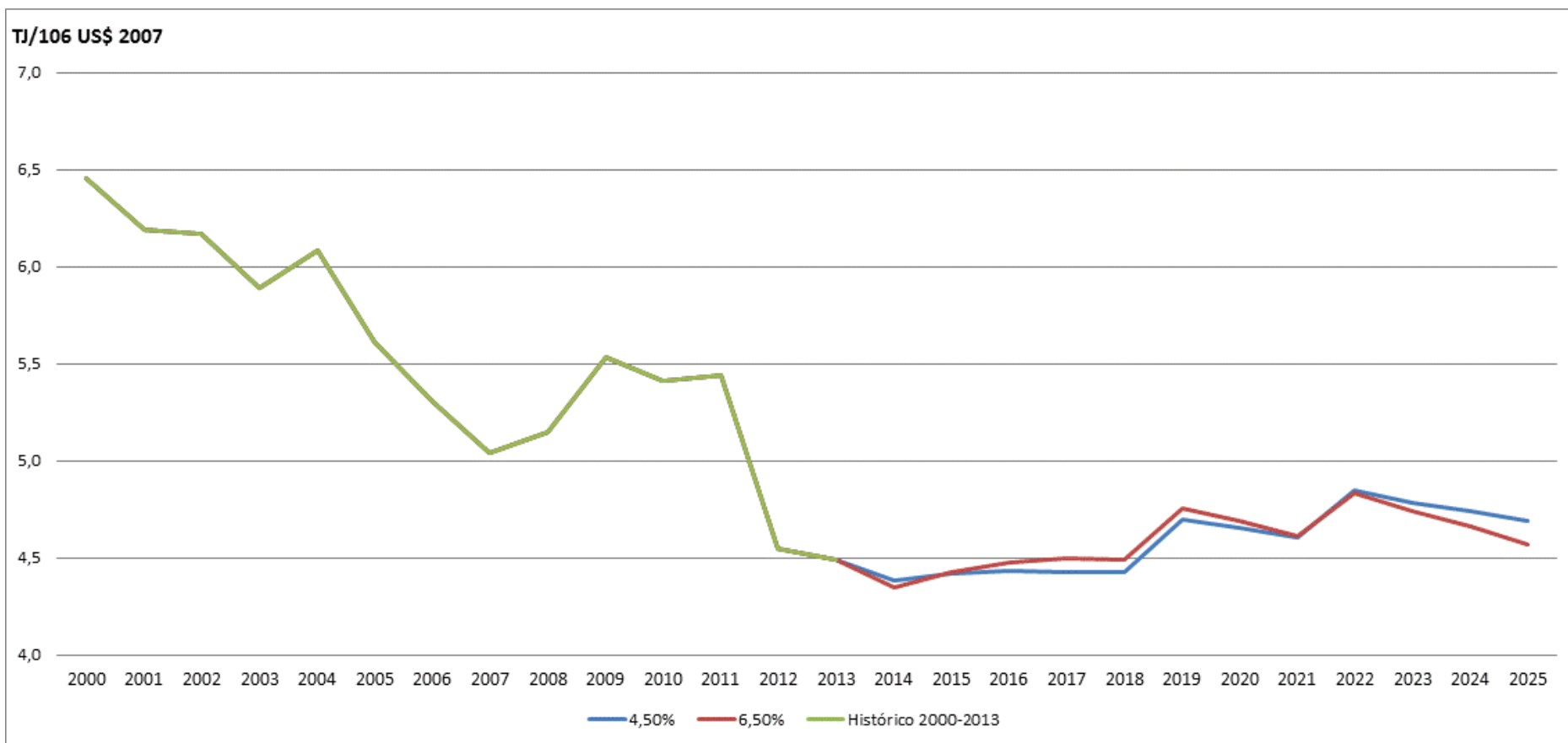


*PBI: 6,5%*

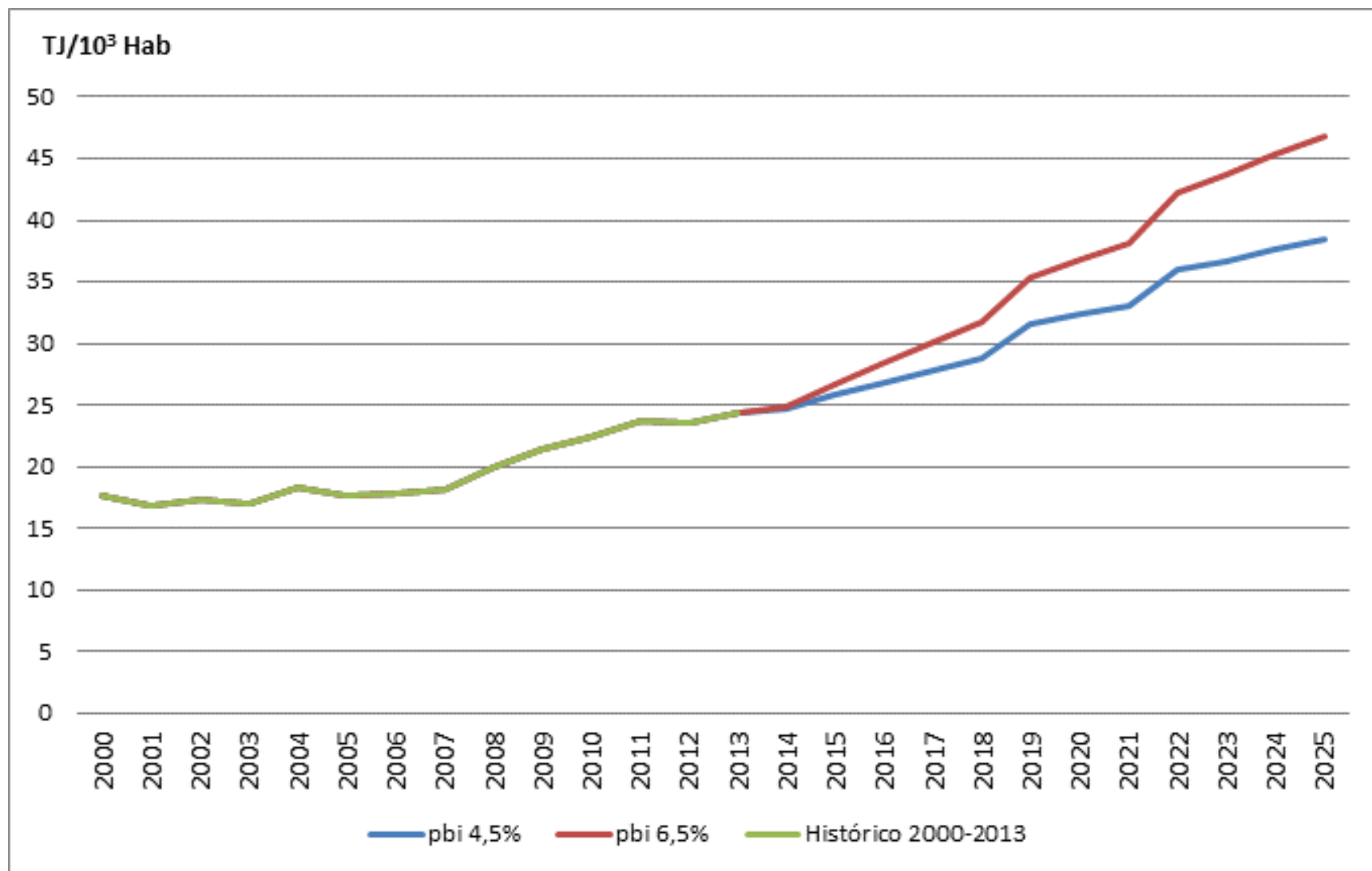


In both scenarios more than 60% of the electricity generated comes from renewable sources.

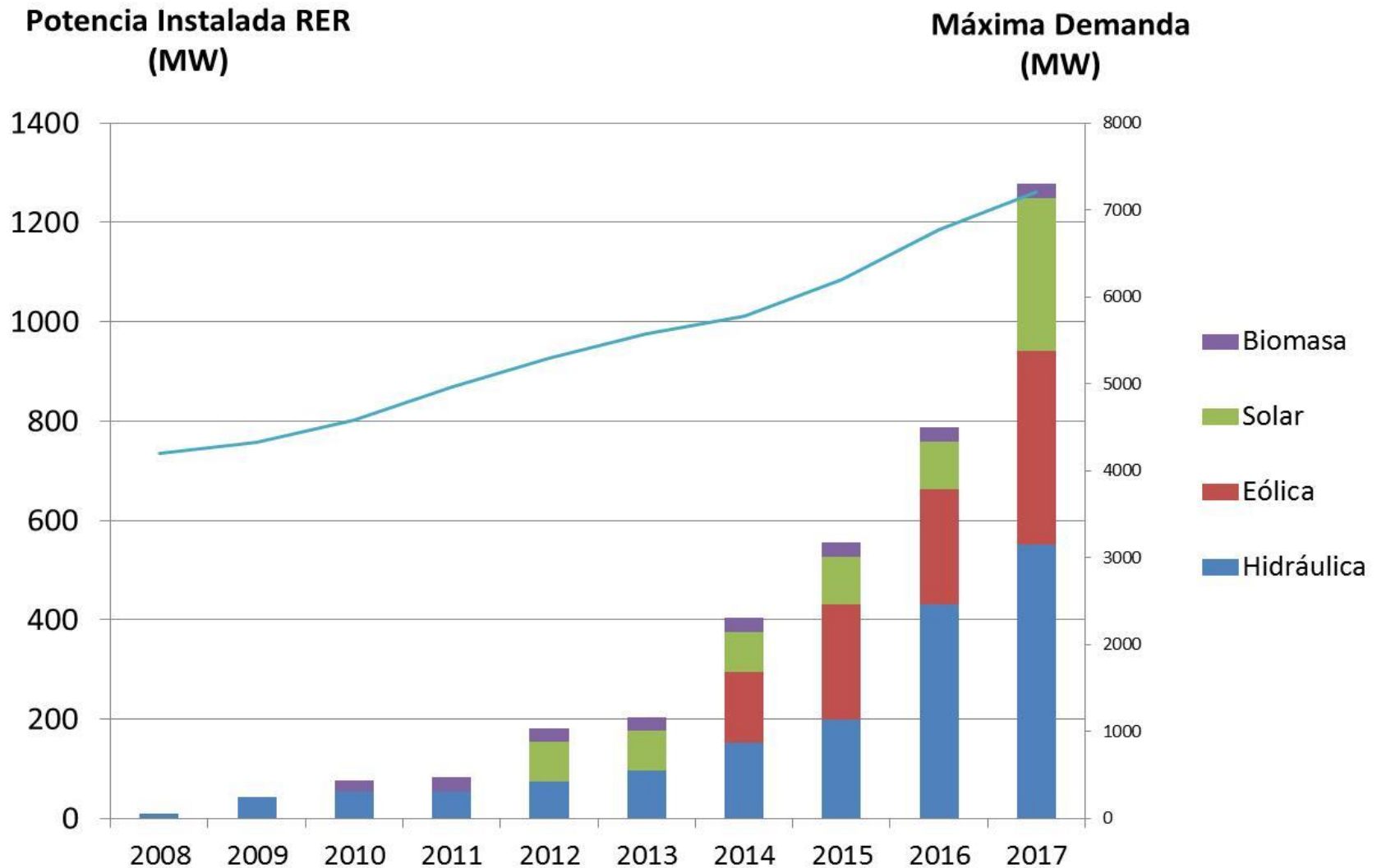
# Energy intensity



# Per capita energy consumption



# Impact of Renewables in the SEIN



## Section # 3

### ***Peru's energy sector***

### ***Main Challenges & Conclusions***

# Main Challenges

## **1. Execute the investment plan in generation, transmission and distribution of electricity, including renewables**

- a. Keep orthodox macro-economic policies and
- b. A pricing policy in line with the international trend

## **2. Reduce oil imports**

- a. To promote the replacement of Diesel B5 by GN (CNG and LNG)
- b. Promote the development of a national network of pipelines.
- c. Diversifying exploration activity in riskier frontier basins, increasing exploration commitments in existing contracts and promoting sustainable technologies with the exploitation of proved undeveloped reserves.
- d. Encourage exploration of areas with high prospectivity of gas resources.
- e. Continue modernization projects refineries to have increased production of liquid hydrocarbons derived from better quality.

## **3. Prepare the energy transition to reduce emissions of greenhouse gases**

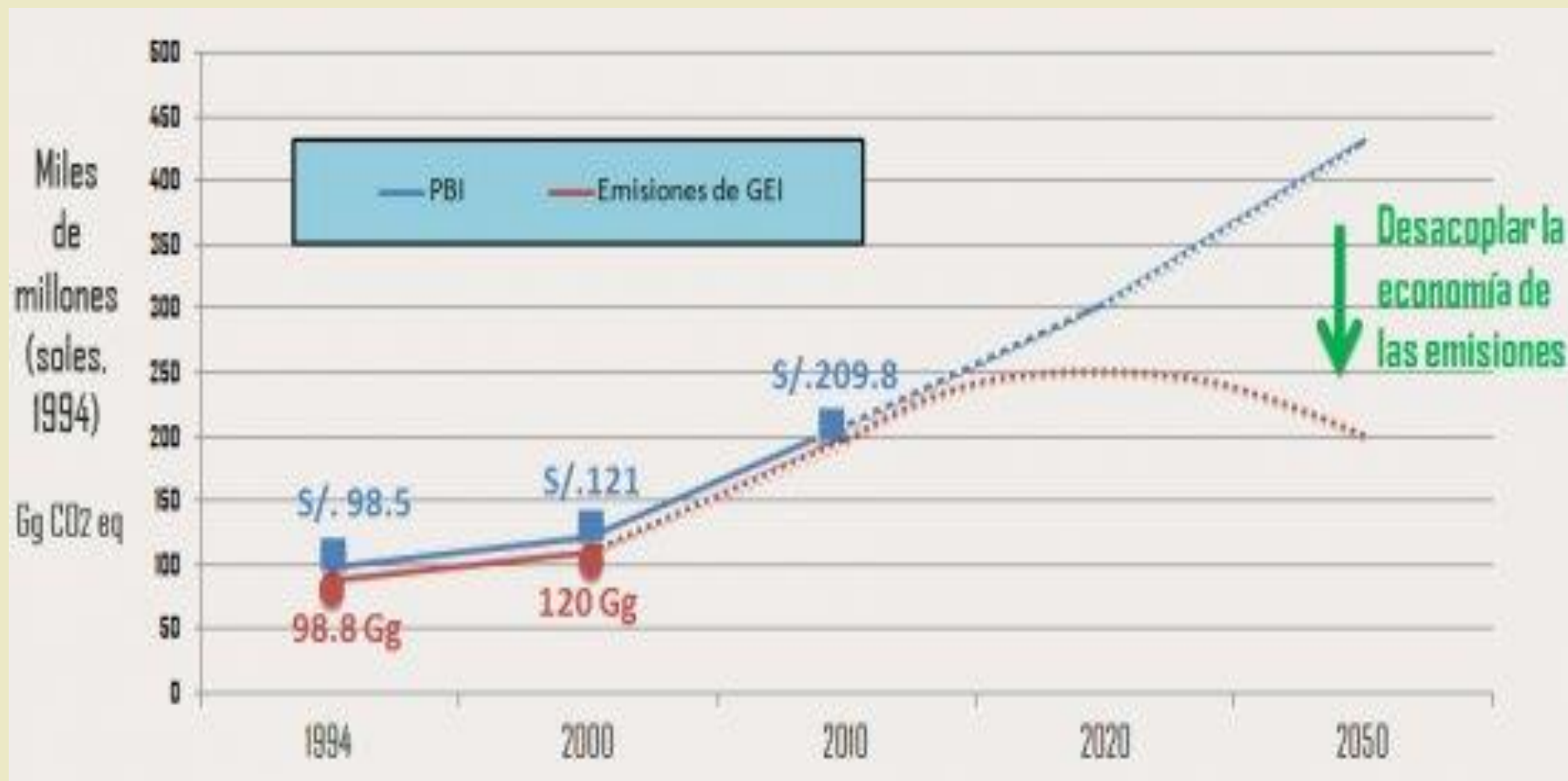
- a. Encourage the replacement of traditional biomass and even LPG by GN in the Residential and Transportation sectors.
- b. Set national policies reduction in greenhouse gases



# Investments

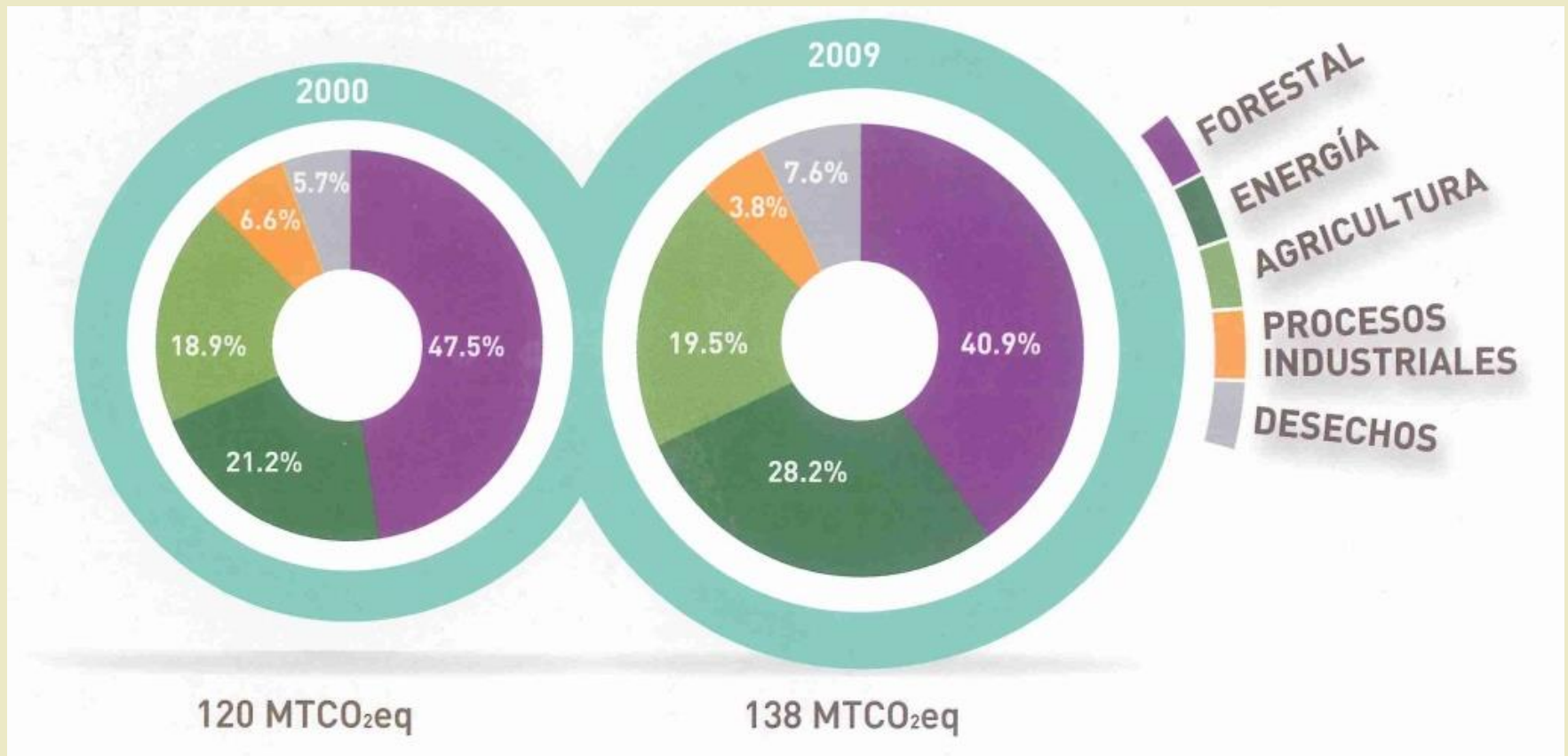
<b>Investments - mainly by private companies - should double between 2014 and 2025</b>			
		<i>in current USD</i>	
<b>Escenario</b>		<b>PBI 4,5 %</b>	<b>PBI 6,5%</b>
<b>Electricity</b>	Generation	6,700	7,300
	Transmission and distribution	1,700	1,700
<b>Gas</b>	Upstream	5,200	6,000
	Transport and distribution	11,549	11,679
	Petrochemicals	5,000	5,000
<b>Petróleo</b>	Upstream	16,000	18,000
	Downstream (refineries)	3,500	3,500
<b>Total (MM US\$)</b>		<b>49,649</b>	<b>53,179</b>

# GDP vs Emissions of GhG



Fuente: MINAM, 2010; INEI

# GHG Emissions by sector



# From Lima to Paris

- The UN Climate Change Conference, COP21 will be held in Paris, from 30 November to 11 December 2015.
- The objective of this conference is to achieve, for the first time in over 20 years of UN negotiations, a binding and universal agreement on climate, from all the nations of the world.
- The overarching goal is to reduce greenhouse gas emissions to limit the global temperature increase to 2 degrees Celsius above pre-industrial levels.
- Countries have agreed to outline actions they intend to take within a global agreement by March 2015. These commitments are known as Intended Nationally Determined Contributions or INDCs.

# The Climate Change

The distribution of causes and effects of climate change is not uniform. In particular, low-income countries, only marginally contribute to the accumulation of GhG could suffer the greatest impact of global warming.

Among the areas that would be most affected are Africa, South and South-East Asia and Latin America, while countries such as China and the USA would have a comparatively minor impacts and record a greater responsibility in the accumulation of GhG.

Peru would be among the ten countries most vulnerable to climate events. The main effects are associated preliminarily with:

- glacial retreat,
- increased frequency and intensity of rains (El Niño, in particular) and
- raising the sea level.

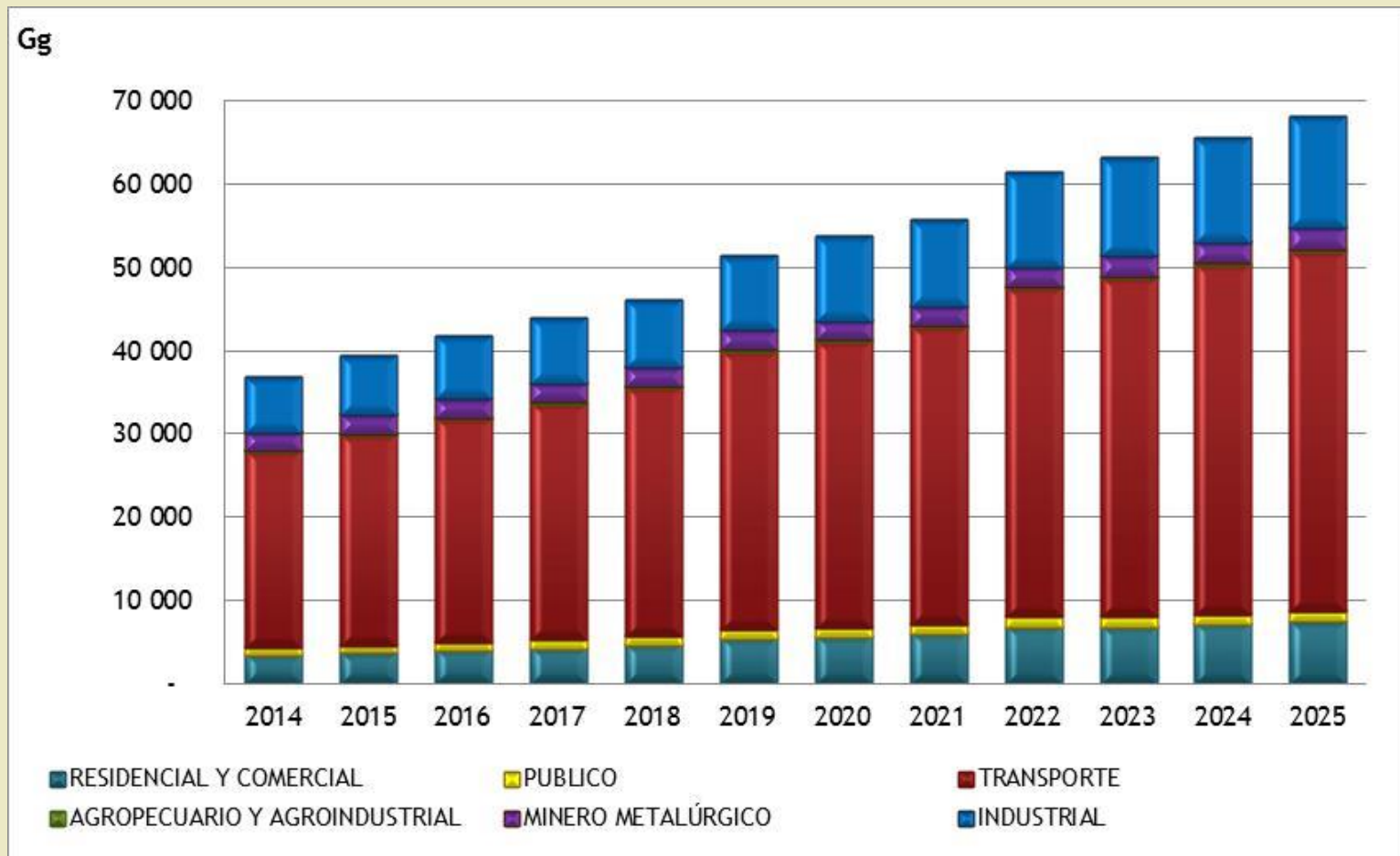
# Measures taken in Peru

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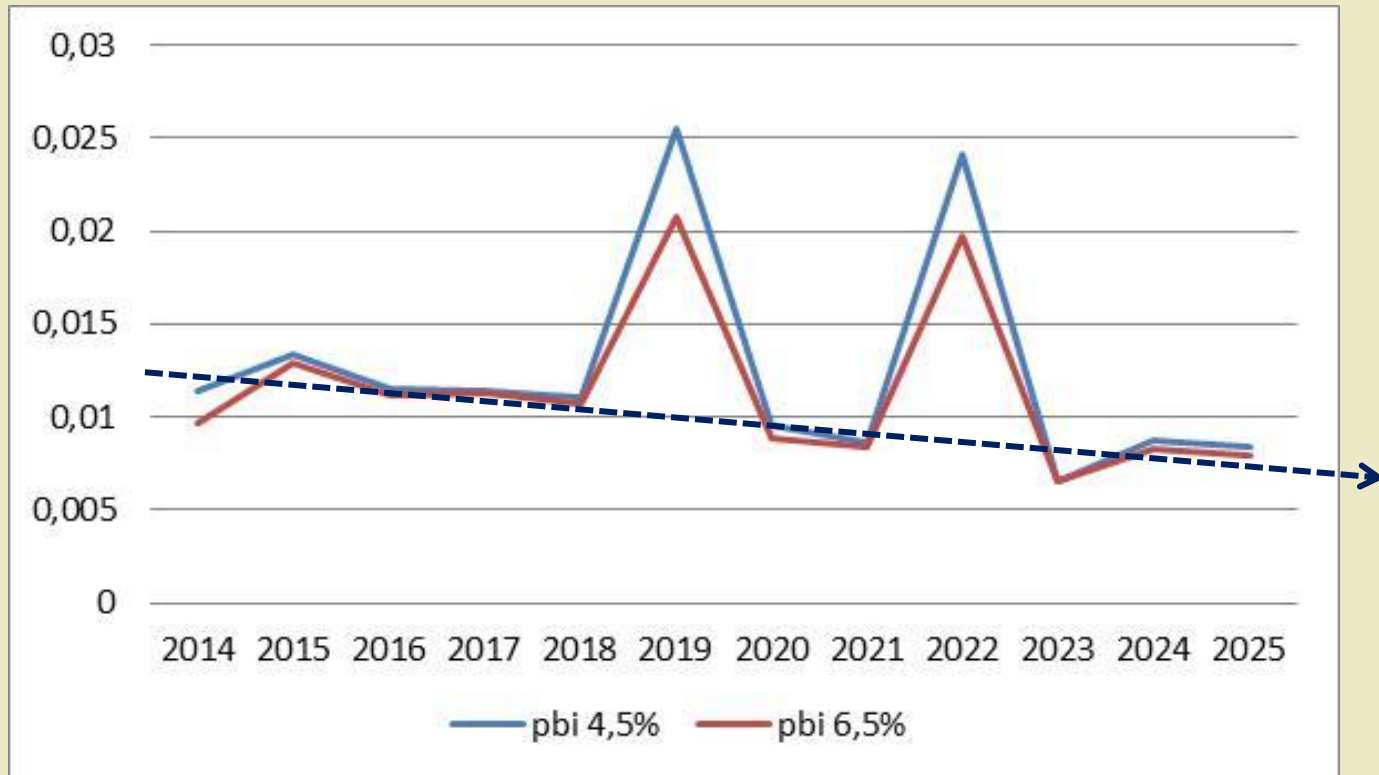
- Perú has been actively taking part since the 90's in the Clean Development Mechanism.
- The Government is preparing in addition to the INDC a number of voluntary NAMAs (National Appropriate Mitigation Actions) including measures in relation to forest conservation, energy and solid wastes.
- Peru will be disproportionately impacted by climate change; it needs to actively prepare **mitigation** as well as **adaptation** measures.

# Emissions of GgG by sector

Case PBI 4,5% (Gg CO<sub>2</sub> eq)



# Reduction of GhG per unit of GDP



By 2025, natural gas will be a dominating source in the energy matrix; this will subsequently allow the introduction of a larger share of renewables.



# Final Remarks

- Final energy demand is expected to continue strongly correlated to GDP growth, the startup of new mines, and the impact of energy conservation programs in residential, industrial and transport sectors.
- It should be met with domestic resources, making use of low cost technologies. Gas will be for the projected period the most demanded energy source at the level of final consumers as well as for transformation into electricity and petrochemicals. Thus it is critical to boost the exploration and development of hydrocarbons, to construct gas pipelines and to upgrade the refineries.
- Energy access is another important task for the next decade, key to consolidate the sector reforms. This includes electricity access and development of gas networks in main cities.
- Energy efficiency policies will be directed to increase the sector competitiveness, to reduce environmental impacts as well as inequality in energy access. A key concern is the reduction of diesel consumption in the transport sector.
- The commitment to develop clean renewable energy sources will continue so as to take advantage of Peru's potential and contribute to global reduction of CO<sub>2</sub> emissions.