



Ministério  
de Turismo, Investimentos  
e Desenvolvimento Empresarial



SUSTAINABLE ENERGY  
FOR ALL

# Energy Scenario Development for CABO VERDE

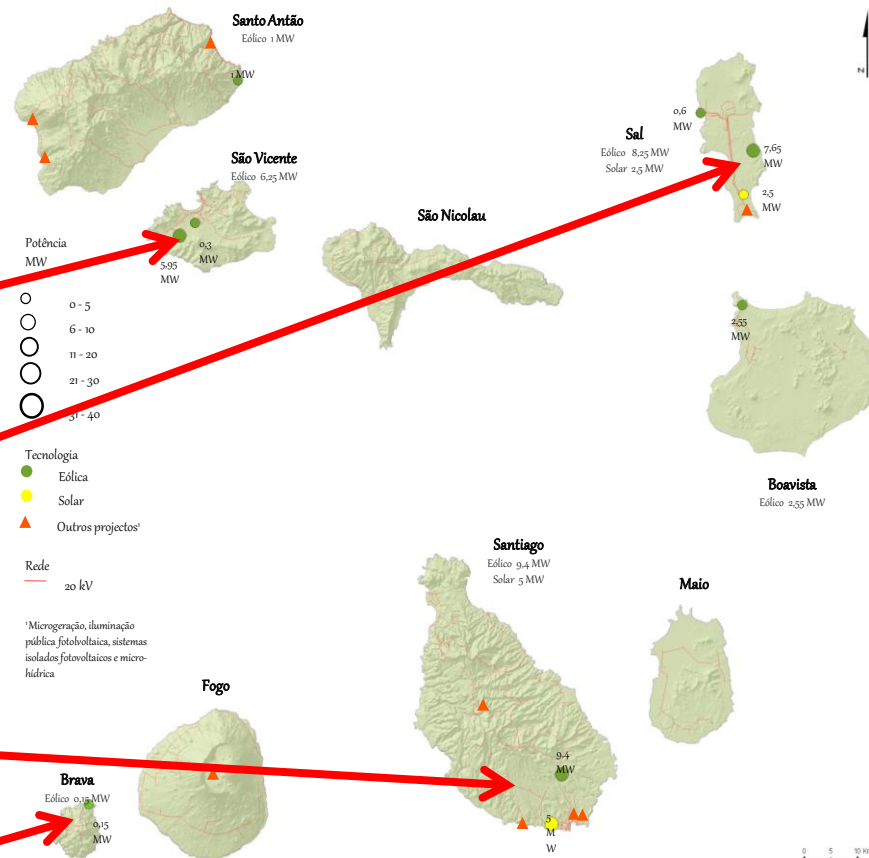
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Energy Consultant

**Abidjan, 24 Mars 2013**

# Energy Systems in Cabo Verde: Power Sector

Installed Capacity (MW)	Population	2010	2013
Santo Antão	43.915	6,0	6,0
São Vicente	76.107	19,4	19,4
São Nicolau	12.817	2,2	3,2
Sal	25.765	16,9	20,4
Boavista	9.162	4,5	17,0
Maio	6.952	1,4	1,0
Santiago	273.919	46,9	<b>69,7</b>
Fogo	37.051	3,8	3,2
Brava	5.995	1,1	<b>0,9</b>



**NOT SUSTAINABLE**

**ACCESS TO ELECTRICITY: > 95%**

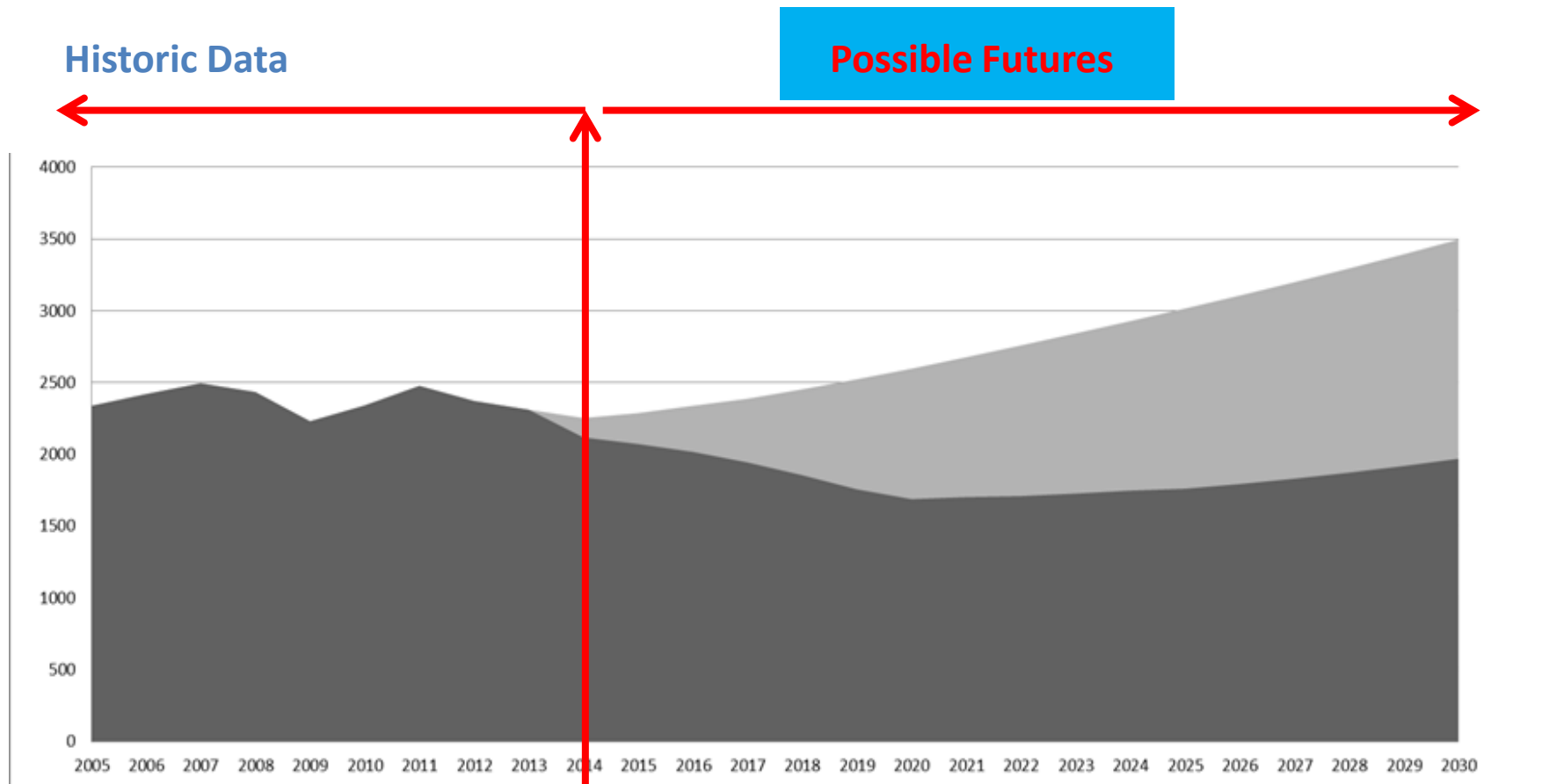
**MAINLY FROM DIESEL  
( GHG )**

**AFFORDABILITY  
( > 35 Cents per kWh + Taxes )**

# Cabo Verde National Energy Targets

**Energy Efficiency Targets:** defined according to the Baseline Scenario

**Baseline Scenario until 2030**



# Useful Concepts

**Energy Drivers** = Why we need energy

**Indicators** vs Absolute Values

Specific Consumption = Energy per service

Energy Intensity = Energy in the economy

**SCENARIO = STORYLINE + QUANTIFICATION**

Quantification may need **Modelling**

$E = f(x; y=g(x); y; t) \Rightarrow$  **DATA**

# Useful Concepts

**STORYLINE** is what make a scenario plausible

Defined using a **Pool of Expert**: the most experimented and relevant stakeholder of the energy sector

**Driver** => Statistical Analysis of historical data

Correlation, Variation, ....

Scenario Type: **Exploratory Scenario**

Set a **point on a future** and explore different way to achieve that point

# Variables

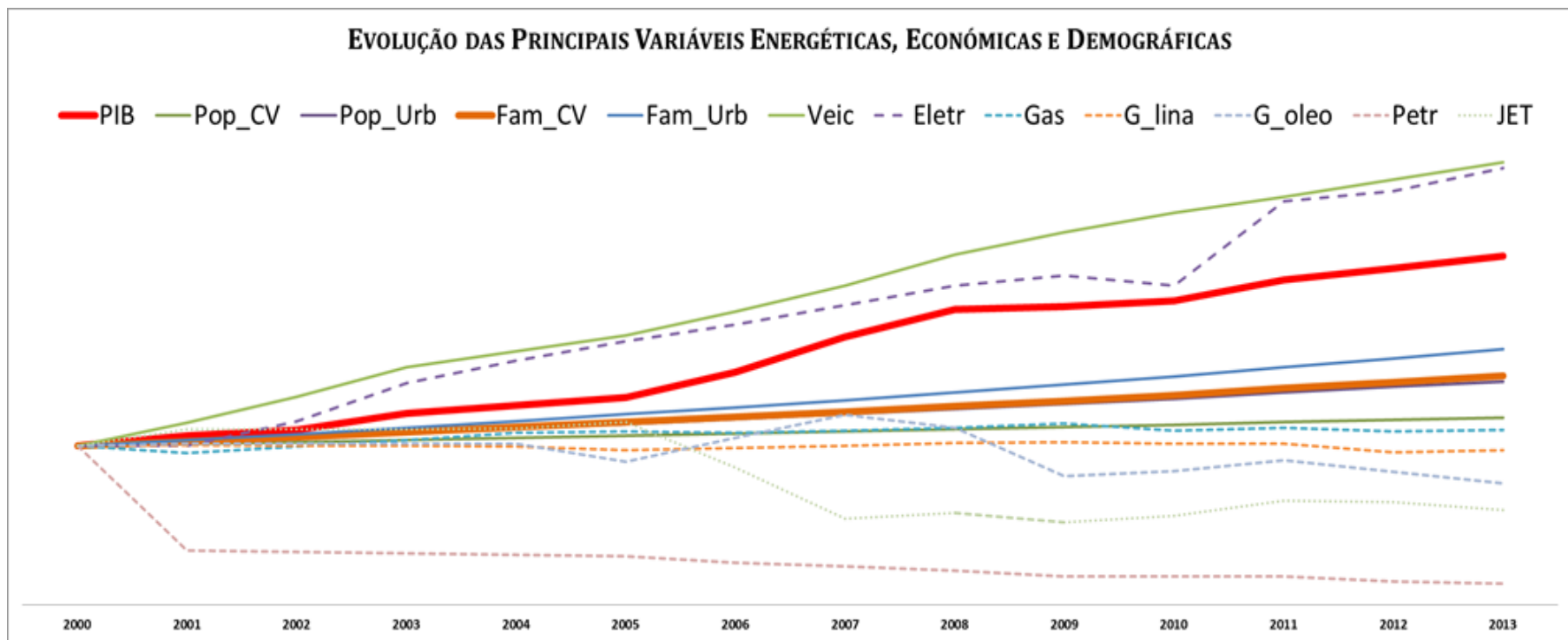
	2000 (value)	2005 Growth. (%)	2010 Growth. (%)	2013 Growth. (%)
<b>GDP</b>	72.382	1,30	1,91	2,19
<b>Population Total</b>	434.625	1,06	1,13	1,18
<b>Population Urban</b>	234.368	1,14	1,30	1,41
<b>Population Rural</b>	200.257	0,98	0,94	0,91
<b>Families Total</b>	94.699	1,15	1,32	1,44
<b>Families Urban</b>	53.704	1,20	1,44	1,61
<b>Families Rural</b>	40.271	1,00	0,99	0,97
<b>Vehicles</b>	20.562	1,69	2,47	2,79
<b>Electricity</b>	142.327	1,66	2,01	2,75
<b>Gas</b>	10.000	1,09	1,10	1,10
<b>Gasoline</b>	7.218	0,97	1,02	0,97
<b>Gasoil</b>	65.124	0,90	0,84	0,76
<b>Kerosene</b>	3.614	0,31	0,18	0,13
<b>JET</b>	29.460	1,15	0,56	0,60

# Drivers Analysis: Correlations

	GDP	Totl_Pop	Urb_Pop	Rur_Pop	Tot_Fam	Urb_Fam	Rur_Fam	Vehicles
Vehicles	0,99	0,99	1,00	0,99	-0,99	0,99	0,99	-0,89
Electricity	0,97	0,97	0,99	0,99	-0,98	0,99	0,99	-0,89
Gas	0,78	0,79	0,78	0,77	-0,74	0,77	0,77	-0,53
Gasoline	-0,07	-0,06	-0,17	-0,17	0,18	-0,17	-0,17	0,26
Gasoil	-0,52	-0,50	-0,57	-0,58	0,61	-0,58	-0,59	0,70
Kerosene	-0,68	-0,68	-0,70	-0,70	0,67	-0,70	-0,69	0,49
JET	-0,81	-0,82	-0,76	-0,75	0,73	-0,75	-0,75	0,55

# Drivers Analysis: Results

- **Electricity** follows Population and Economic Growths;
- **Petroleum Products** consumptions has slow down and almost stagnated;
- Correlation between Vehicles, Gasoil and Gasoline is weak!!!.

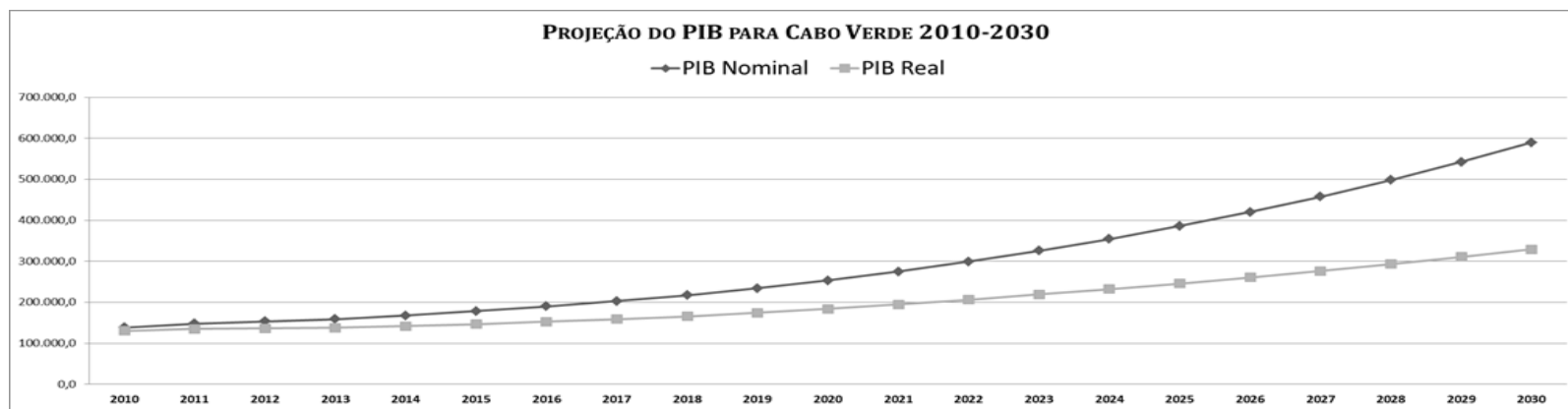
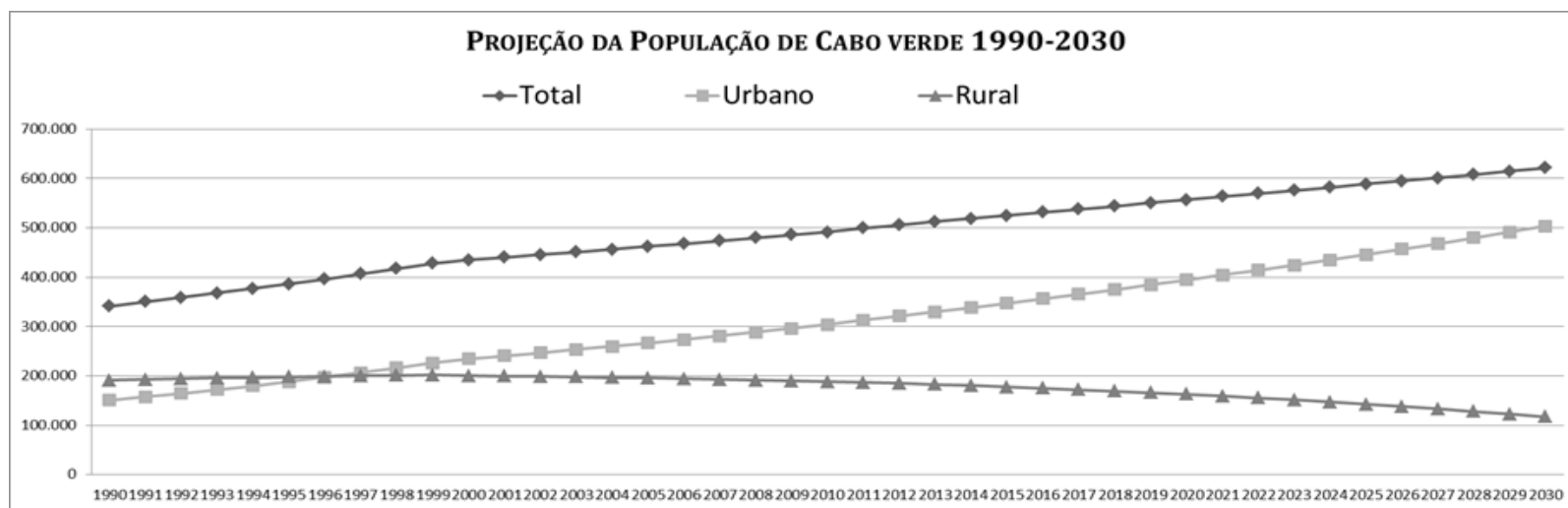




# External Scenarios

**Demographic Scenario:** Based on National Institute of Statistics Projections

**Economic Scenarios:** based on government and IMF scenario



# Baseline Scenario

**Baseline Scenario:** build based on historical data analysis and economic and demographic external Scenario.

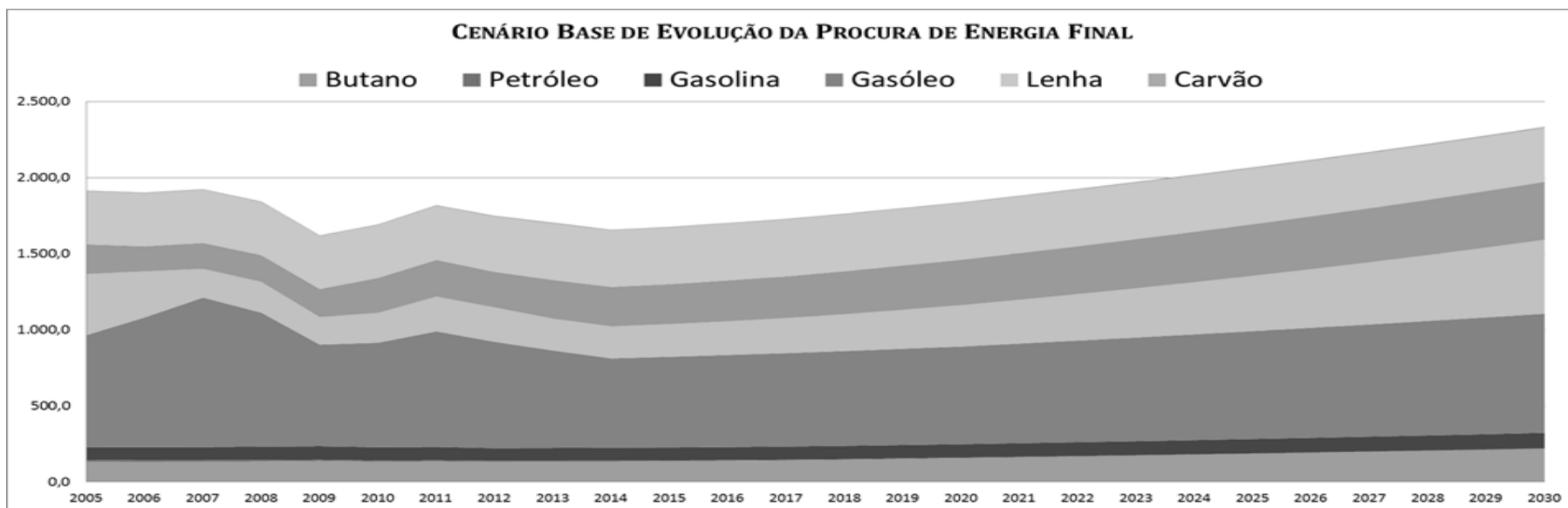
Two Periods: 2015 – 2020 and 2020 - 2030

**Electricity:** Driver = Economic Growth! + situation analysis;

**Gas and firewood:** Driver= Families! Hypothesis on rural/urban distribution, gas adoption by families and per capita consumptions;

**Gasoil and Gasoline:** scenario based on recent trend (Considering economic growth);

**Kerosene:** scenario based on historical trends.



# Cabo Verde National Energy Targets

## ENERGY ACCESS

1. To achieve **100% Electricity Access** by 2017 (from more than 95%)!  
Grid Extension  
Renewable micro-grids  
Individuals Energy Systems (Solar Homes Systems)
2. To achieve **100% Access to Sustainable Cooking Services**  
**Eradicate Use of Three Stones** + Universalization of **Improved Stoves**  
Promotion of **Butane Gas**

## ENERGY EFFICIENCY

1. **Efficient Electricity Distribution Grid**: distribution losses reduced to 8%  
More than 30% of Distributed Electricity (15% technical+15% Commercial)
2. **Petroleum Products (excepts Butane)**: 10% reduction/Baseline
3. **Final Electricity Consumption**: 15% reduction/Baseline  
Promoting **Energy Efficient Building**  
**Energy Standards and Labelling** for Appliance and Equipment's  
Promoting Energy Efficient **Intensive Consumers (like Hotels)**

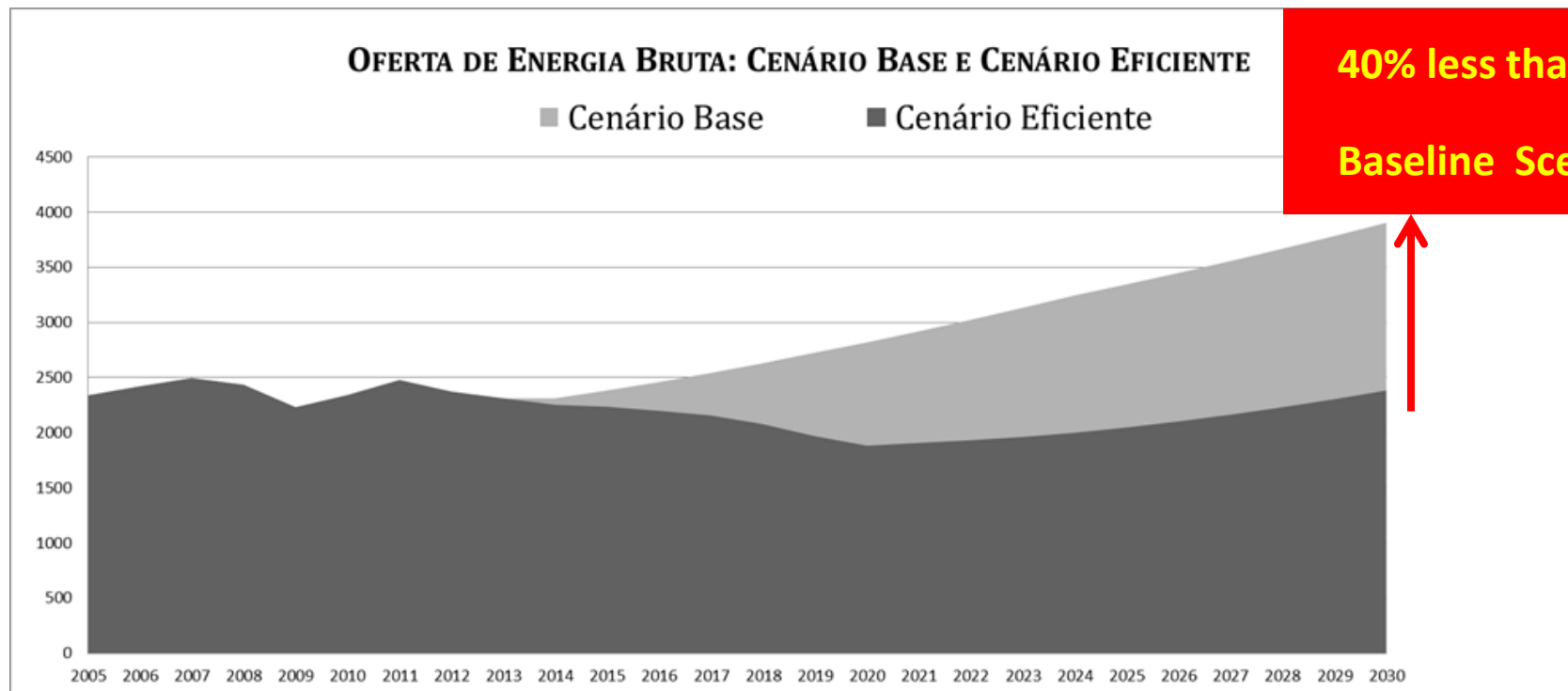
## RENEWABLE ENERGY

1. **100% Electricity from Renewables in 2020!**
2. New buildings: **Mandatory use Solar Water Heaters** (link to Energy Efficient Building)



# Primary Energy Consumption

## Combined Contribution of Energy Efficiency and Renewable Energy targets



**40% less than in the  
Baseline Scenario**

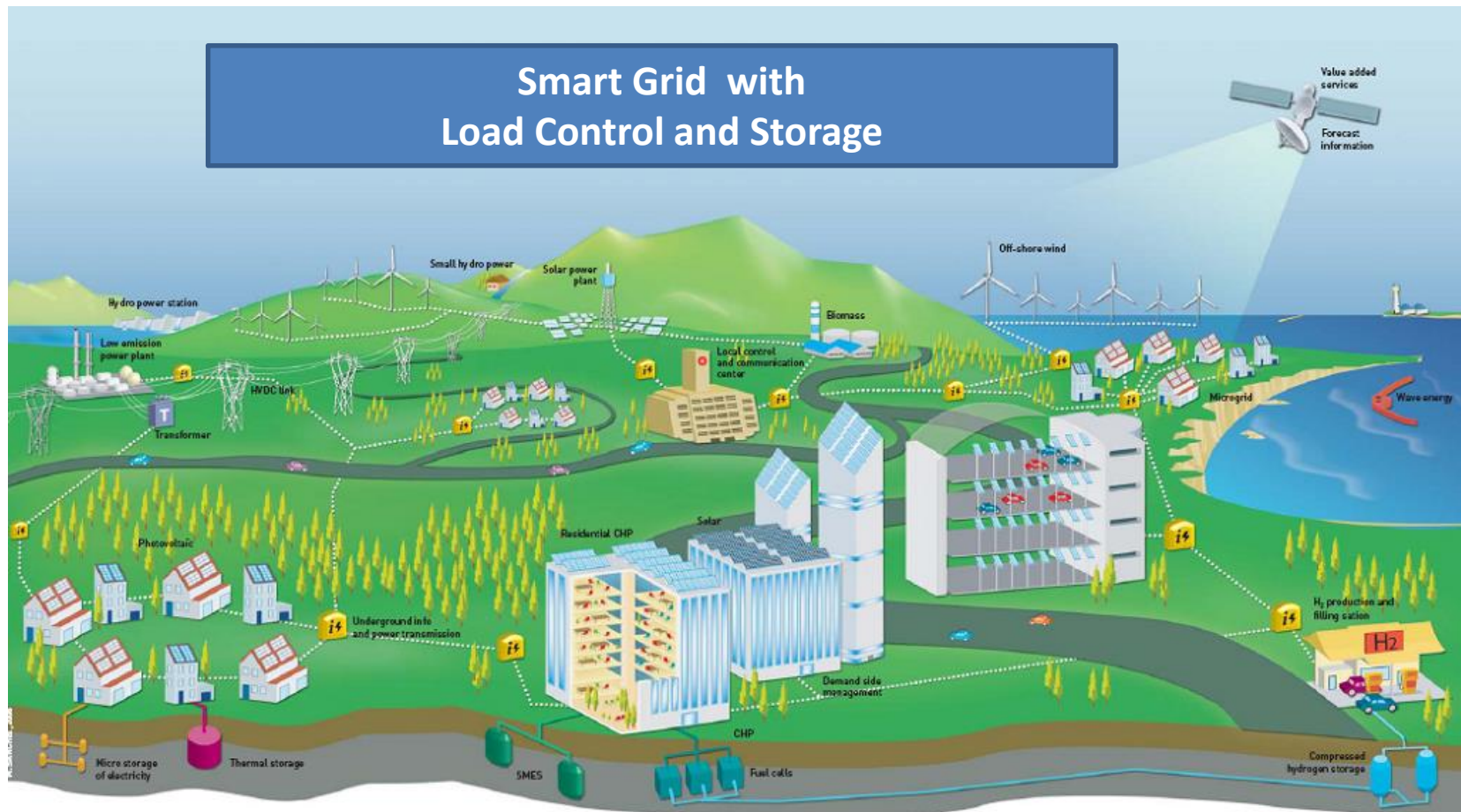
# The Energy Future: Vision

**WE ALL ARE PRODUCERS**



**NOTHING IS LOST, EVERYTHING IS STORED  
Grid Transport but also Store  
Energy**

**Buildings, condominiums and micro-  
grids are Consumers and Producers**



*Obrigado!*