

JICA Knowledge Co-Creation Program (Group & Region Focus)
Energy Policy (A) & (B) JFY2017
Country Report
Cabo Verde

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**Ministério da Economia
e Emprego**

Direção Nacional de Energia Indústria e Comércio

Content

1. General Information;
2. Energy Reserves;
3. Current Energy Policy and Measures;
4. Past Energy Demand and Supply;
5. Outlook of Energy Demand and Supply (2020, 2030)
6. Energy Related Investment;
7. Major Difficulties and Bottlenecks in Formulating Energy Policies;
8. Subjects of Interest.

Cabo Verde Country Profile

Location : West Africa ≈450 Km from West Africa
Land Surface Area: 4.033Km²
Exclusive Economic Zone: ≈ 700.000 km²
National language – Creole
Official language – Portuguese
Country Capital – Praia
Currency – Escudos with a fixed peg to the Euro



Cabo Verde was discovered in 1460 and was under Portuguese colonial rule until 1975, when it achieved its independence on 5 July. In January 1991 was institutionalized the multi-party system. Currently Cabo Verde has a stable semi-parliamentary regime, enjoying peace, social and political stability.



Demography

Gráfico 1 - Evolução da população e dos agregados familiares. Cabo Verde, 1990-2016

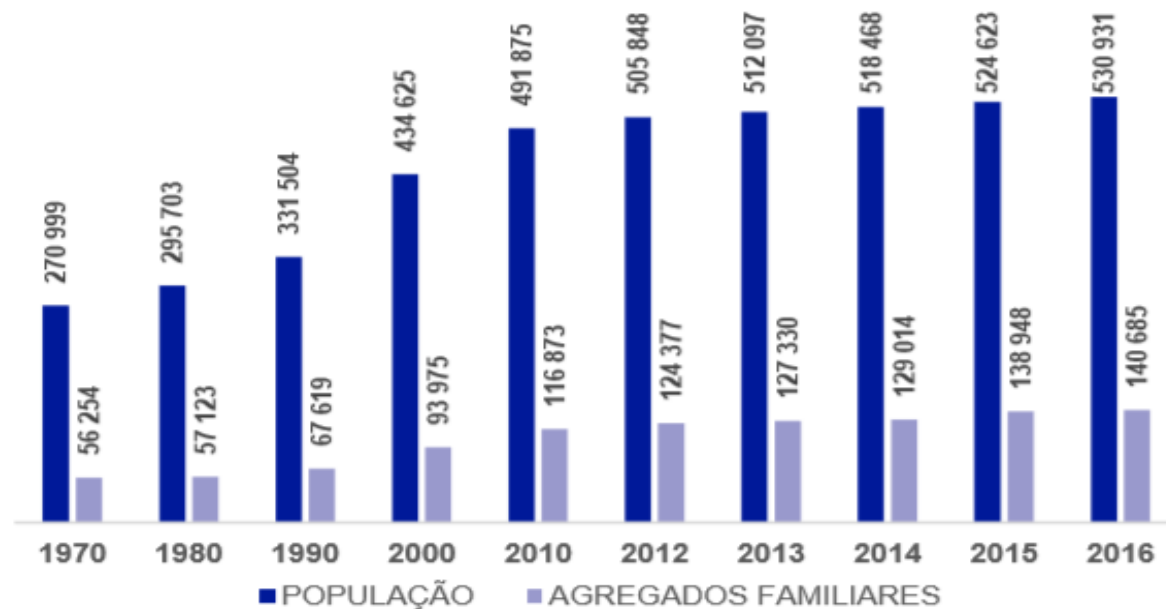
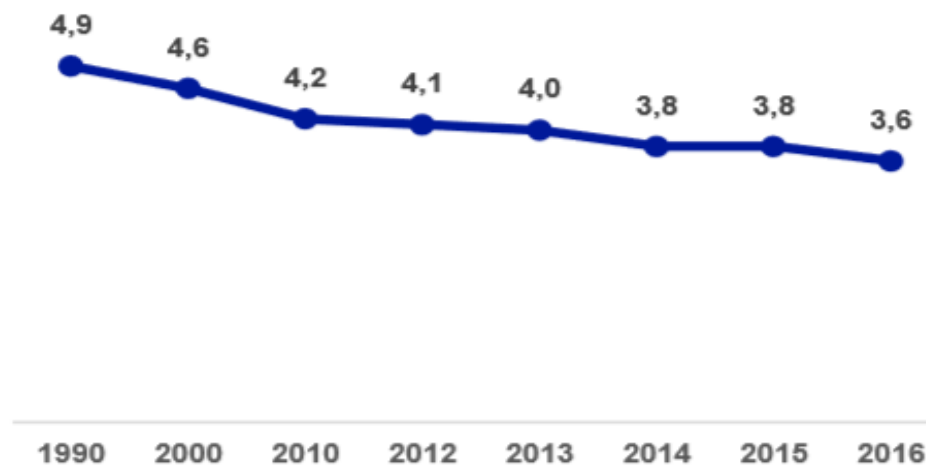
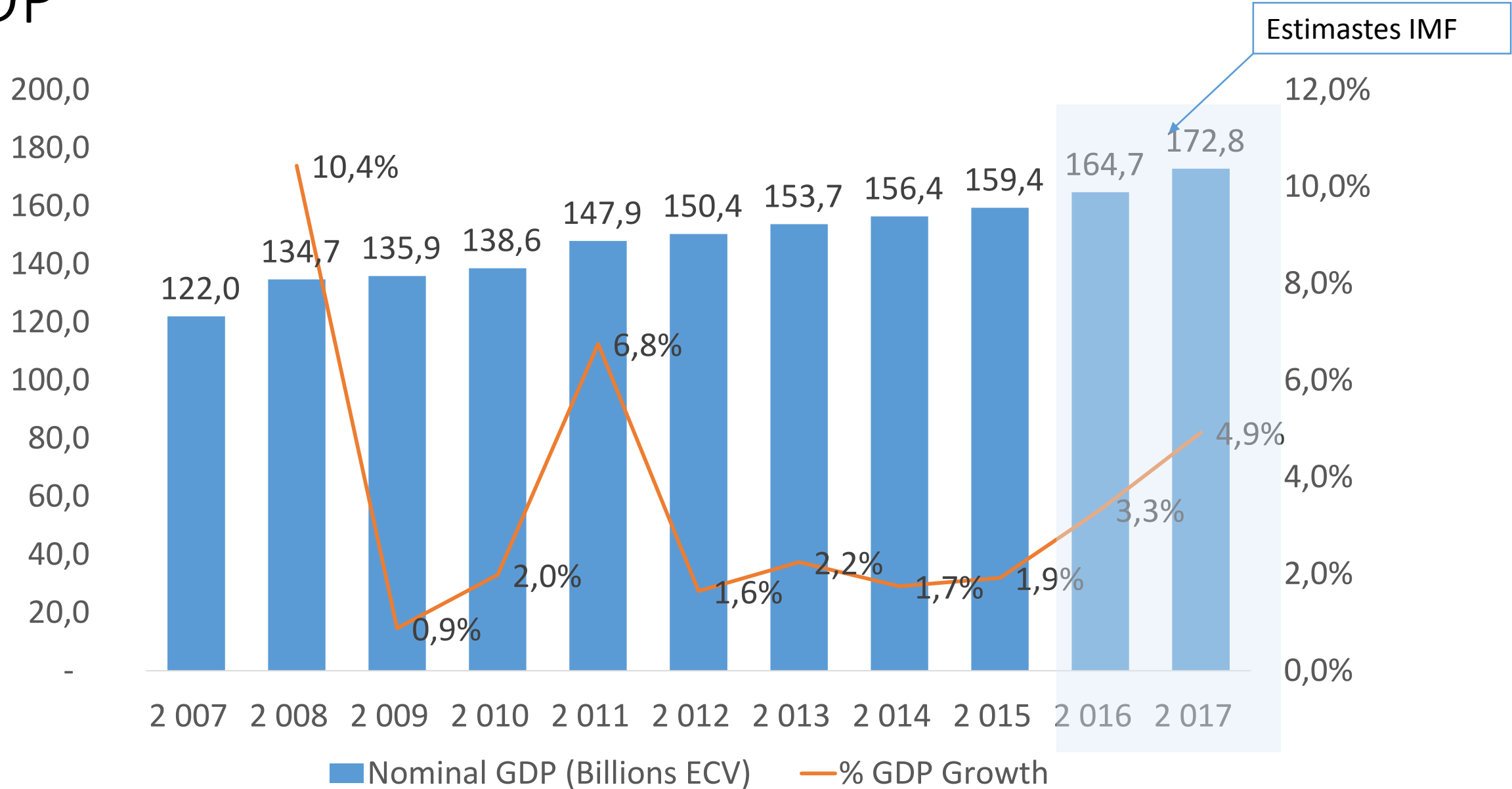


Gráfico 2 - Dimensão média dos agregados familiares. Cabo Verde, 1990-2016

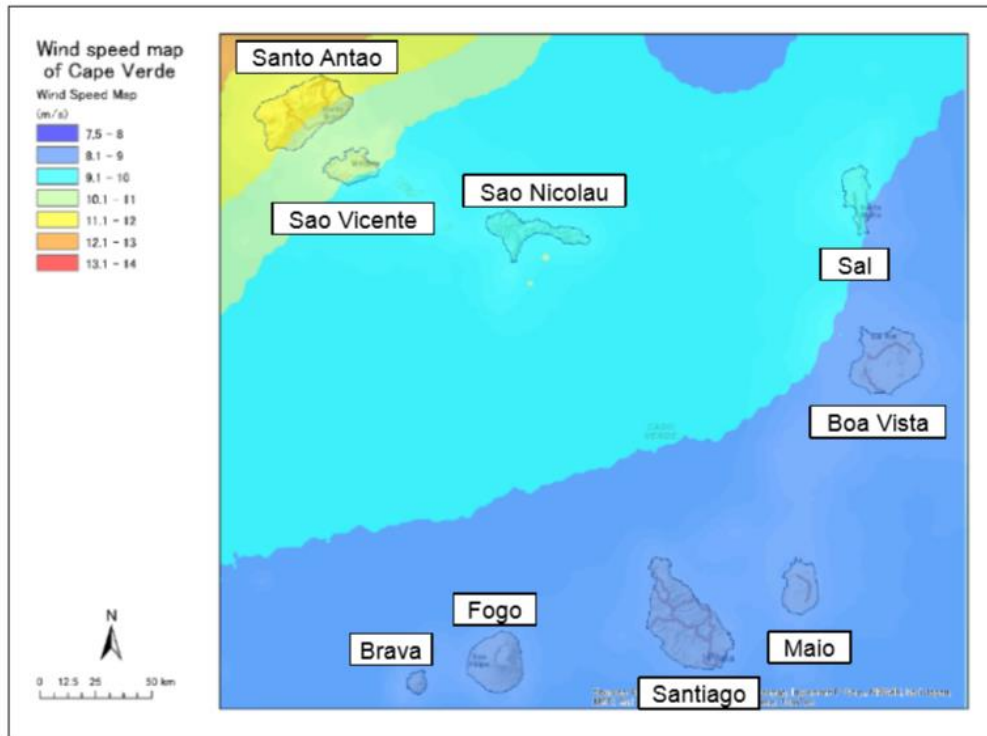


Fonte: INE, Censo 1990, 2000, 2010 e IMC-CV, 2013, 2014, 2015, 2016

GDP



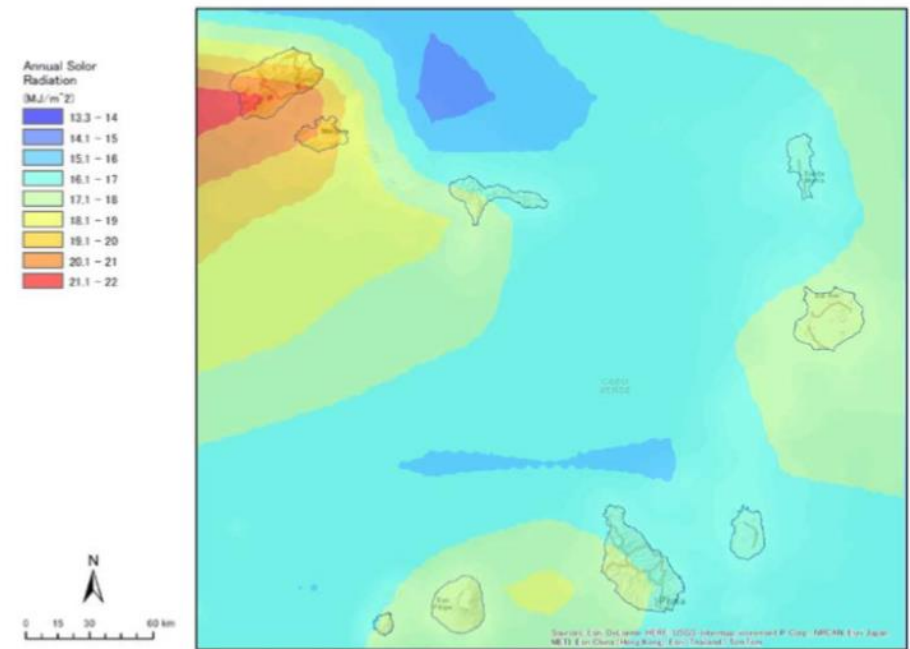
Energy Reserves



Source: JICA Study Team

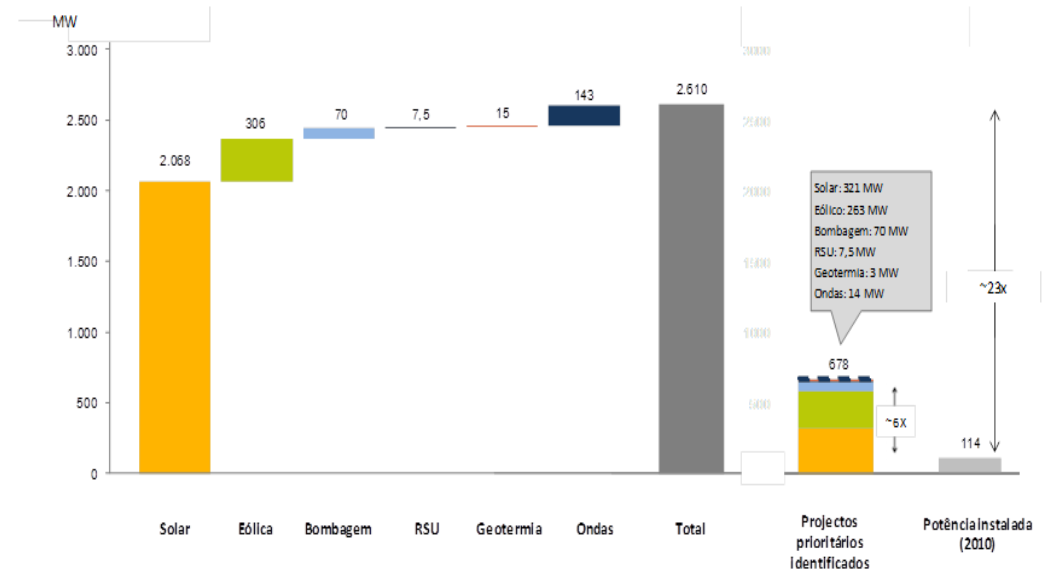
Figure 7.3-15 Average annual wind velocity (2015) calculated according to numerical prediction data [ground height of 55 meters]

No known fossil energy reserves but strong wind, solar and other renewable energy potential.



Source: JICA Study Team

Figure 8.3-5 Mean Solar Radiation Map for Cabo Verde based on GPV Data Simulation

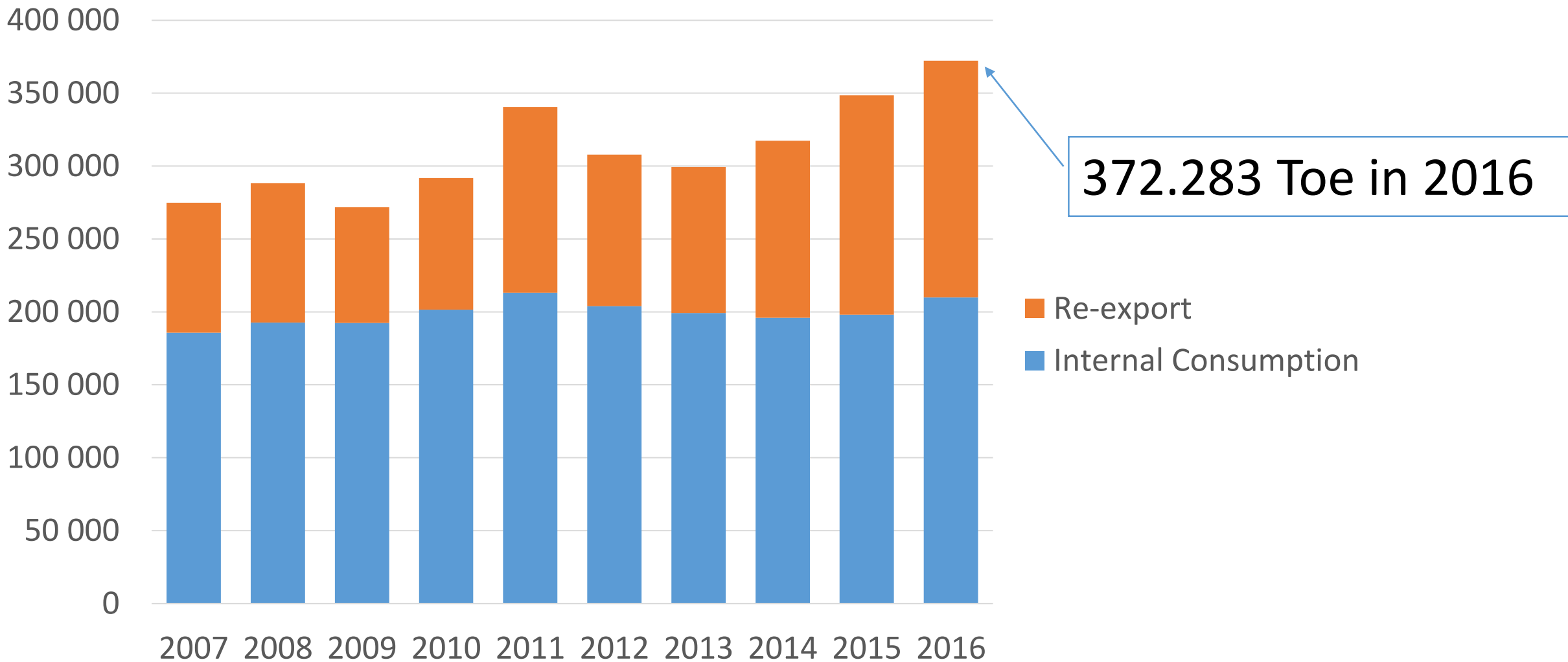


Current energy policy and measures

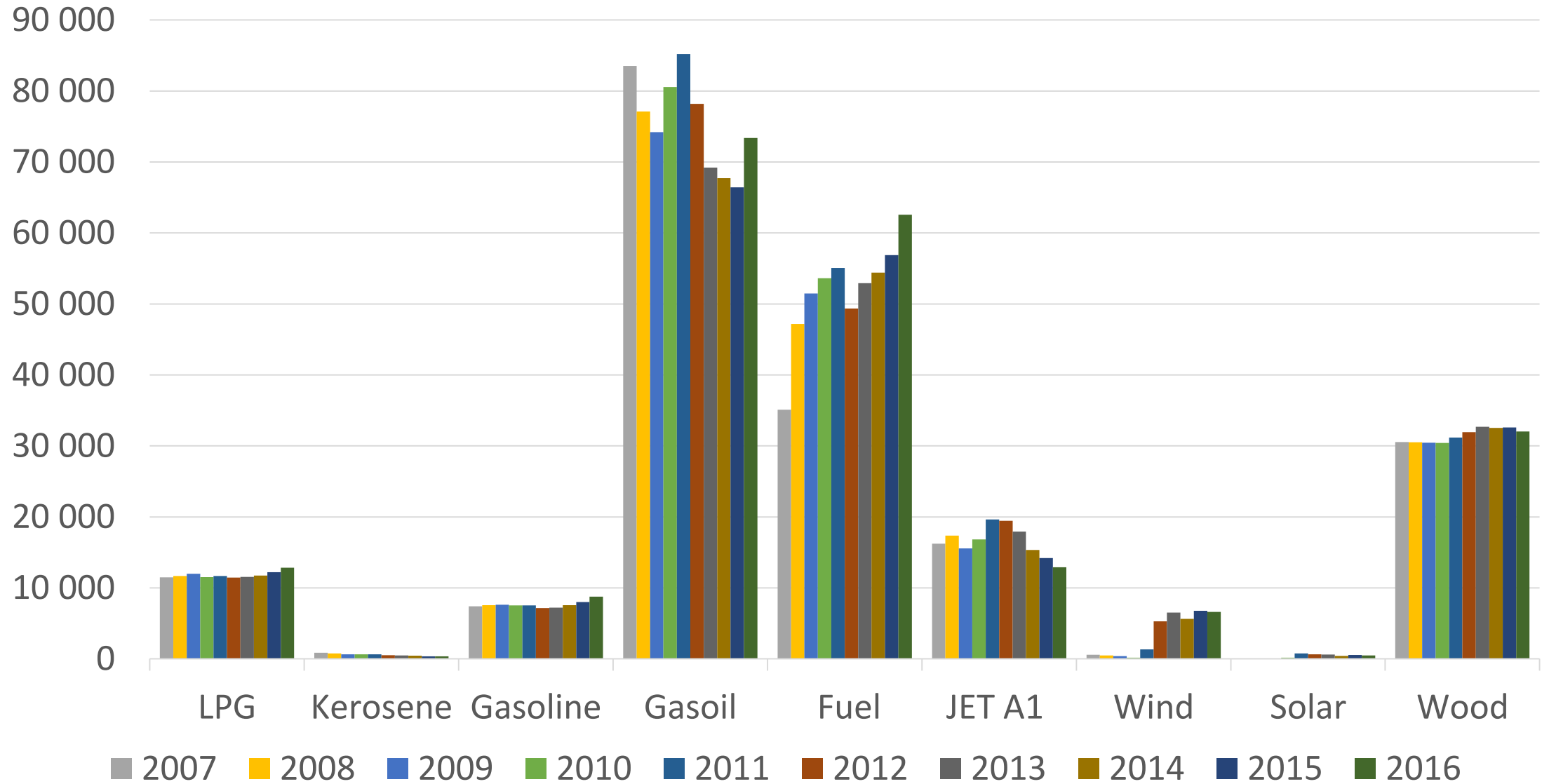
- The long-term strategy is to accomplish the transition to an energy sector that is secure, efficient, sustainable, without reliance on fossil fuels and capable of providing universal access and energy security.
- Cabo Verde is firmly committed to a global low-carbon transformation, which decouples economic growth from emissions, provides for the sustainable use of natural resources, and has laid the relevant groundwork to achieve energy independence relaying on renewable sources and energy efficiency.
- The GoCV has made significant progress towards achieving energy access goals and increasing the use of RE in the electricity mix in the recent years. However, the country is still highly dependent on the use of imported fossil fuels and thus oil price volatility and transportation costs have an impact on its economy. The insularity character of the country also contributes to the complexity of the problem.

Demand and supply

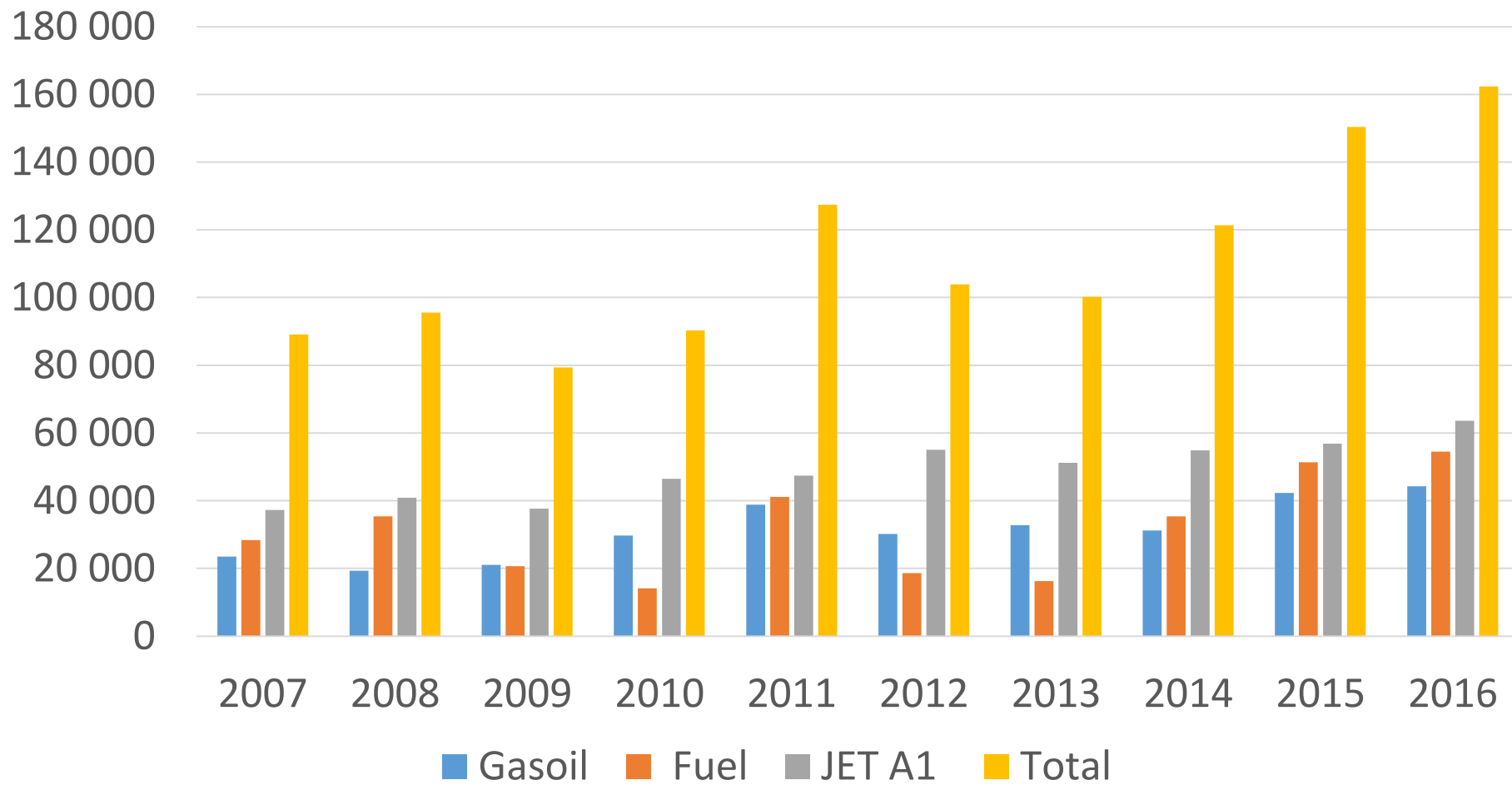
Total Energy Consumption (Toe)



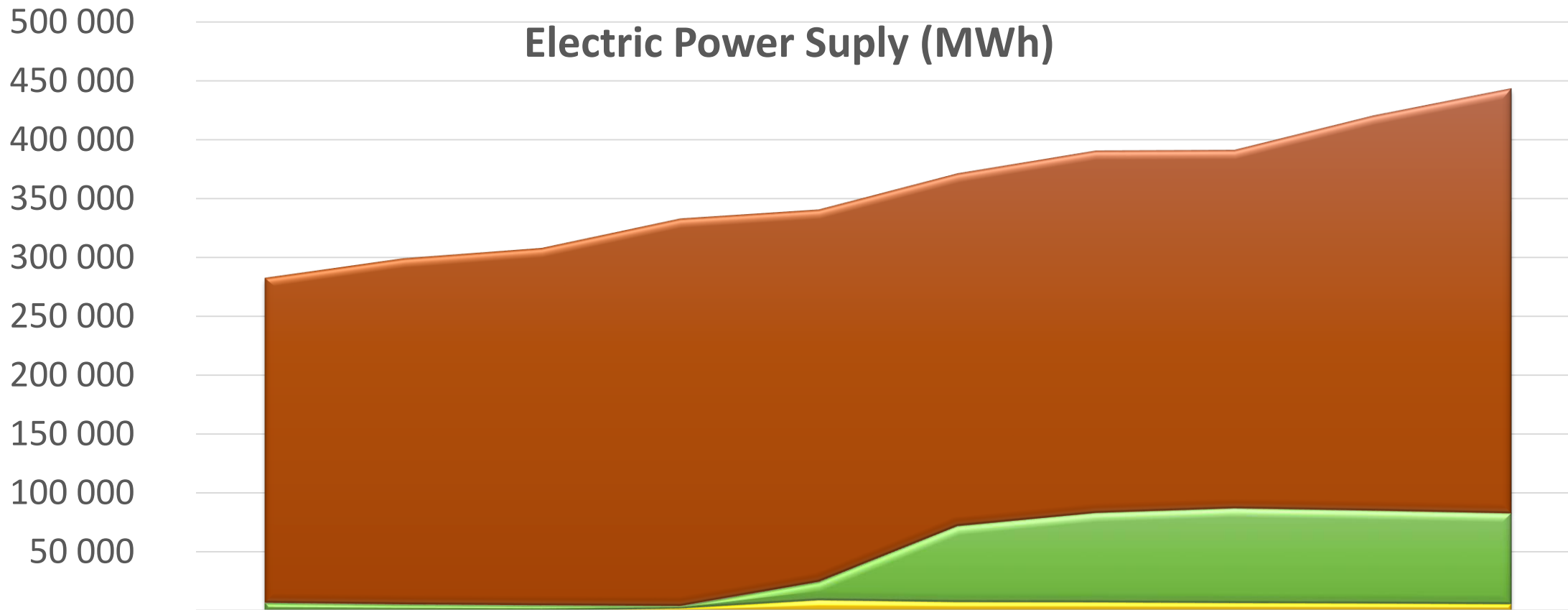
Internal Energy Consumption (Toe)



Re-export (Toe)



Electric Power Suply (MWh)

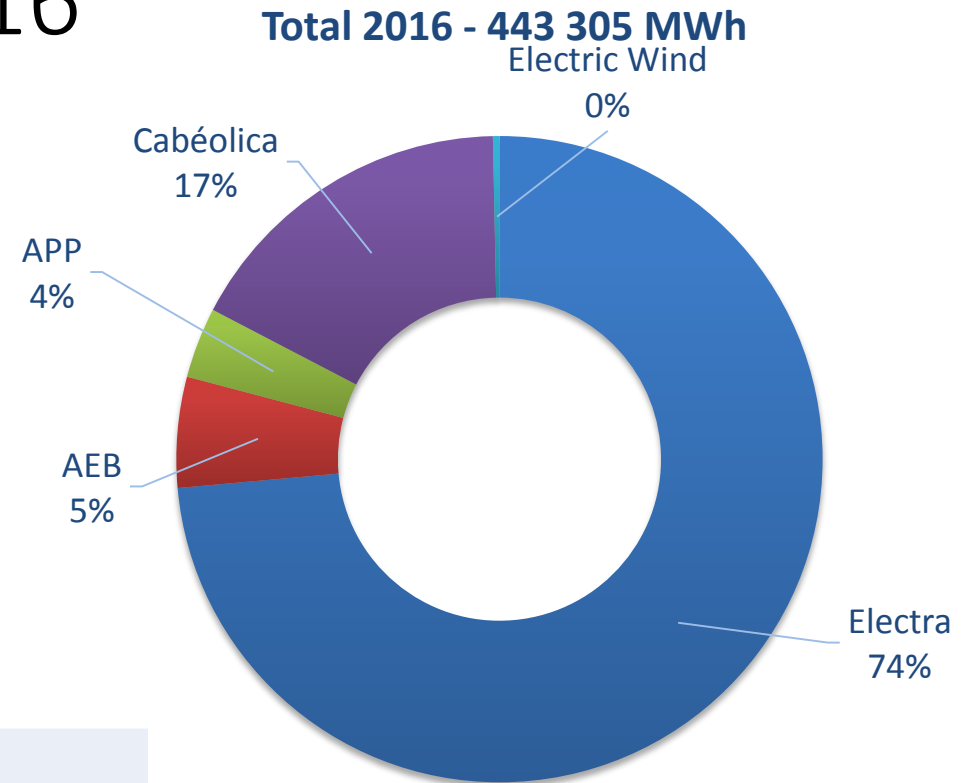


	2 0 0 7	2 0 0 8	2 0 0 9	2 0 1 0	2 0 1 1	2 0 1 2	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6
■ Diesel	275 55	293 51	303 16	328 80	315 90	299 05	307 41	304 23	335 17	360 73
■ Wind	6 869	5 510	4 661	1 992	15 605	64 495	75 824	80 183	78 820	76 932
■ Solar	-	-	-	2 105	8 956	7 464	7 253	6 647	6 214	5 637

Power Supply in 2016

Generation (MWh)	Comb. F.	Eólico	Solar PV	Total
Electra	320 572		5 595	326 166
AEB	24 511			24 511
APP	15 654		42	15 696
Cabéolica		75 486		75 486
Electric Wind		1 446		1 446
Total	360 737	76 932	5 637	443 305
	<u>81,37%</u>	<u>17,35%</u>	<u>1,27%</u>	

Existing capacity (MW)	Gasoleo	Fuel 180	Fuel 380	Eólico	Solar PV	Total
Electra	27,34	80,13	18,44		6,75	132,66
AEB	8,60	3,0				11,60
APP	2,41	3,8			0,036	6,25
Cabéolica				25,5		25,50
Electric Wind				0,5		0,50
Total	38,4	86,9	18,4	26,0	6,8	176,51
	22%	49%	10%	15%	4%	



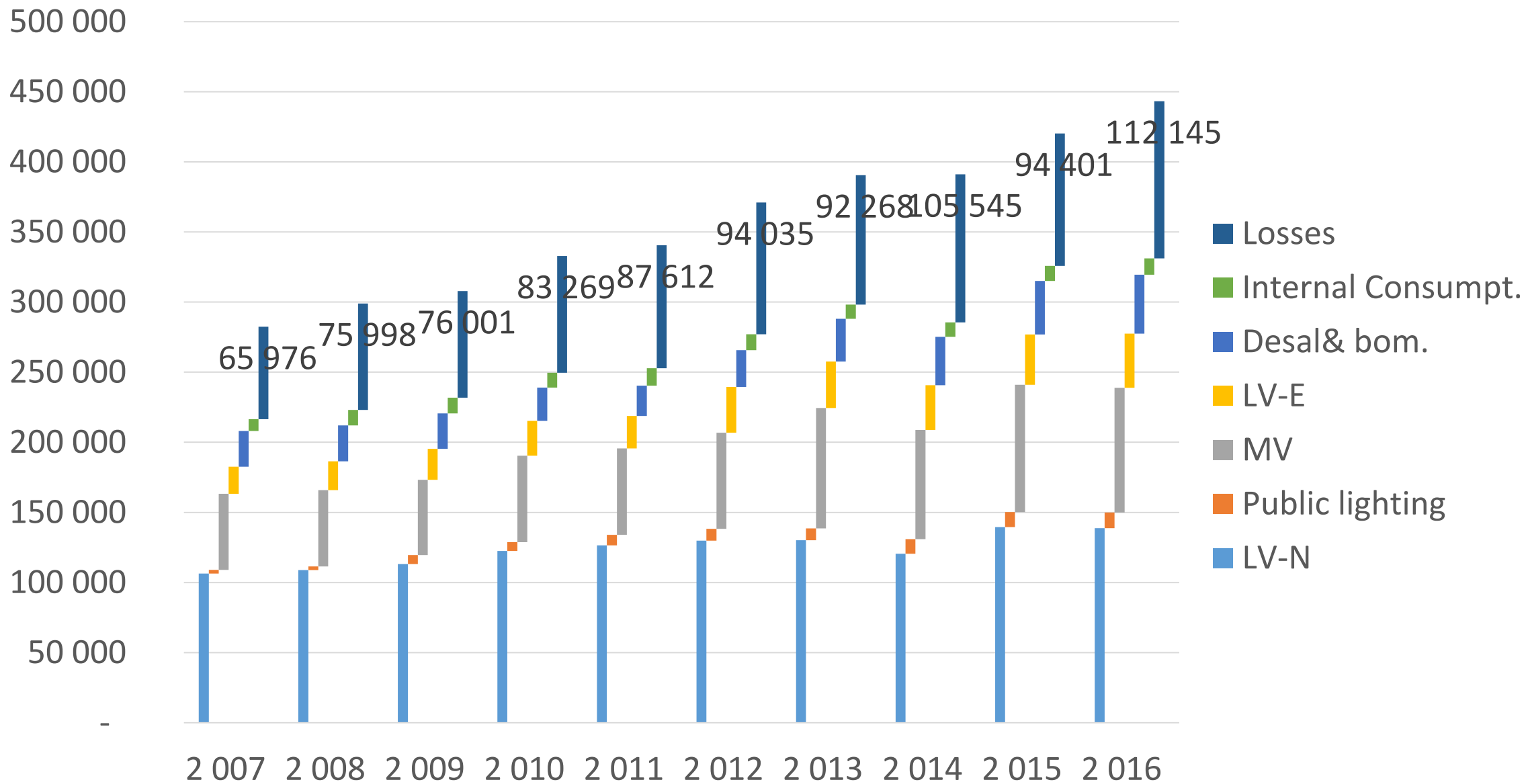
+ 1 GWh produced by Distributed Generators

Power Supply in 2016(cont.)

	Factor de Capacidade (%)		
	Diesel	Eólico	Solar PV
Electra	29,1%		9,5%
AEB	24,1%		
APP	28,8%		13,4%
Cabéolica		33,8%	
Electric Wind		33,0%	
Total	<u>28,7%</u>	<u>33,8%</u>	<u>9,5%</u>

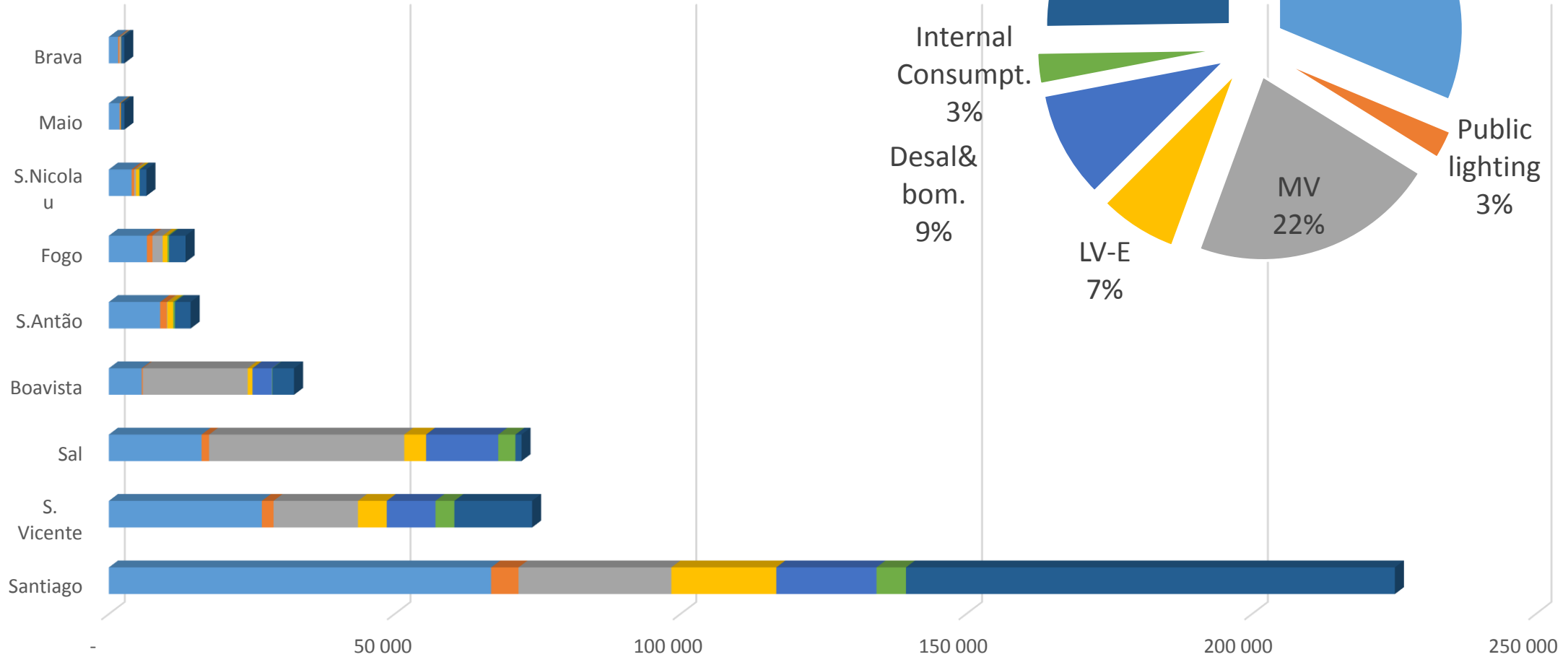
Produção Cabéolica					
	S.Vicente	Sal	Boavista	Santiago	Total
Potencia Instalada	5,95	7,65	2,55	9,35	25,50
Produção Decl. Cabe.	18 246	17 213	7 878	32 020	75 358
Fator de Capacidade	35,0%	25,7%	35,3%	39,1%	33,7%
Disponivel Decl. Cab.*	28 987	32 208	10 174	33 834	105 202
Fator de Capacidade	55,6%	48,1%	45,5%	41,3%	47,1%
* Estes dados exigem uma análise de validação					

Electric Power Consumption & Losses (MWh)



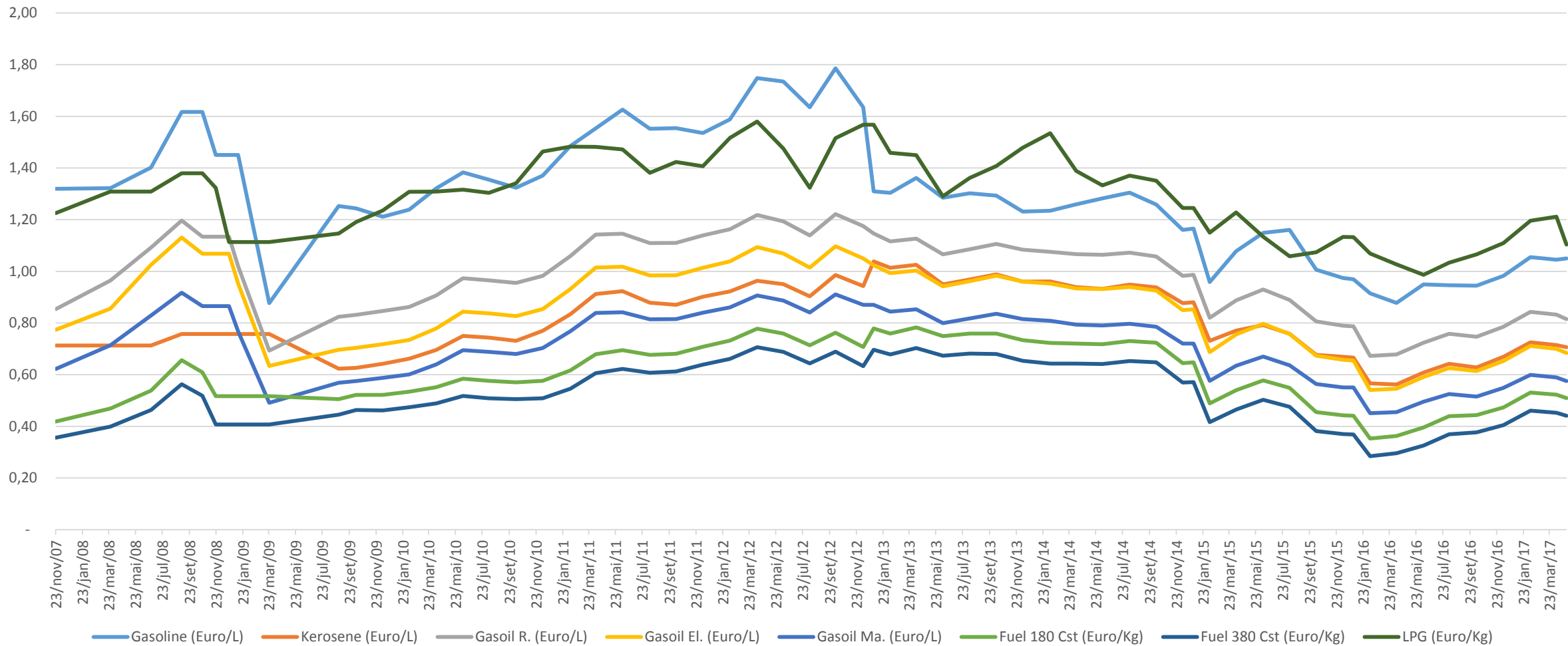
Energy consumption 2016 (MWh)

■ LV-N ■ Public lighting ■ MV
■ LV-E ■ Desal& bom. ■ Internal Consumpt.



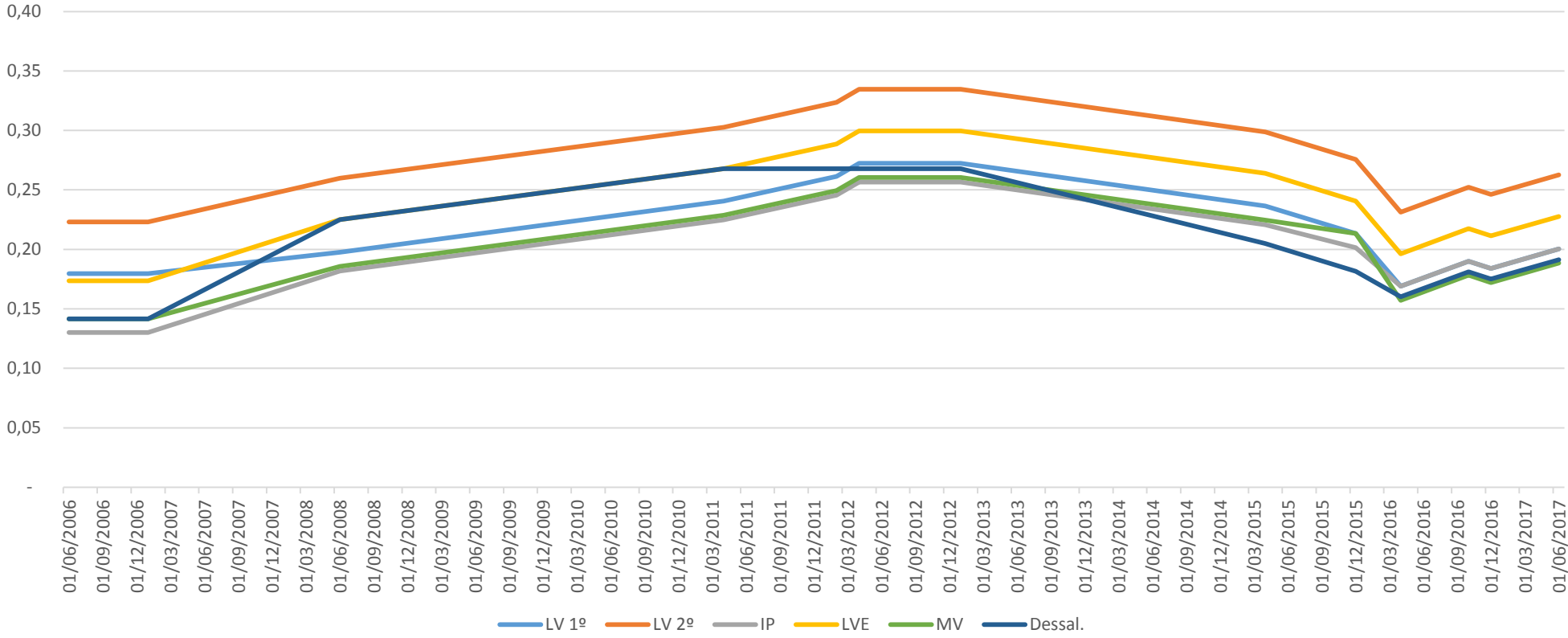
Energy Prices

Regulated retail fuel prices



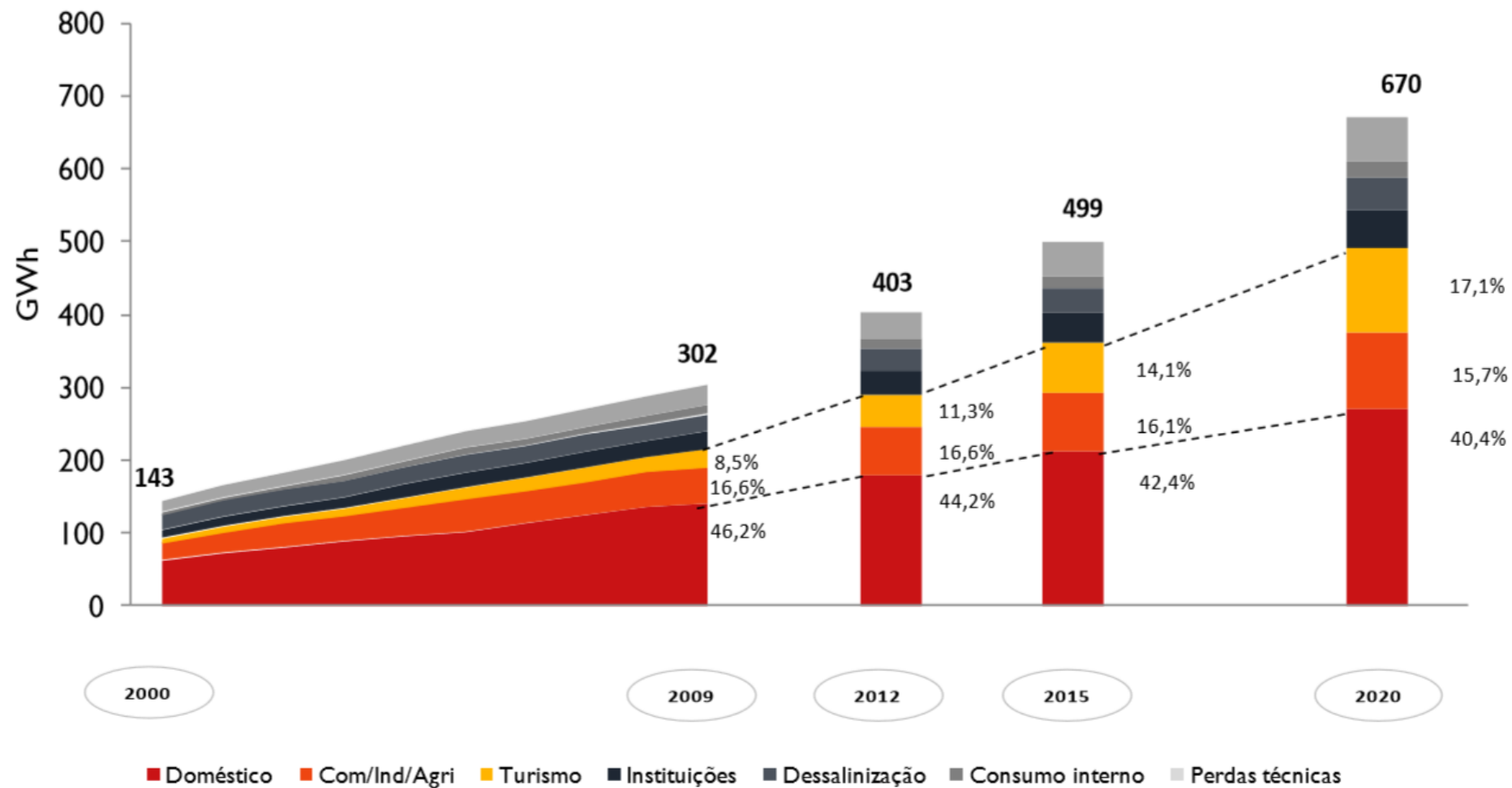
Energy Prices

Electricity Tariff (Euro/kWh)



Outlook 2020

Cenário de evolução do consumo de energia eléctrica por sector

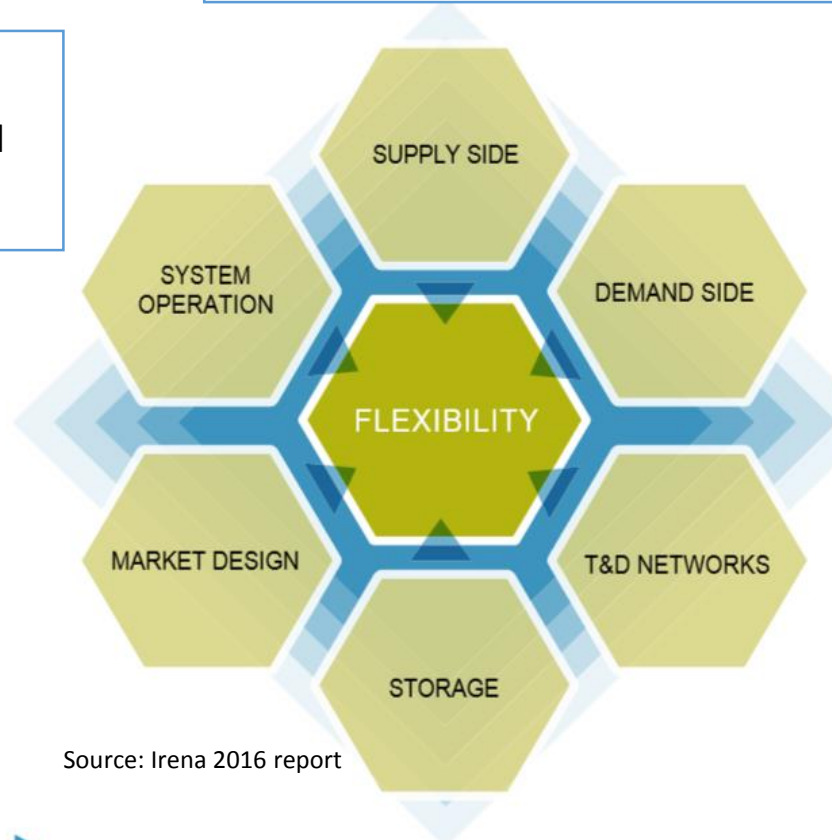


Energy Related projects

- Reinforcement of conventional power production capacities in some Island
- Electricity Master Plan Horizon 2040 (TAF – EU);
- Blue print for Isolated Micro -grids (Luxdev)

- SCADA/EMS/DMS (JICA)
- Road Map for Smart Grid Development (Luxdev)

- Unbundling of the electricity sector (MEE/WB)
- Modernization of the electricity tariff structure (BM),
- Procedures and tender doc. For renewable IPP bids (GIZ)
- Toolbox for renewable energy tariff design in ECOWAS (GIZ –EU)



Source: Irena 2016 report

- Appliances & Building Energy Efficiency Project (PNUD)
- Operationalizing the Framework for Distributed Generation of Renewable Energy in Cabo Verde (GIZ, BM);
- Promotion of Thermal Solar for Water heating (AECID)
- Smart Meters and Revenue Protection Program for Electra

Development of a Grid Code for the Power Sector of Cabo Verde (GIZ)
 Reinforcement of T&D grids in 6 Islands (JICA)

20 MW PSP for Santiago Island (TAF -UE)

Major difficulties and bottlenecks

In the short term, it will need to address the following key challenges:

- strengthen the institutional structure and seek additional human and funding sources for the central energy policy formulation, planning and regulatory functions;
- Improve the National Energy Information System;
- Define the basket of incentives to increase private sector interest on RE.
 - Policy, incentive schemes and tariffs should be designed with the idea that IPPs and DG systems will play an increasing role (having in mind that tariffs should remain affordable to households and businesses).
 - Offer a fairer net-billing scheme to self-generators in order to promote system-wide efficiency;
 - Work on reducing commercial and technical losses;

Subjects to study in the order of priority

- Forecasting the evolution of consumption and peak, on a short/medium-term period.
- Assess how to act with major consumers, in terms of tariffs and shift of consumption patterns, in order to linearize the load diagrams;
- Cost and benefit analysis of lowering the technical minimums of thermal groups to increase the spinning reserve.
- Integration of storage technologies in the planning process.
- Security of Supply (e.g. System reliability criteria: Largest generation unit loss / Operational Planning with reserve margin, probabilistic analysis - LOLE, N-2/N-1,
- Fuel supply security – degree of dependency and diversity of primary energy supply)

Thank you!

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