



# The Electricity Sub Sector in Senegal and Opportunities in Renewables

December, 2016

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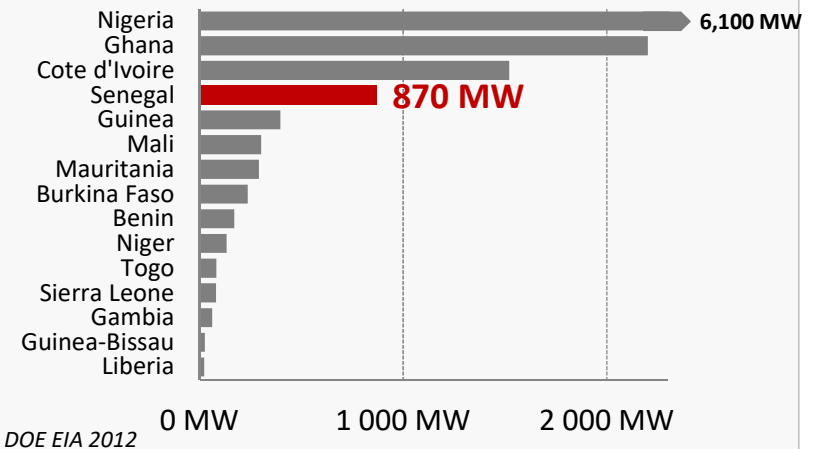
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Senelec strategic management

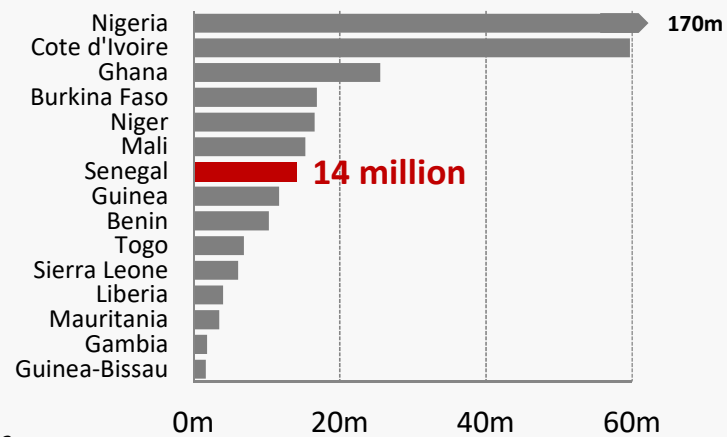
# Senegal is a leading country in West Africa



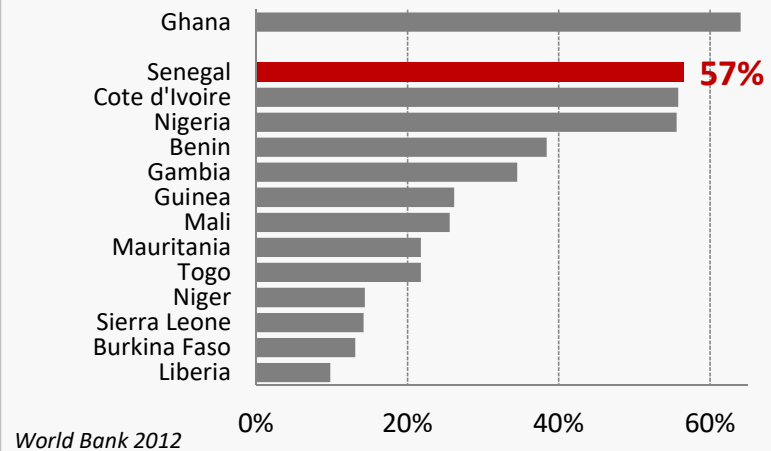
## Nominal Generation Capacity



## Population



## Electrification

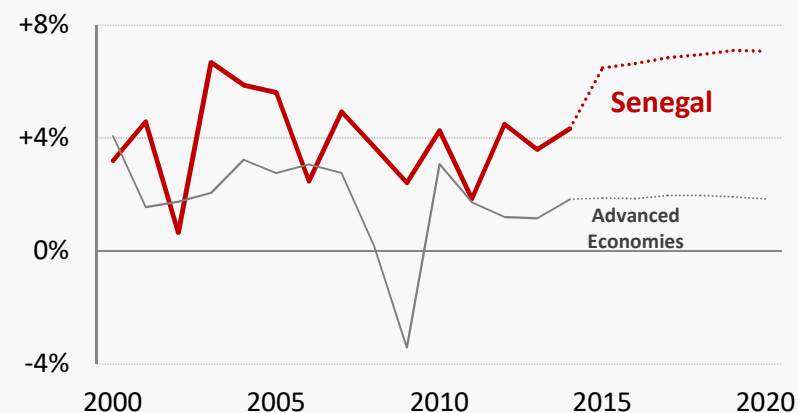


# Senegal is a major democracy



- Senegal has been a notably stable democracy since independence in 1960
- Transitions between governments have been smooth
- Is ranked in the top decile for transparency and governance
- Stable organic GDP growth of about 4% per annum
- With few natural resources, Senegal avoided the resource bubble
- Senegal is an investment destination of choice
- The power sector offers specific investment opportunity

## Real GDP Growth



Source: IMF

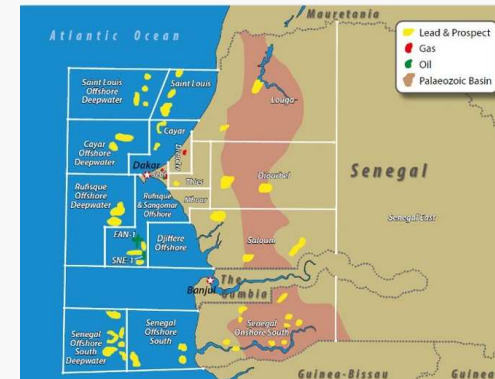
## Transparency International 2015 rankings for mainland Africa

#1	Botswana
#2	Rwanda
#3	Namibia
#4	Ghana
#5	Senegal = South Africa

## Senegal has natural resources of energy

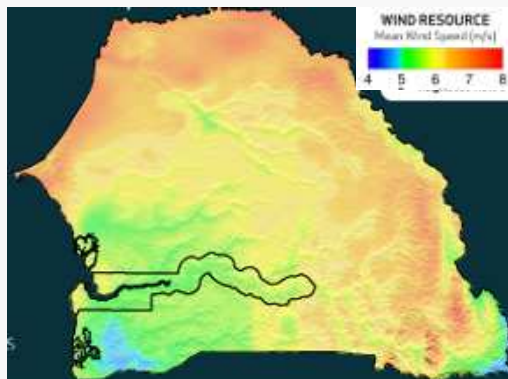
- Senegal has few indigenous sources of energy; imported fuels (diesel/HFO)
- The main source of household energy is wood and charcoal
- Recent gas discovery has potential for power generation and industrialisation
- Wind and solar are real opportunities

## Gas



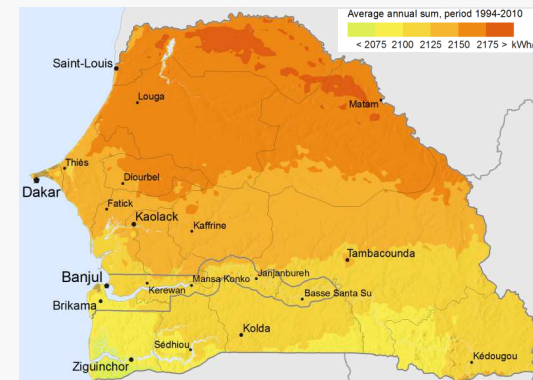
20 tcf of gas discovered offshore in 2015  
will be commercialised over the next decade

## Wind



Good wind on Atlantic coast north of Dakar.  
250 MW of wind projects in IPP program

## Solar



Irradiation is good and 300 MW of solar PV projects in IPP program

# Overview of electricity sub sector in Senegal

- Senelec is a joint stock company 100% owned by the Republic of Senegal
- Senegal is a member of the West African Power Pool
- Primary fuels are diesel and HFO
- Wind and solar power will grow via IPPs
- On grid 15.79 Renewable Energy with hydro (75 MW) and solar (42 MW)

Owner	Power Plant	Capacity	Fuel	COD	
Senelec	C3	25	HFO	1966-78	
	Cap de Biches	TAGs	Diesel	1984-95	
	C4	84	HFO	1990-2003	
	Bel Air	C6	93	HFO	2006
		TAG 4	35	Diesel	1999
	Kahone	C7	93	HFO	2008-2012
		C1	15	Diesel	1982
	CICAD	2	Solar	2014	
IPPs	Total Senelec		367 MW		
	Contour Global	86	HFO/ GAZ	2015-2016	
	Kounoune	68	HFO	2006	
	Senergy 2	20	solar	2016	
	Kima Solaria	20	Solar	2016	
	Tobene	105	HFO/ GAZ	2015-2016	
	Total IPPs		299 MW		
Imports	Manantali	Mali	60	Hydro	2002
	Felou	Mali	15	Hydro	2013
	Total Imports		75 MW		
Off grid	80 MW				
Total	- Nominal		821 MW		

# Senelec has significant experience with IPPs

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- Over 20 years experience with IPPs, which now generate over 30% of power
- Three thermal and several renewable IPP projects in construction and development
- Senelec believes in partnerships with IPPs with appropriate sharing of risk/reward
- Government is proactively pursuing power generation for its *“Plan Senegal Emergent”*

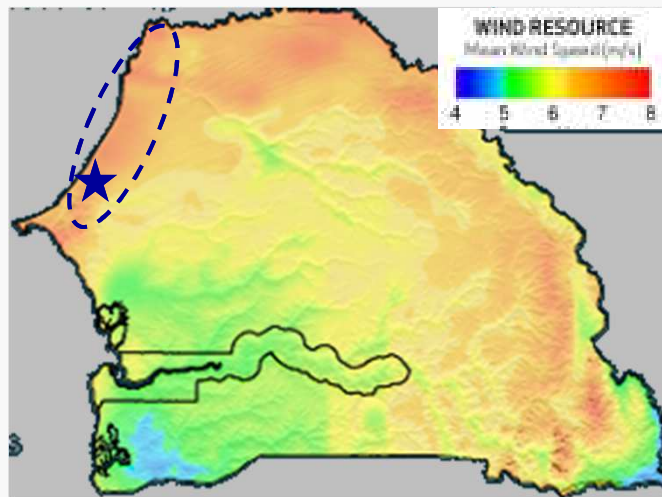
## Successfully Implementing IPPs

- Prioritise projects realistically
- Optimise fuels and sites when selecting IPPs
- Offer credible bankable PPAs
- Integrated hands-on management by all parties during execution
- Senelec has closed 8 IPPs

# Current renewable energy generation projects

## Wind IPP projects

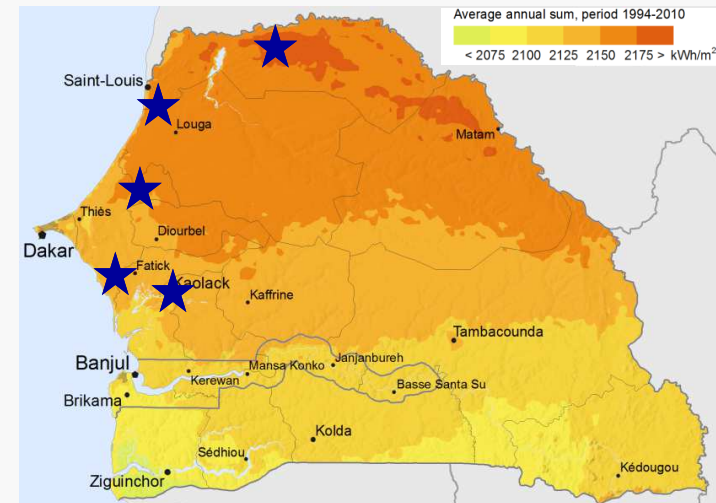
- 150 MW Taiba Wind project in development near Taiba Ndiaye (in 3 x 50 MW phases from 2018 to 2020)



## Solar IPP projects

Several other solar projects in development

- 30 MW Senergy PV in construction / 2017
- 20 MW Senergy 2 in operation /2016
- 20 mw Kima Solaria in operation/ 2016
- 29 MW TenMerina in development/2017
- 20 MW EDS-Eximag in development/ 2017

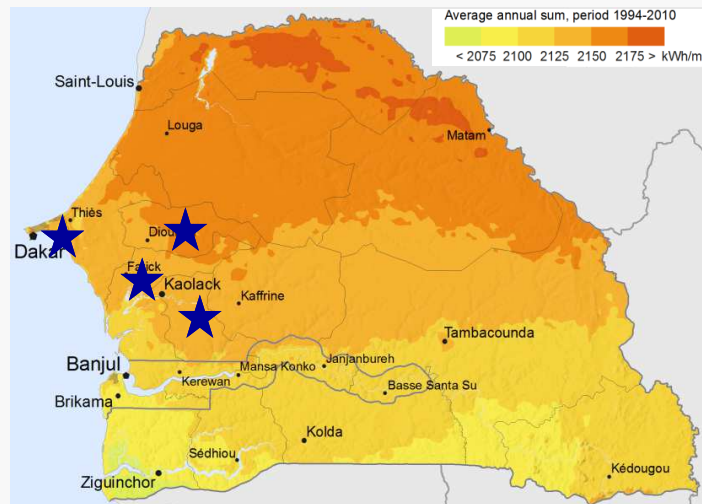




# Current renewable energy projects

## Solar IPP projects

- 15 MW DIAS EPC of KfW /2017
- 23 MW Scaling solar Kael /2018
- 30 MW Scaling Solar Kahone / 2018
- 47 MW Scaling in others sites / 2018



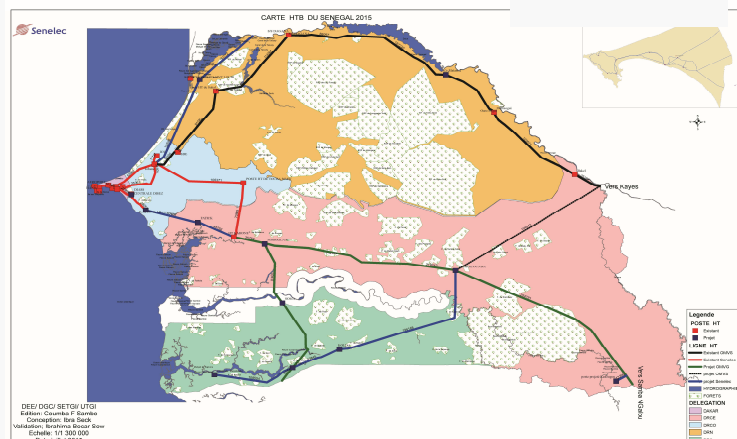
In 2018, with production capacities expected including the 100 MW solar Scaling Solar program and the first 50 MW of 150 MW wind farm of Taiba Ndiaye, the rate of renewables in the energy mix goes around 30%.

## Biomass

Opportunities with typha, marine algae etc..

## Expansion of transmission network offers investment opportunities

- Senelec operates about 13,000 km of transmission:
  - 30/90 kV national grid
  - 225 kV supranational grid
- Concentrated on centres of population and demand in western Senegal
- Isolated mini-grids in remote areas



High voltage Transmission Network						
		Wire		km	I <sub>max</sub> A	Build
30 kv	Cap des Biches	288 mm	Almelec	18	550	1979
	Cap des Biches	288 mm	Almelec	16	550	1979
	Cap des Biches	366 mm	Almelec	20	630	1991
	Cap des Biches	366 mm	Almelec	20	630	1991
	Bel Air	288 mm	Almelec	5	550	1979
	Bel Air	366 mm	Almelec	5	630	1991
	Bel Air	366 mm	Almelec	5	630	1991
	Cap des Biches	288 mm	Alu-acier	5	525	1959
	Sococim	288 mm	Alu-acier	38	525	1959
	Thiès	288 mm	Alu-acier	30	460	1959
	Cap des Biches	366 mm	Almelec	58	630	1992
	Tobène	366 mm	Almelec	13	630	1992
	Tobène	2*288 mm	Almelec	124	800	1992
90 kv	Boucle de Dakar			945		
225 kv	Manantali – Tobène Tobène Touba Kaolack			945		

# In summary: Opportunities in the power sector

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## Wind & Solar Power Generation

- Senelec supports renewable IPPs by offering credible bankable PPAs
- Government of Senegal is tendering up to 100 MW of solar capacity,

## Gas-fired Generation

- The Grand Tortue field is the largest gas reserve in West Africa
- Senegal's long-term strategic generation master plan is based on gas-fired power generation from Tortue

## Improved Transmission

- Senelec's grid now focusses on Dakar, the centre of population and generation
- working to extend the grid to the interior and the south

## Off-Grid Generation

- Senegal already has 80 MW of off-grid generation capacity
- The government grants concessions to electrify local regions and private firms and local communities themselves can tender for concessions

# Senelec strategic management

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Mr Mouhamadou Makhtar Cissé, General Manager of Senelec since June 2015, has initiated, under His Excellency President Maky Sall impulse, several measures:

- the implementation of the Strategic Plan Senelec 2016-2020. It takes into account not only external requirements (including those of the State of Senegal and the macroeconomic environment) but also internal requirements arising from the relevance of the recommendations of studies or missions of audit (Organization and Management of Senelec, management of risk, unbundling activities of Generation, transmission and sale of electricity).
- The drafting and the implementation of the Procedures Manual of Senelec lean-to to the entire management process, business and support (ongoing mission).
- Strengthening the QSE approach, commitment to have our activities and procedures of the accounts Department of sales management certified according to ISO standards
- the commitment of customer satisfaction in terms of continuity and quality of service.
- The continuation of the projects of priority program for investments for the upgrade of the industrial infrastructure (PAP, PASE...).
- The reform of human resources management

**He welcomes you to Senegal to invest in Senelec projects.**

