République du Sénégal
Un peuple –Un But –Une foi

EXPERIENCE ON MODELLING ENERGY SYSTEMS IN SENEGAL

Presented by

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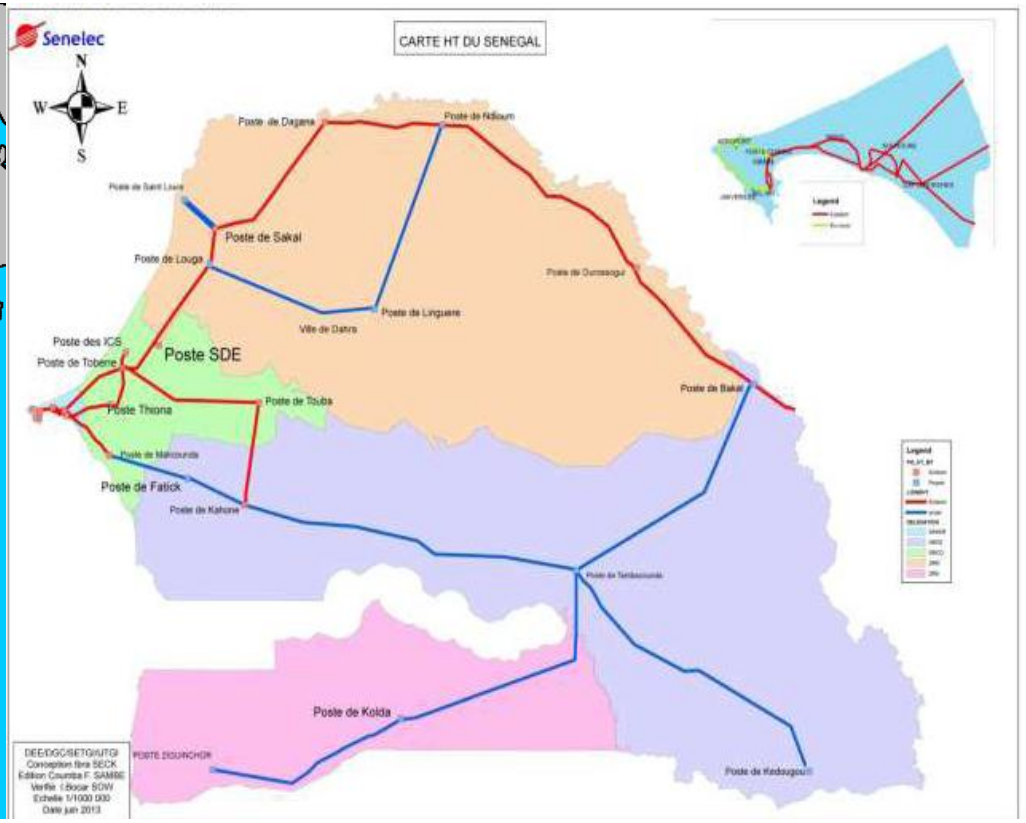
COUNTRY DETAILS

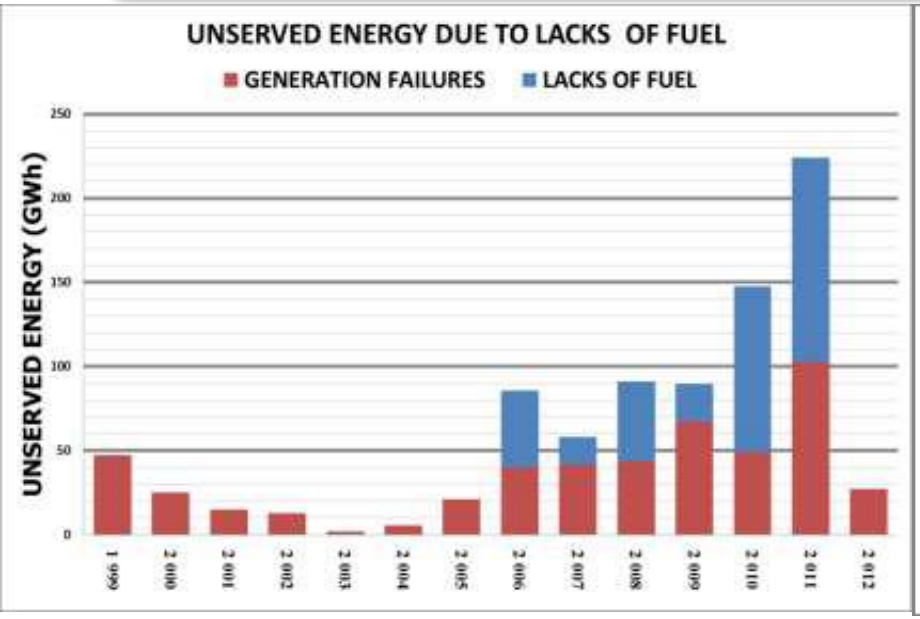


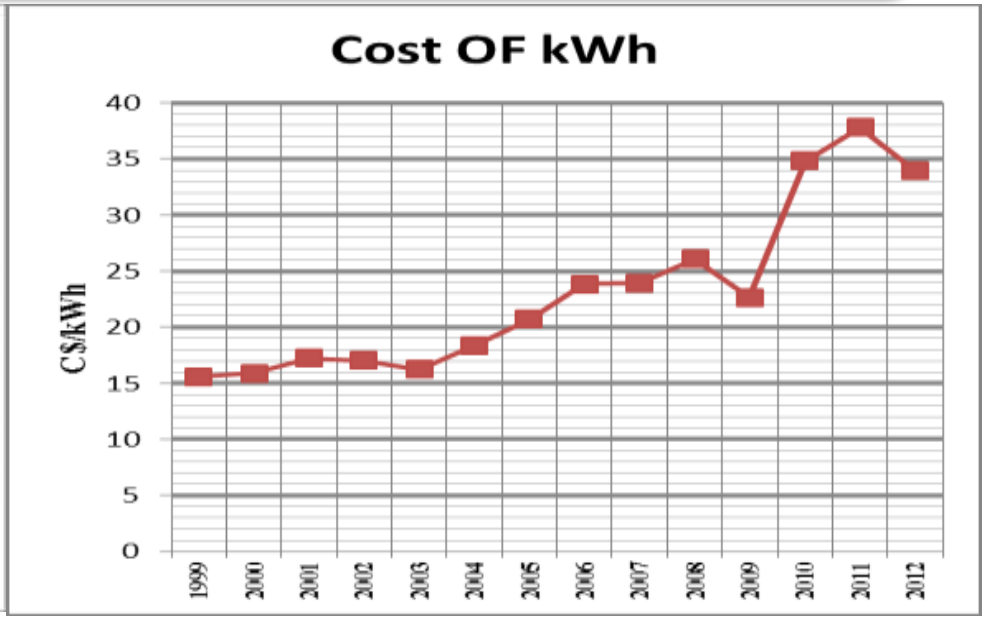
- 13 Million people
- High energy demand for household use and commercial production

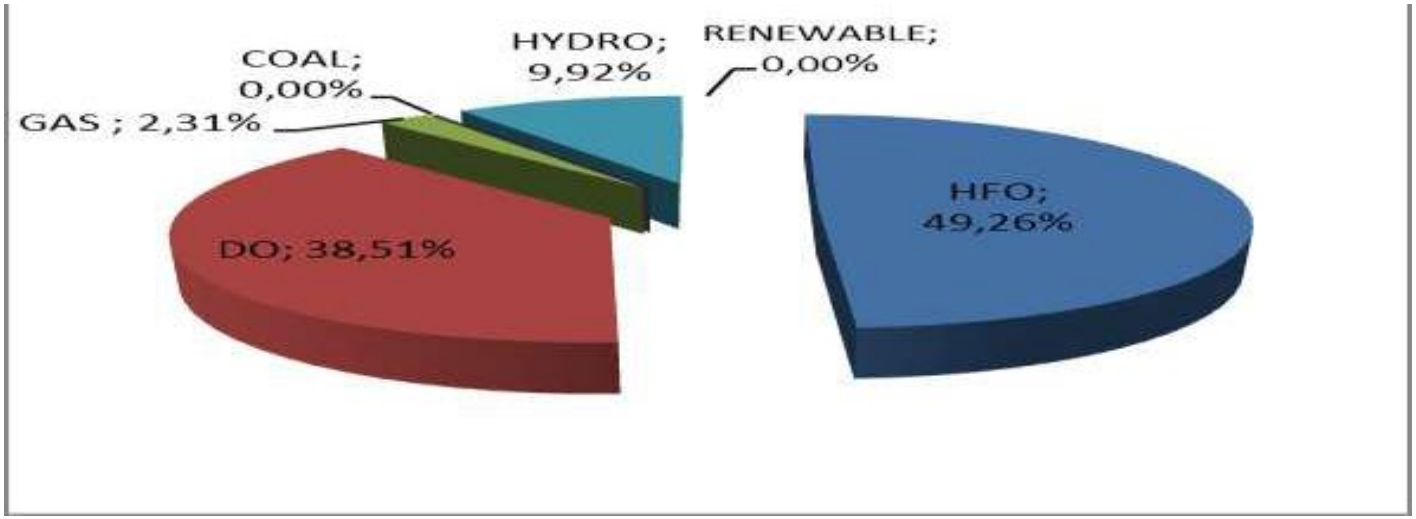
ENERGY SITUATION IN 2014

- **HUGE CRISIS IN ELECTRICITY SECTOR SINCE MORE THAN 10YEARS WITH**
  - ✓ PERMANENT DETERIORATION OF THE SERVICE QUALITY (LOAD SHEDDINGS)
  - ✓ FINANCIAL PROBLEMS OF SENELEC (UTILITY)
    - **Deficit of generation fulfilled by 150 MW Diesel power plant rental at an annual cost of 106,8 billions CFA Francs (217 Millions USD)**
    - **Very old, saturated networks without any emergency system**
- **INADAPTED MIX OF ENERGY (85% OF LIQUID FUEL)**
- **VERY HIGH GENERATION COST OF kWh (C$34/kWh – C$ 38/kWh) WHILE THE kWh IS SOLD TO THE CUSTOMERS AT C$ 23,6/kWh**
- **UNAFORDABLE LEVEL OF SUBSIDIES (200 – 240 Millions USD per year)**
- **LIMITED ACCESS TO ELECTRICITY FOR THE POPULATION & DIFFICULTES TO ATTRACT INVESTORS**

ENERGY SITUATION IN 2012







GOAL OF THE GOVERNMENT

- **Energy Sector Development Policy Letter (ESDPL) signed in October2012 :**

« a Senegal where electricity is

- **Available in quantity and quality,**
- **Competitive,**
- **Generated from diversified energy mix including coal, natural gas, hydroelectricity, renewable energy (wind, solar, biomass)**
- **While Senelec main utility recover its normal operational parameters »**

BY YEAR 2017, COST OF kWh ENTRE 12 &16 USD Cents

PEAK EVOLUTION

Puissance de pointe (MW) - Réseau Interconnecté

Année	Ventes (GWh)	Pertes techniques et non-tech.	Énergie à livrer au RI (GWh)	Demande en puissance (MW)
2010	1 984	398	2 382	412
2011	2 224	430	2 654	456
2012	2 521	470	2 991	510
2013	2 669	478	3 147	532
2014	2 831	488	3 319	557
2015	3 213	532	3 744	629
2016	3 725	586	4 311	724
2017	3 919	617	4 536	761
2018	4 125	649	4 774	801
2019	4 343	684	5 026	844
2020	4 585	722	5 306	891
2021	4 859	765	5 624	944
2022	5 126	807	5 933	996
2023	5 410	852	6 261	1 051
2024	5 712	899	6 611	1 110
2025	6 033	950	6 983	1 172
2026	6 411	1 009	7 420	1 246
2027	6 769	1 066	7 835	1 315
2028	7 152	1 126	8 277	1 390
2029	7 560	1 190	8 750	1 469
2030	7 986	1 257	9 243	1 552

PLANNING CRITERIAS

- **Plant life**

➢ Supply system

- diesel : 25 years
- Gas turbine : 20 years
- Coal power plant : 30 years
- Wind power plant : 20 years
- Solar power plant : 20 years

➢ **Transmission system**

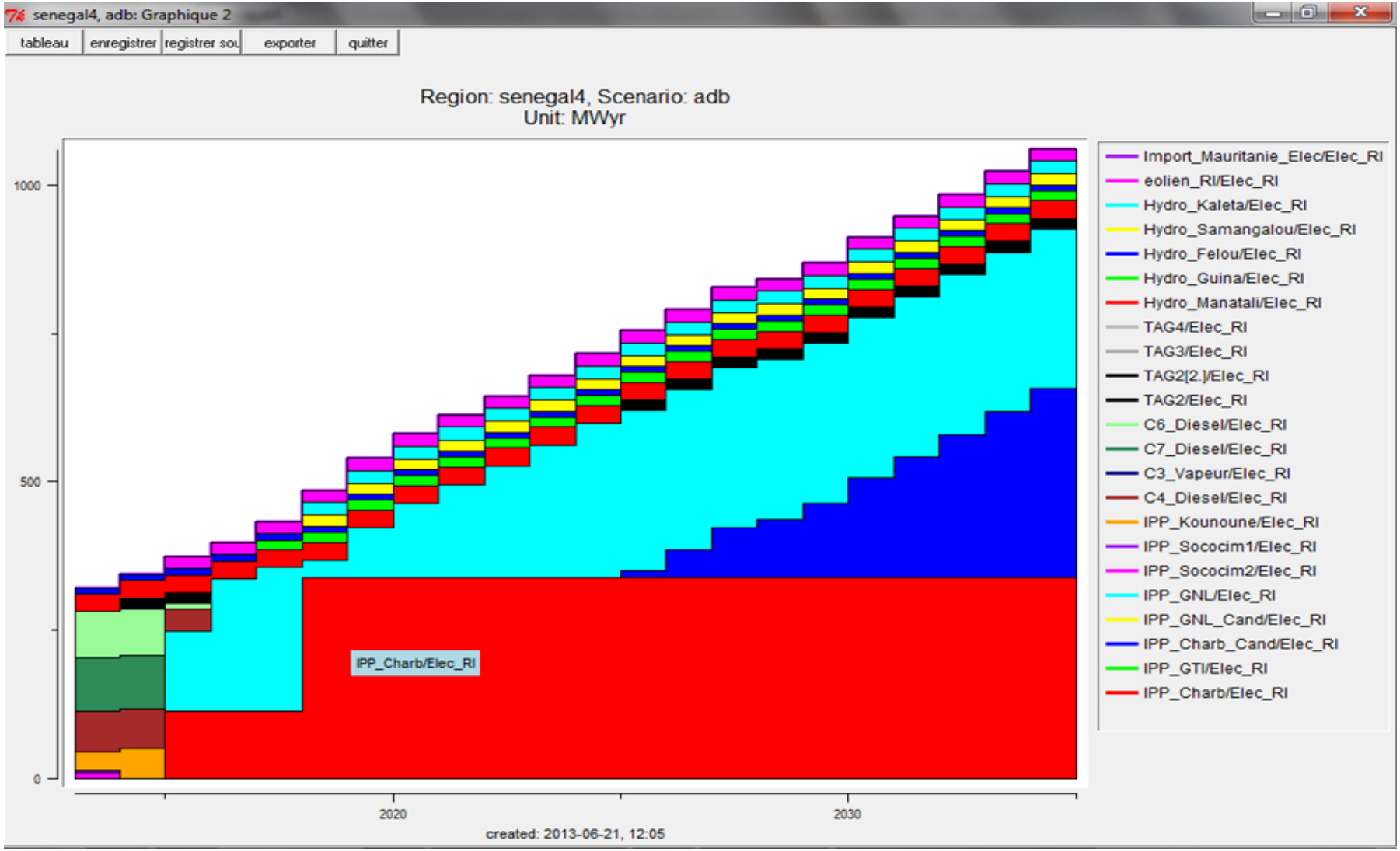
- Distribution and transmission grids : 30 years

➢ **Base year: 2012** for the power plants features

➢ **Period: 2010 - 2030**

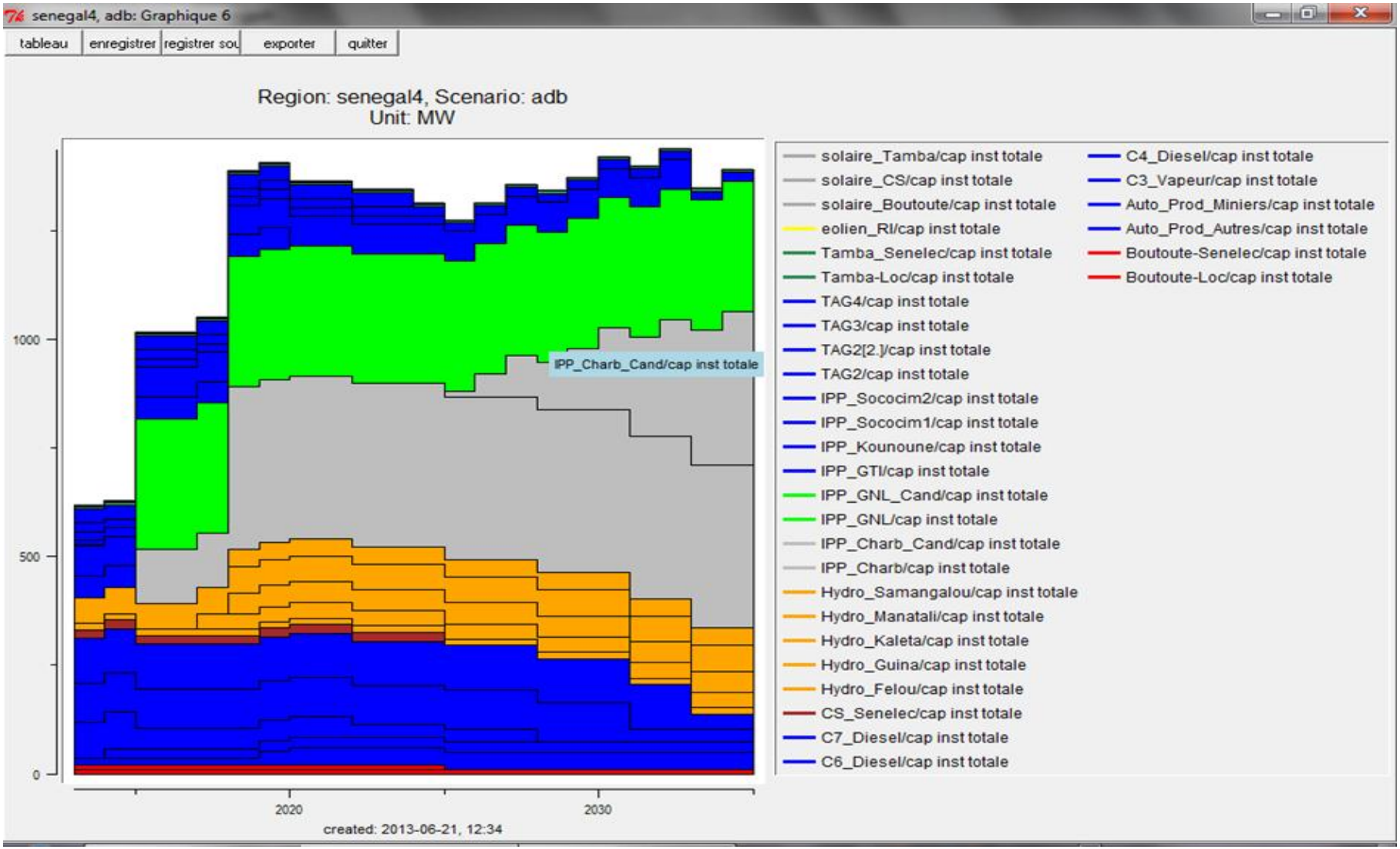
RESULTS IN MESSAGE

EVOLUTION OF ELECTRICITY PRODUCTION DURING THE PERIOD



RESULTS IN MESSAGE

EVOLUTION OF TOTAL INSTALLED CAPACITY DURING THE PERIOD



ANALYSIS OF RESULTS

The optimization of the power production and its prospects of evolution in Senegal are given the following results in MESSAGE:

➢Evolution of power production

From 2016, Electricity production will be dominated by:

- ✓ **Coal fire plant IPPs (350MW installed with Kepco and CES)**
- ✓ **The LNG IPP with the company Liberty (300 MW)**
- ✓**The coal IPP Candidate, with low production cost will substitute the other plants more expensive**

➢Evolution of fuel consumption

Following the trend of production, it will be dependent on majority of coal (for IPP Kepco and CES, and the IPP Coal candidate) as the consumption of LNG will be important over the period for plants using gas

ANALYSIS OF RESULTS

- **Evolution of Installed Power Plants**
  - ✓ **The power generation will be very diverse, but mostly dominated by coal-fired plants and gas plants.**

We also denote the presence of hydro-electricity plants with OMVS (regional river cooperation with Manantali, kaleta, Sambangalou ...) and the presence of renewable energy sources with the Wind turbines and solar power plants.

The diversity of technologies in installed capacity in power are in line with the policy of energy mix in the Government of Senegal short and mean term strategy

THANK YOU FOR ATTENTION