Webinar: Opportunities for wind energy development in Tunisia

Tuesday 27th March 2018

Place of wind power in Tunisian energy context

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Tunisian Wind Energy Association (ATEE)

- **Date of creation**: April 2012
- **Mission:** promotion wind energy in Tunisia
- **Program intervention** : sensitization, training, information, framing, Publishing statistics, organization of events, realization of pilots projects, Eve technology
- **Achievement**:
  - Action to raise awareness and to strengthen the neighborhood relationship between wind farms and the inhabitants living nearby
  - Programming technical visits to wind farms for engineering schools and technical institutes
  - Supervision of several graduation projects
  - Comments on the renewable energy bill
  - Realization of some specific studies related to the wind power
  - Co-organization of SIED 2015 and SIED 2017 exhibition
  - Support organization for "Euroconventionglobal": **Tunisia Renewable Energy & Power Infrastructure Investment Conference-**2016 and 2017 ...

The ATEE is the local interlocutor of journals, magazines and specialized international organizations (windpower monthly, GWEC, AWEA, WWEA, ..)

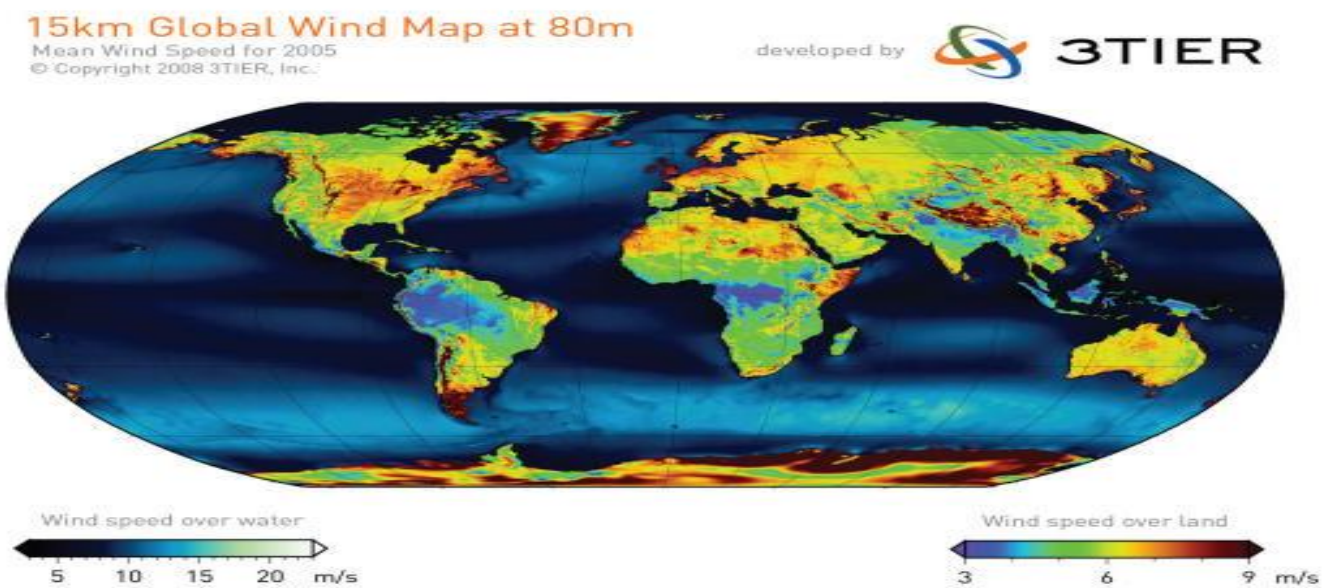
- **Supporting Partners:**

CONTENT

- **World wide: State of the art**
  - Potential and achievements
  - Technological evolution
  - Decreased LCOE
- **Tunisia: Achievements**
  - Wind farms
  - Wind Atlas 2009/2015
- **Tunisia: Outlook**
  - Mix Power 2030
  - Plan 2017-2020
- **Results of studies carried by the ATEE**
  - Wind potential
  - Daily and seasonal production of wind power
- **Conclusion and recommendation**

State of the art world wide

Potential and achievements:



Global wind potential

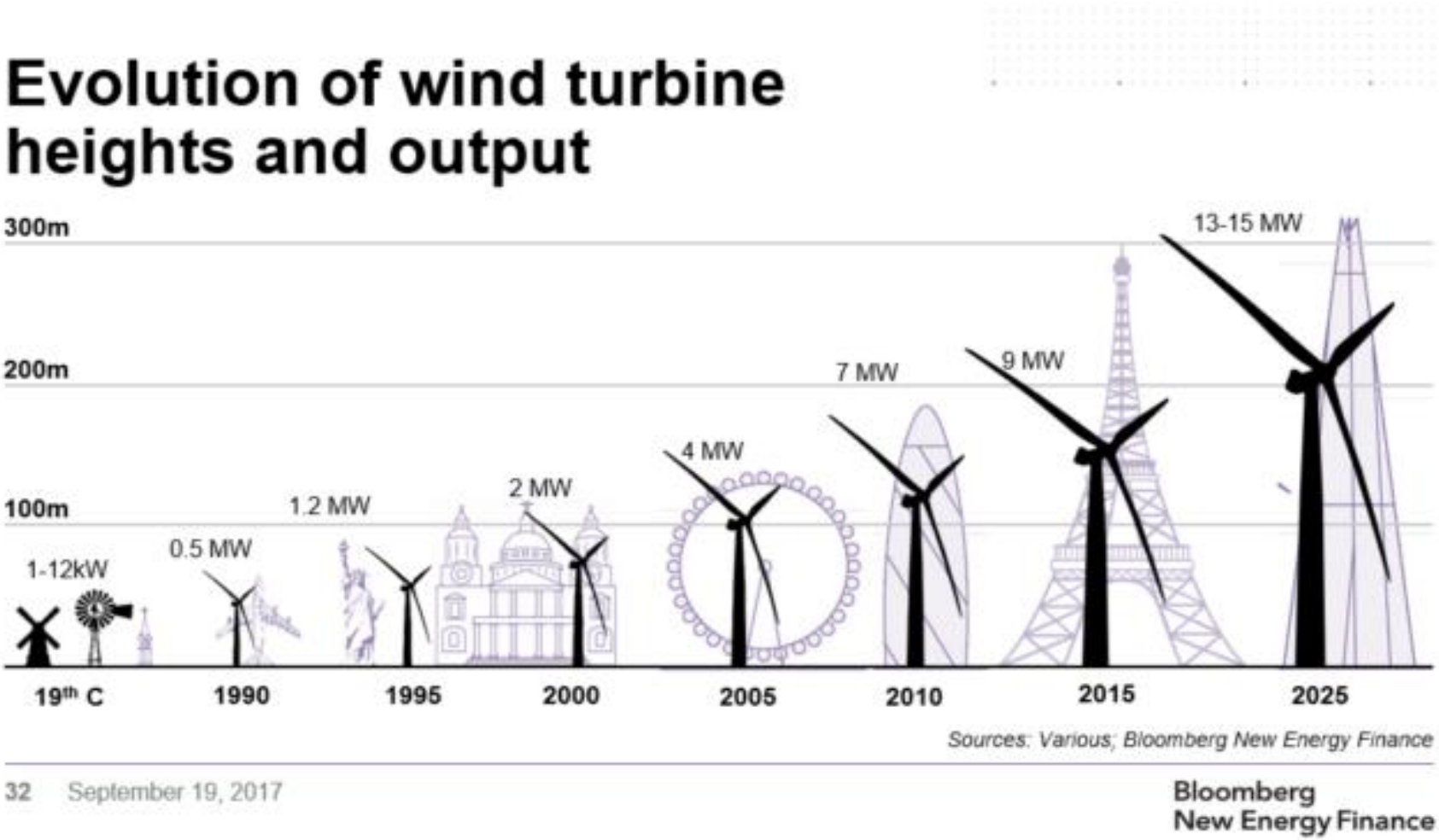
72 000 GW

Global installed capacity 2017

540 GW

State of the art world wide

Technological evolution:



State of the art

Decline LCOE

Renewable Energy—Historical Cost Declines[1]

Selected Historical Mean LCOE Values[2]

Source: Lazard estimates.

Note: Reflects average of unsubsidized high and low LCOE range for given version of LCOE study.

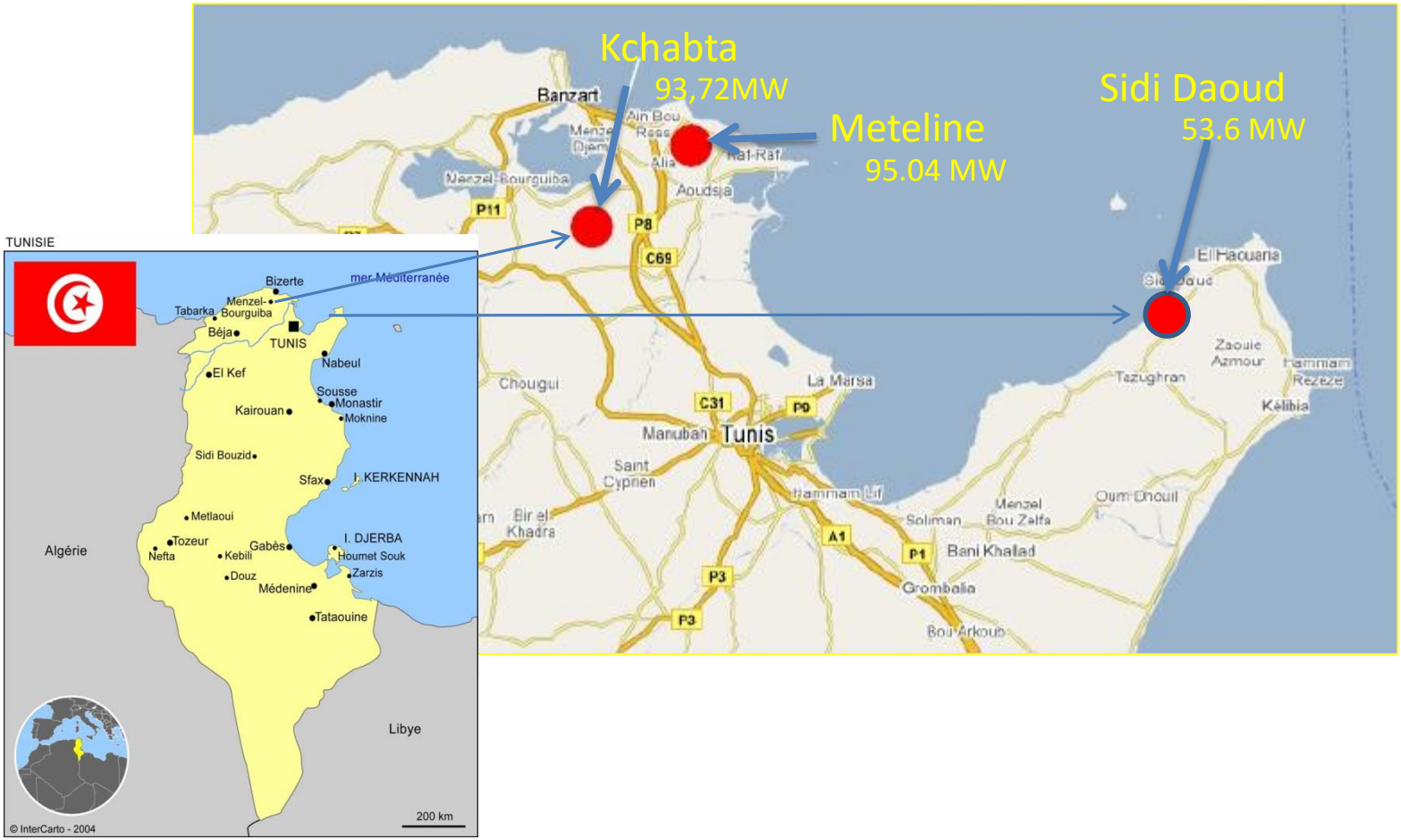
(1) Primarily relates to North American alternative energy landscape, but reflects broader/global cost declines.

(2) Reflects total decrease in mean LCOE since the later of Lazard's LCOE—Version 3.0 or the first year Lazard has tracked the relevant technology.

(3) Reflects mean of fixed tilt (high end) and single axis tracking (low end) crystalline PV installations.

Achievements

Wind farms: Project location (242.36 MW)



achievements

Sidi Daoud Wind Park (53.6 MW)

- *Production:* 150 GWh
- *Economy* : 48 000 Toe
- *CO2 Emission avoided:*113,000 Tons

Designation	1st Step	1st Extension	2nd Extension
No. of Wind Turbines	32	12	26
Installed power (MW)	10.56	8.72	34.32
Start comissionning	August 2000	September 2003	June 2009
Annual Production (GWh)	28	20	100

achievements

Metline-Kchabta Wind Park (188.76 MW)

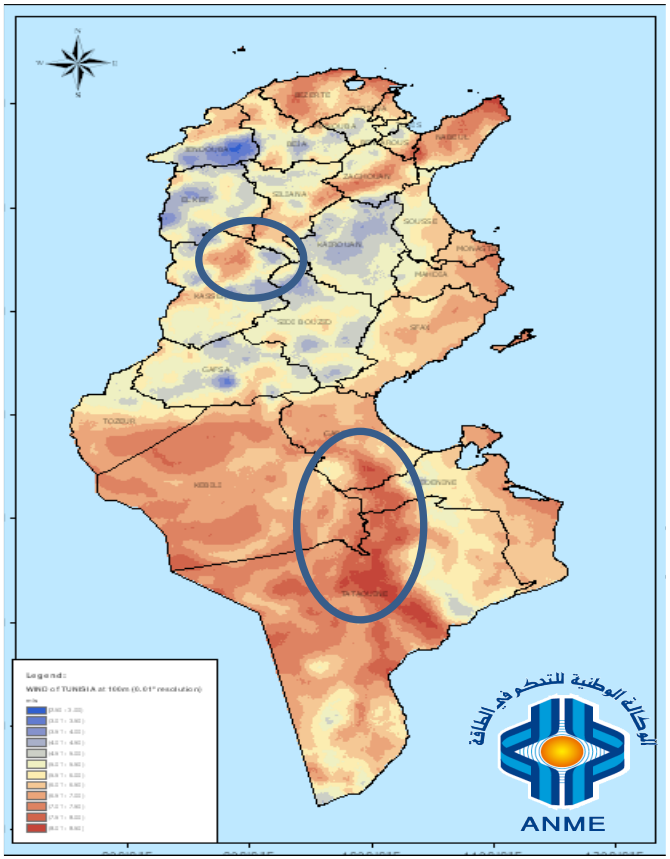
Production: 600 Gwh
Economy: 120 000 Toe
CO2 Emission avoided: 300 000 tons

	METLINE	KCHABTA	EXT.METLINE	EXT.KCHABTA	TOTAL
Number wind turbine	46	45	26	26	143
Power Unit (MW)	1.32	1.32	1.32	1.32	
Power installed (MW)	60.72	59.4	34.32	34.32	188.76

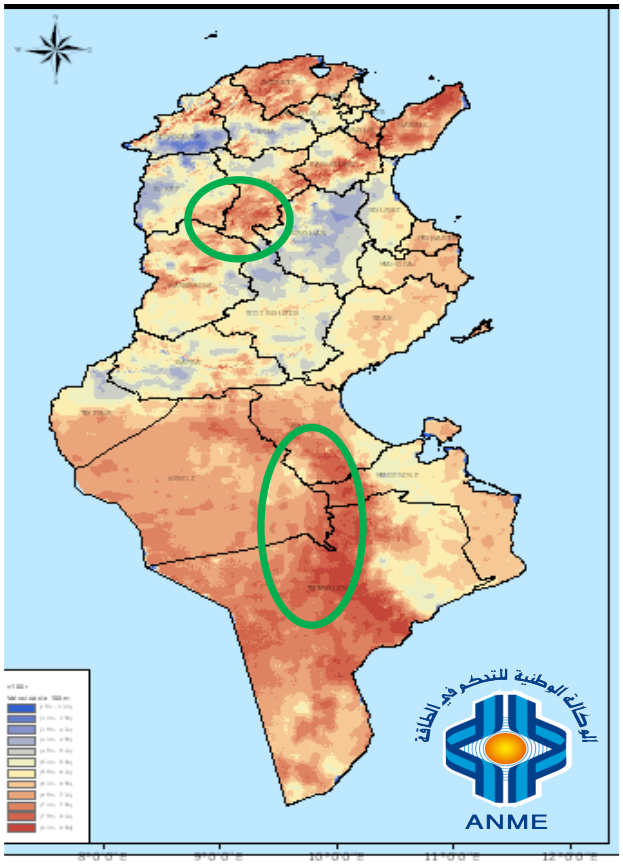
Achievements

wind atlas (1)

Wind Atlas 2009



Wind Atlas 2015:



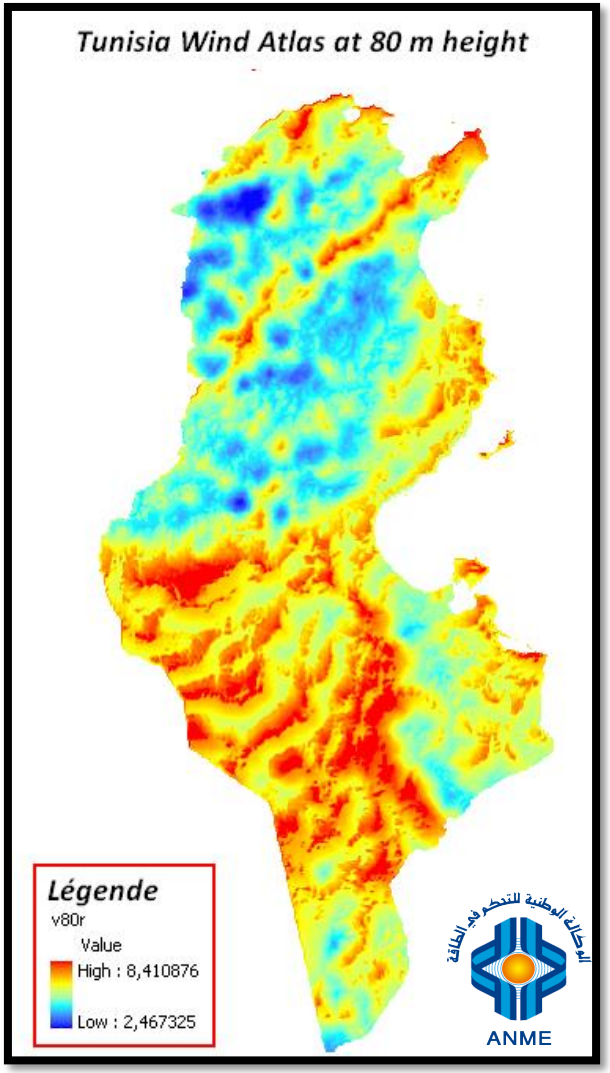
achievements

wind atlas (2)

Additional data in the new version 2015

- Weibull parameters, turbulence intensities at:
  - 10 m
  - 60 m
  - 80 m
  - 100 m

* Wind Rose each 5 km



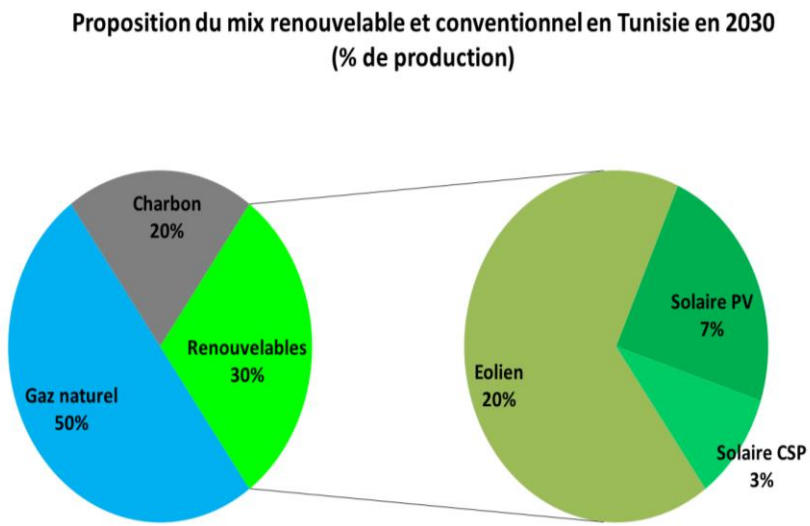
Achievements

GLOBAL INSTALLED WIND POWER CAPACITY (MW) – REGIONAL DISTRIBUTION			
	End of 2016	New 2017	Total 2017
AFRICA & MIDDLE EAST			
South Africa	1,473	621	2,094
Egypt	810	-	810
Morocco	787	-	787
Ethiopia	324	-	324
Tunisia	245	-	245
Jordan	119	-	119
Other[1]	159	-	159
Total	**3,917**	**621**	**4,538**

Source: GWEC

Prospect

2017 achievements	2020 outlook	2030 outlook
245 MW	**595 MW**	**1,750 MW**
2% electric mix	**5%**	**20%**

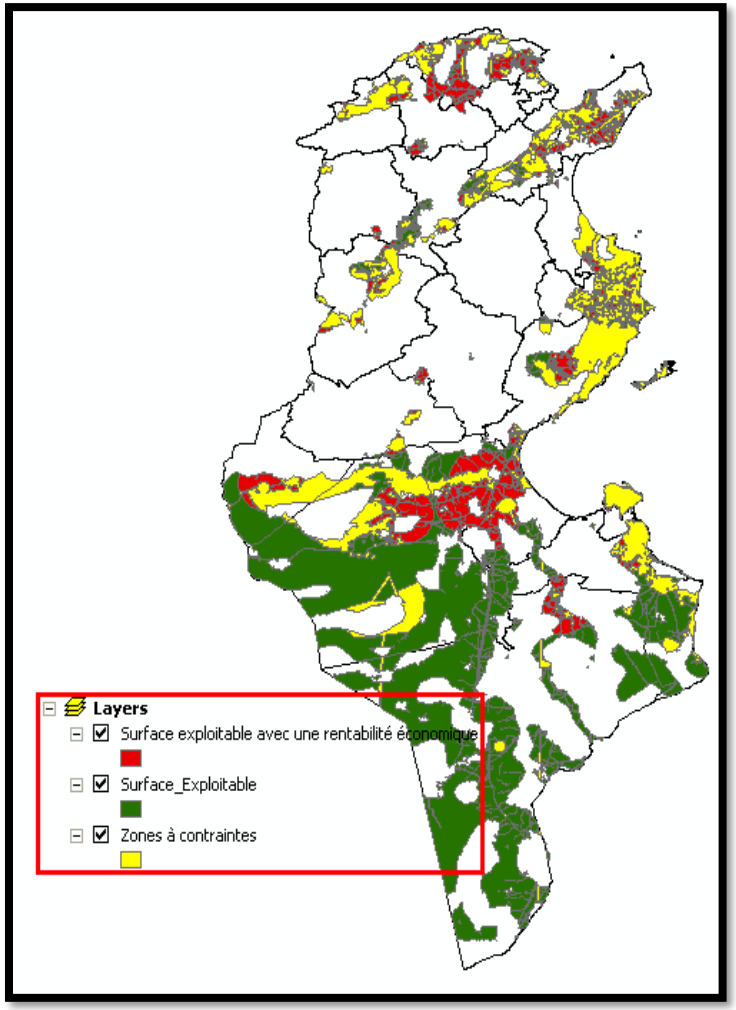


Wind projects launched or in the process of being launched are:

-first call for projects - November 2017: **70 MW**
second call for projects - August 2018: **70 MW**
projects being launched:
-Self production : 80 MW
-EPC tender call for STEG: 80 MW
-IPP tender call: 300 MW

Study Wind potential Study

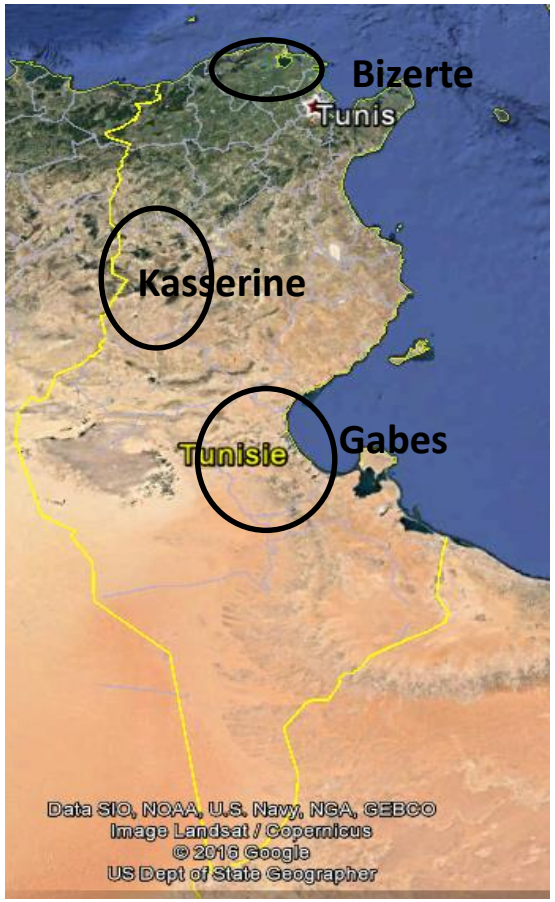
wind potential Wind Atlas + stress = result



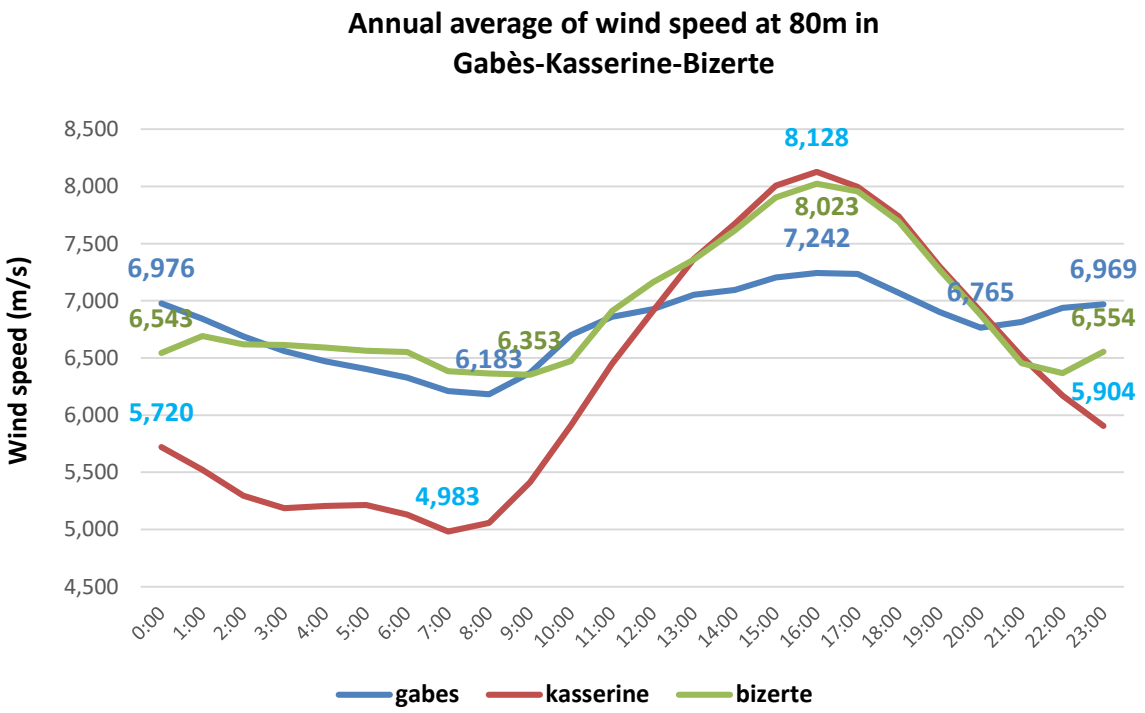
- Total area of quality available: 32 thousand km
- Gross Potential: +10,000 MW
- potential of mobilization limiting factors:
  - Network absorption capacity
  - Access to electricity
  - Land, etc.

Daily and seasonal distribution of wind generation study

Study areas



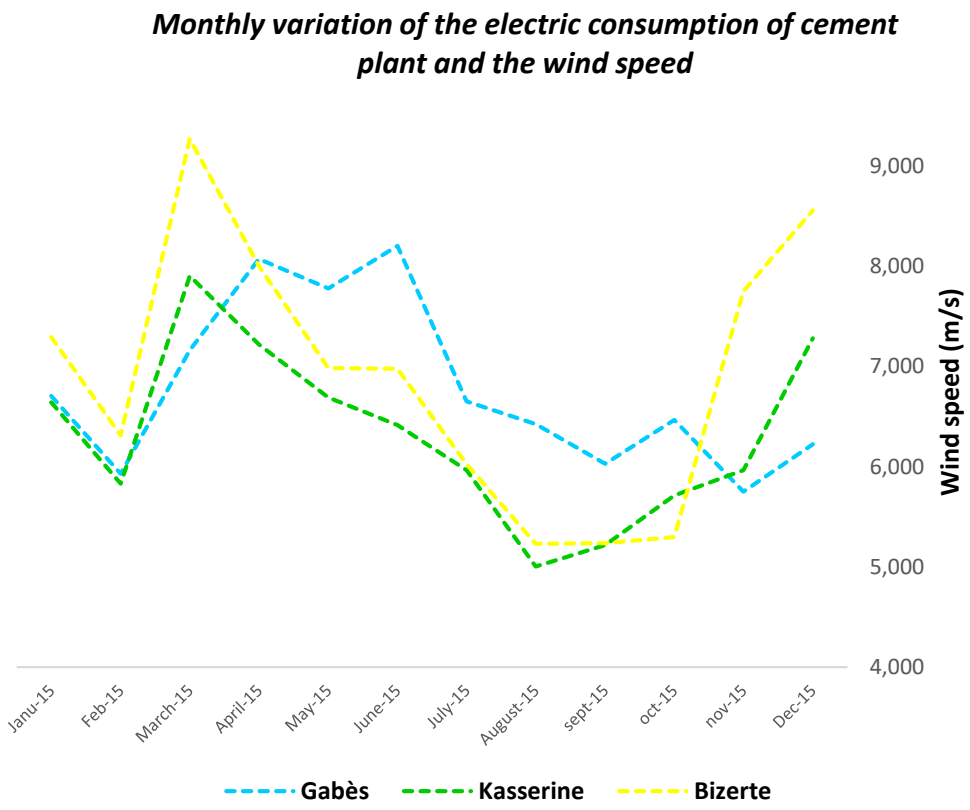
result 1

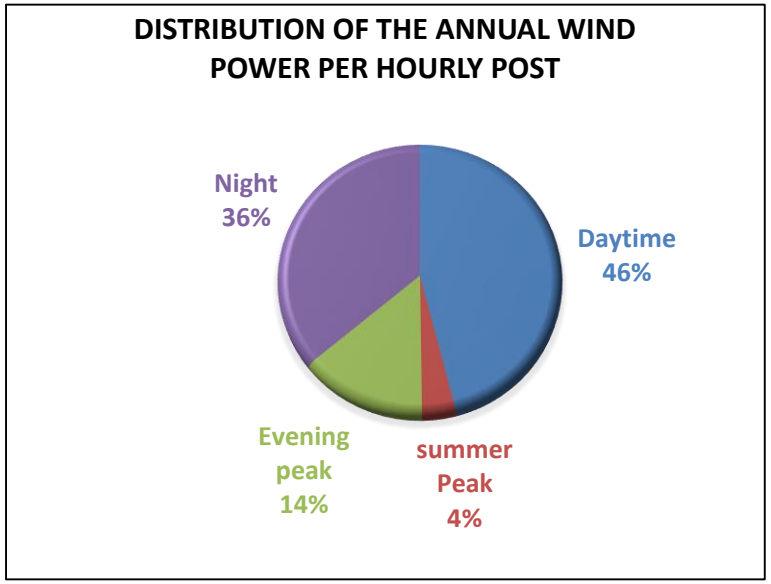


source ATEE

Daily and seasonal distribution of wind generation study

result 2

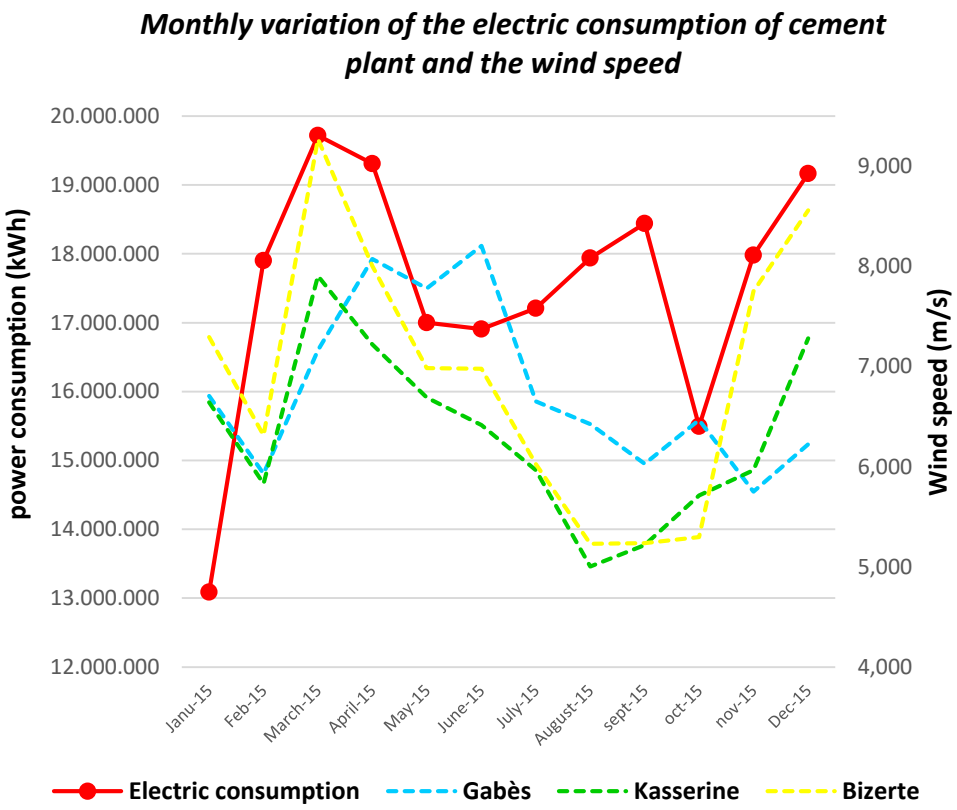


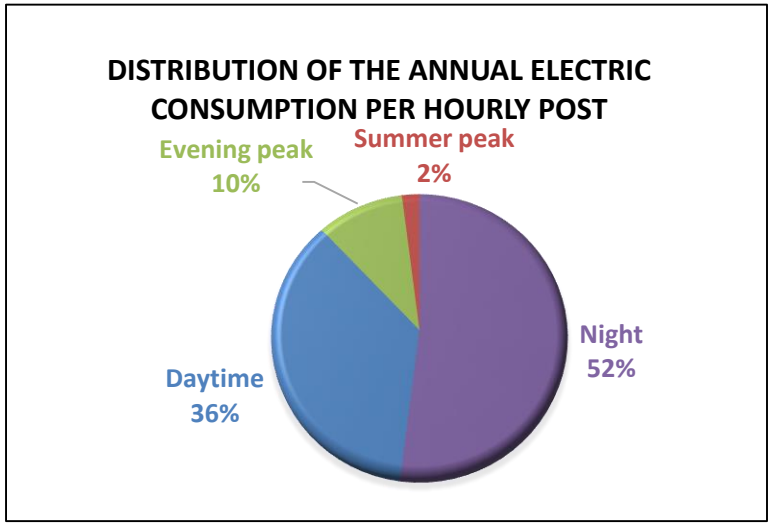


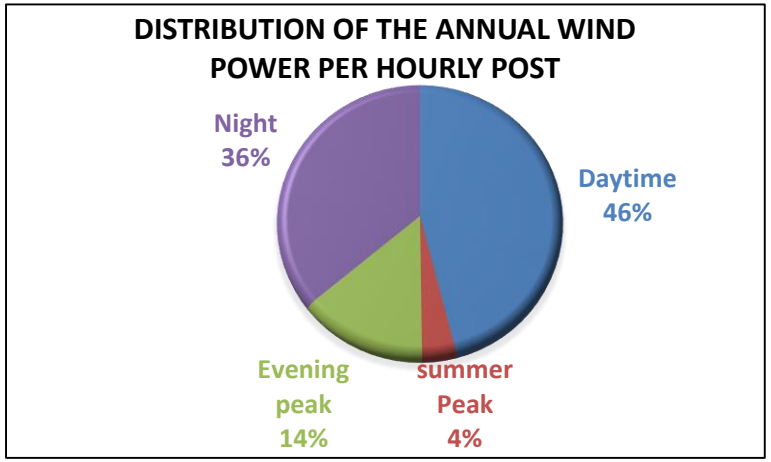
source ATEE

Daily and seasonal distribution of wind generation study

result 3



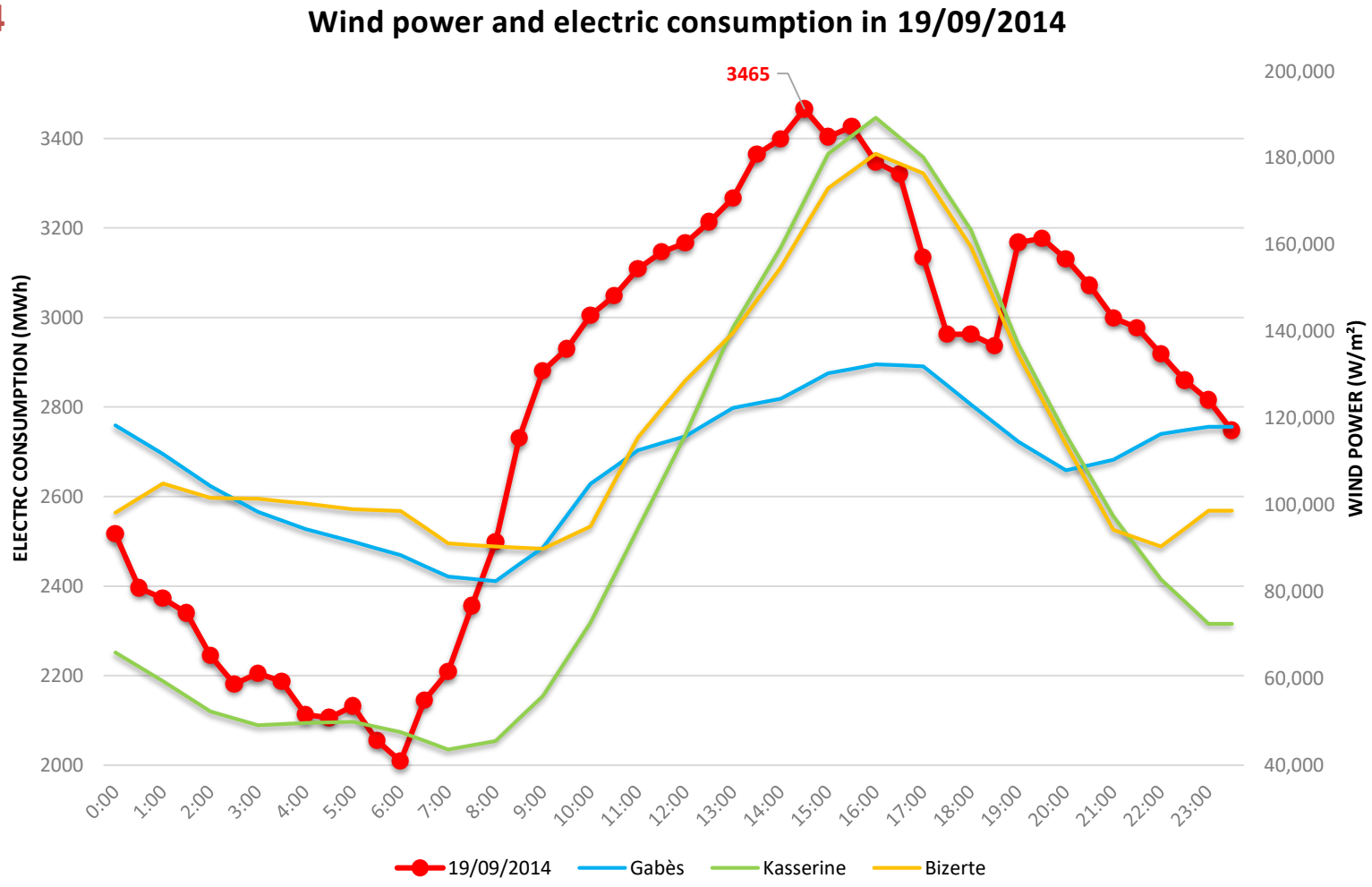




source ATEE

Daily and seasonal distribution of wind generation study

result 4

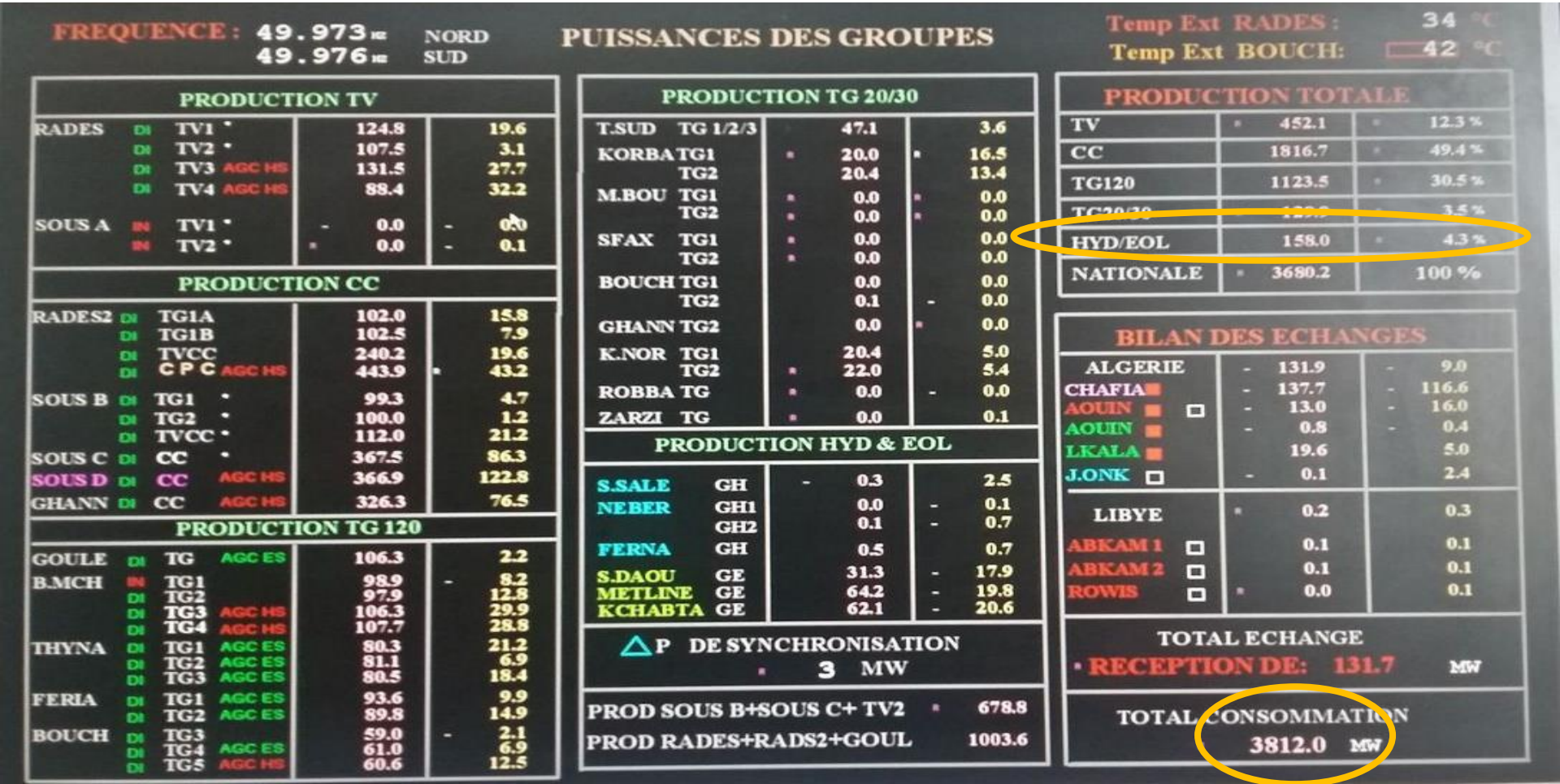


source ATEE

WIND ENERGY SHARE IN ELECTRIC GENERATION 2017

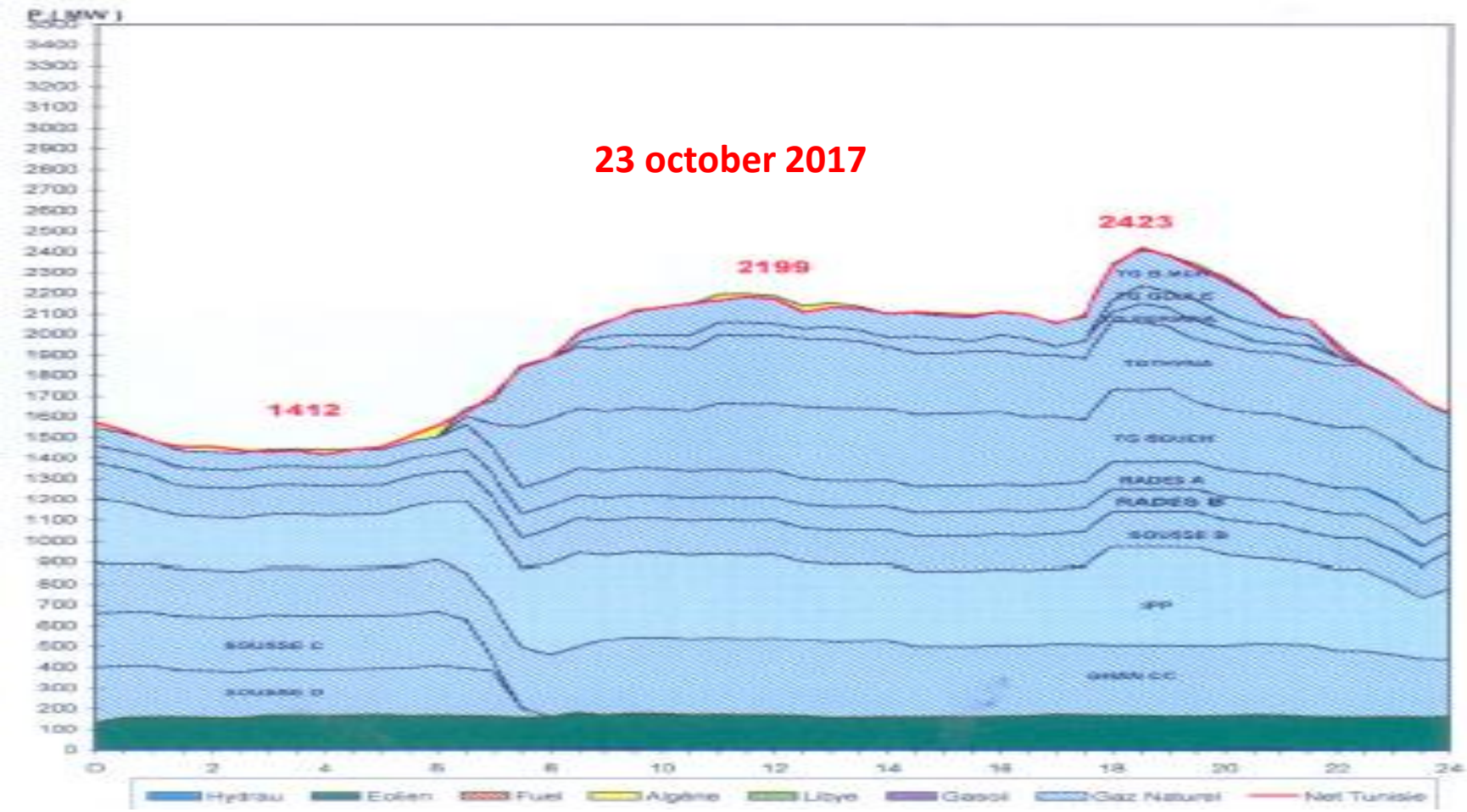
Highest wind energy share in electric peak load in 2017

24 Jully 2017



WIND ENERGY SHARE IN ELECTRIC GENERATION 2017

Highest wind Energy share in electric mix in 2017



Wind Energy: 8.6%

Conclusion & recommendation

- Tunisia has a great untapped wind potential
- Despite the maturity of the technology in the world wind power remains untapped in Tunisia
- There are still many misconceptions about wind energy

- Wind energy, like other renewable energy sources is intermittent but solutions exist through Adaptation new techniques and technologies for the integration of wind power on the grid:

  - Energy storage: STEPs
  - Forecast the wind short and medium term
  - smart grids
  - Electrical interconnection with neighboring countries

THANK YOU FOR YOUR ATTENTION

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