



Morocco and Italy for the transition to clean energy towards Africa

March 9th -Sofitel Jardin des Roses Hotel - Rabat – Morocco



New RE technologies in Morocco and their adaptation for Africa

Integration into electric grids

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RES are a real effective alternative to fossil fuel, but their grow requires extensive SMART applications on the grid, (because of instability with RES penetration).

Italian experience with big NP-RES grow can be useful for Morocco.

Italian NP-RES from 2008 to 2014

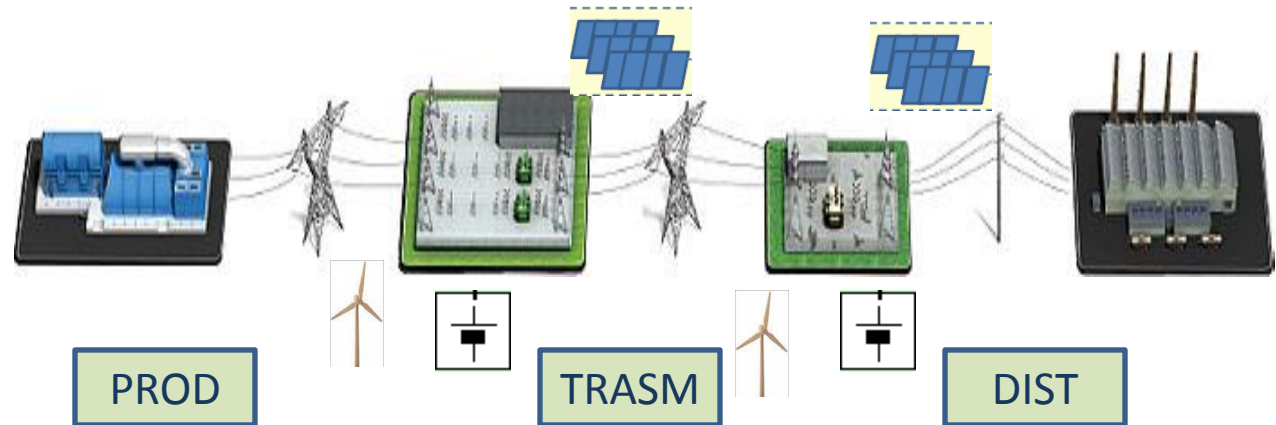
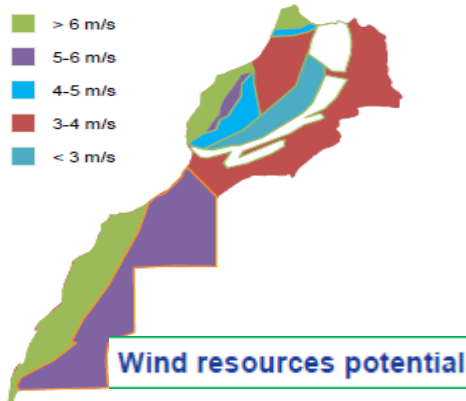
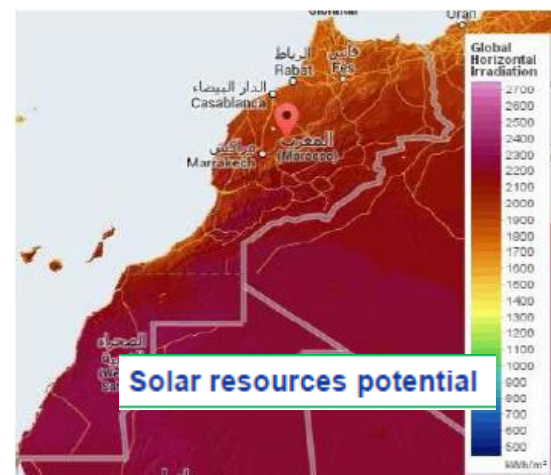
PV from 0,4 to 18,7 GW

Wind from 3,5 to 8,7 GW

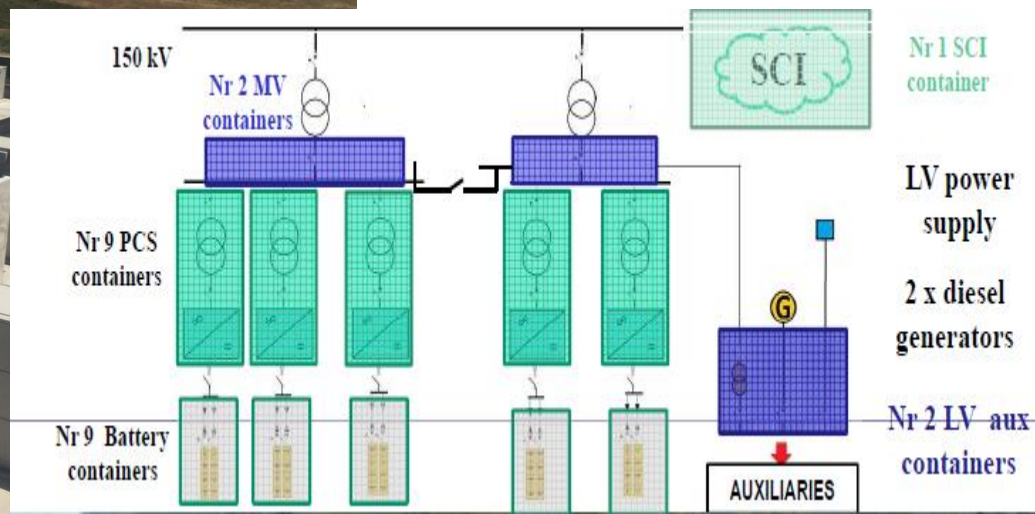
RES Pen from 1+12 to 19+14 %

With the great grow of Renewables from potential prospects, some peculiar problems are expected:

1. Obligation to withdraw RES and grid congestion
2. Need to increase reserve capacity
3. Need to increase predictable generation profile

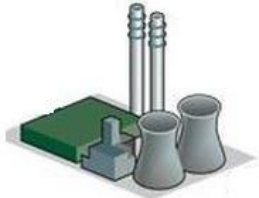


Storage energy intensive to collect energy overload when occurs



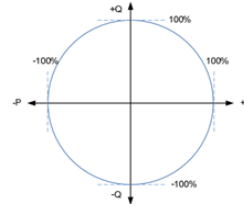
2. Need to increase reserve capacity

Thermo & Hydro



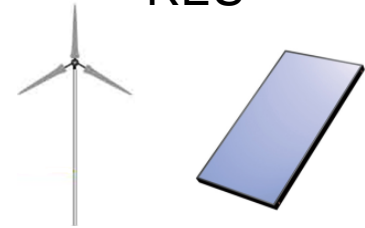
Primary Reg. with
reg.band : $\pm 1,5\% P$

ESS



Primary Reg. with
reg.band : $\pm 100\% P_{ESS}$

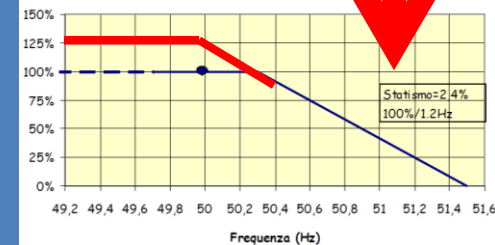
RES



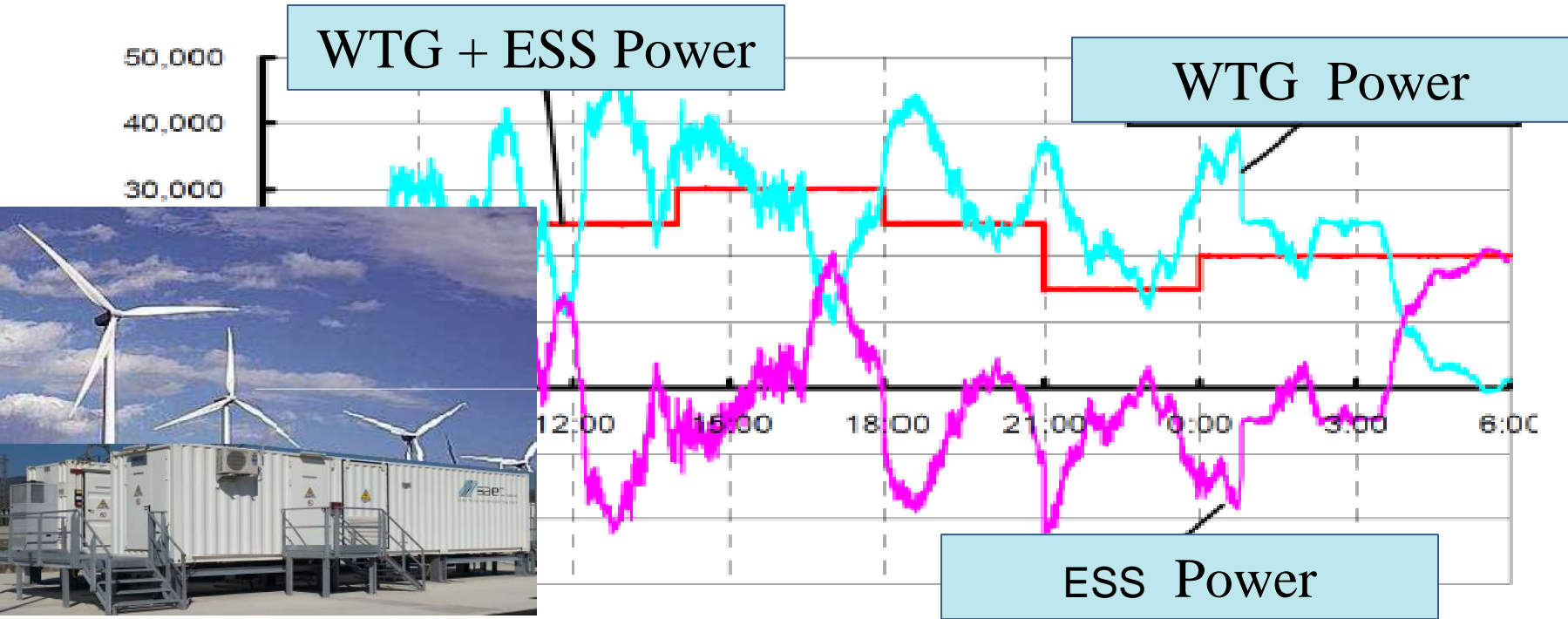
No Primary Reg.
only reduction



RES+ESS



3. Need to increase predictable generation profile



The wind farm output power is able to provide the scheduled profile

WIND /SOLAR
MEASURES
(real time)

WIND/SOLAR
Forecast

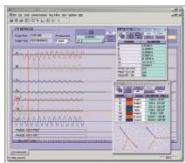
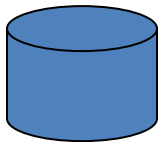
POWER
FREQUENCY
REGULATION

RES + ESS + EMS

ESS EMS

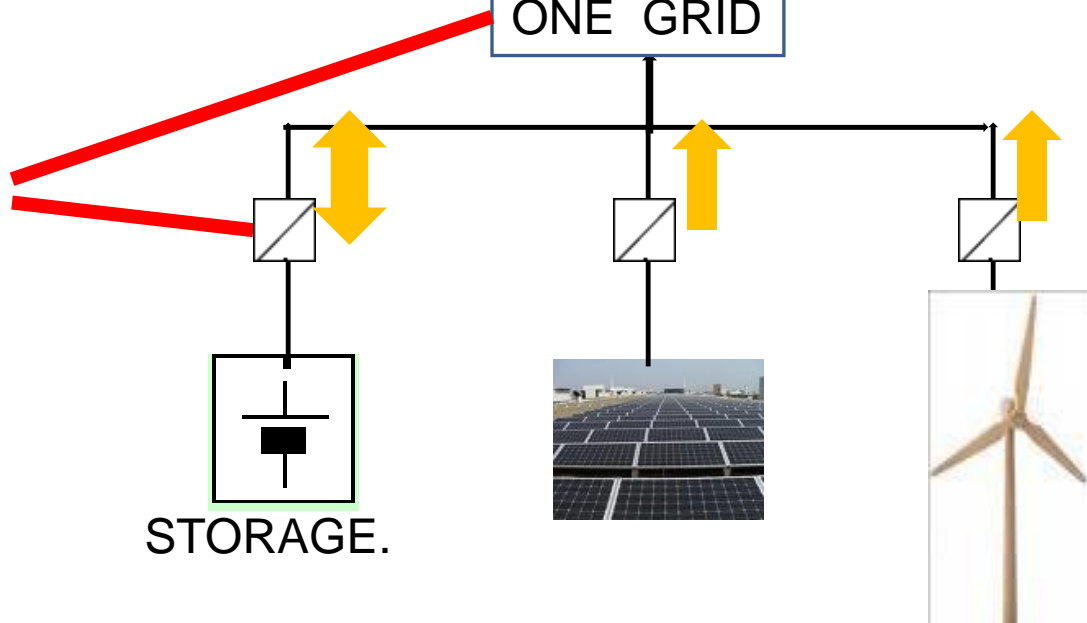


Data Base Monitoring Regulating



ONE GRID

STORAGE.



EPC for RENEWABLES



Energy Storage System ON GRID - OFF GRID

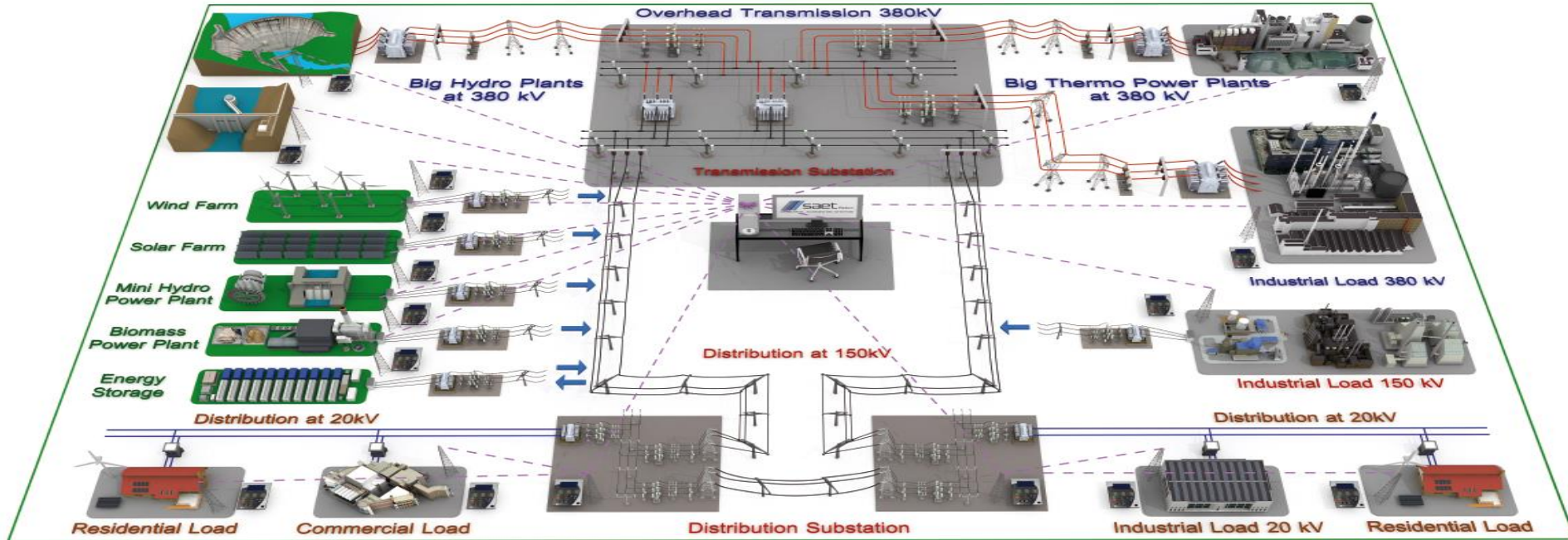


H.V Substation provider



The role of SAET : smart energy solution provider

Can We Smart Your Grid?



Our energy storage projects in MOROCCO will help the integration of renewables, increase system flexibility and lower costs for customers

Thank you for your attention