

2nd AIEE Energy Symposium Rome, 2-4 November, 2017

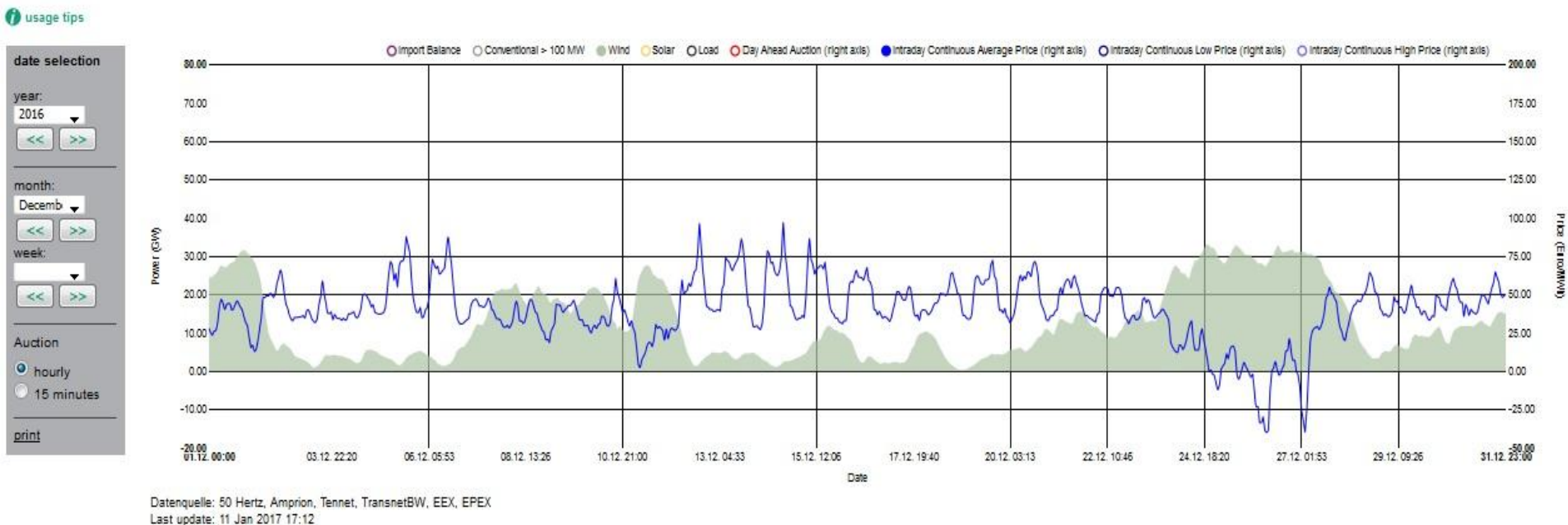
**Electric system at time of choices : an
ecosystem that creates value for France**

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Energy transition in Germany : the failure of a policy

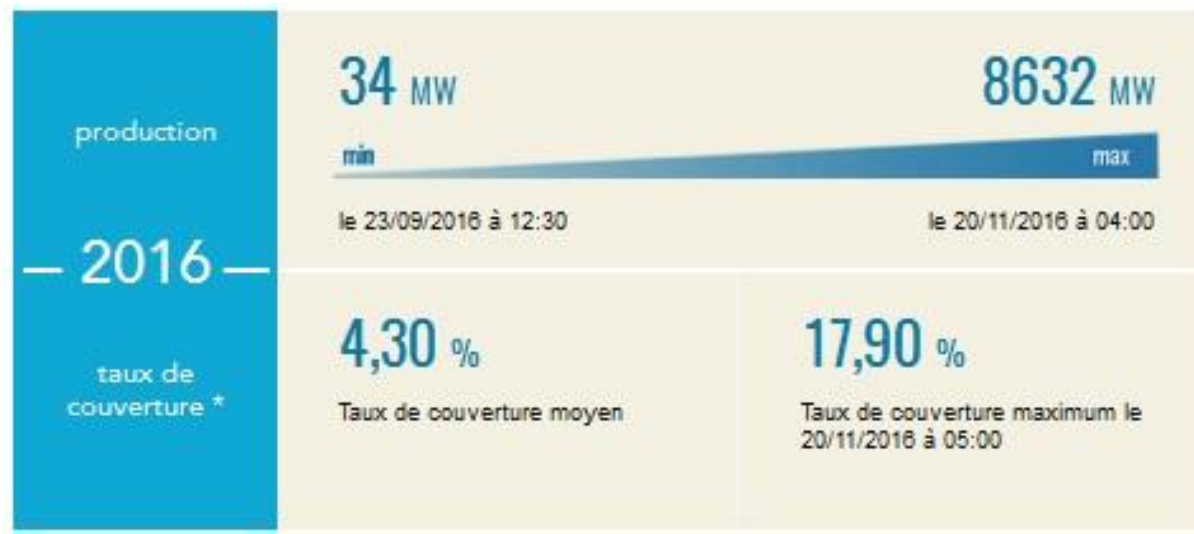
- Intermittent, prioritized and subsidized electricity injection ruins market to negative prices during each period of overproduction.
- Link between German wind power production and MWh Intraday price (in blue) is shown.

Electricity production and spot prices in December 2016



Inability of renewable energy to replace any “pilotable” MW

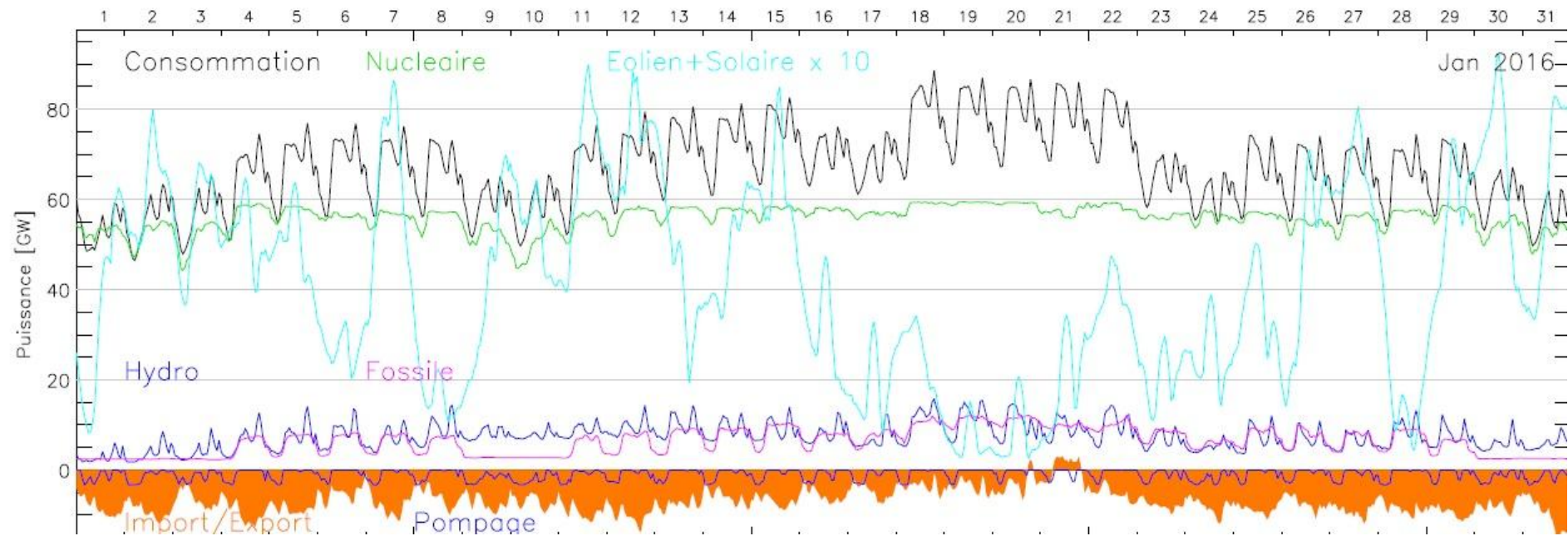
- While network requires permanent balance, rate of wind load is likely to collapse to less than 1% of its installed capacity.
- Lack of possibility of large-scale storage prohibits, due to intermittent energies, the closure of any “pilotable” power station.



(Source : <http://www.rte-france.com/fr/eco2mix/chiffres-cles>)

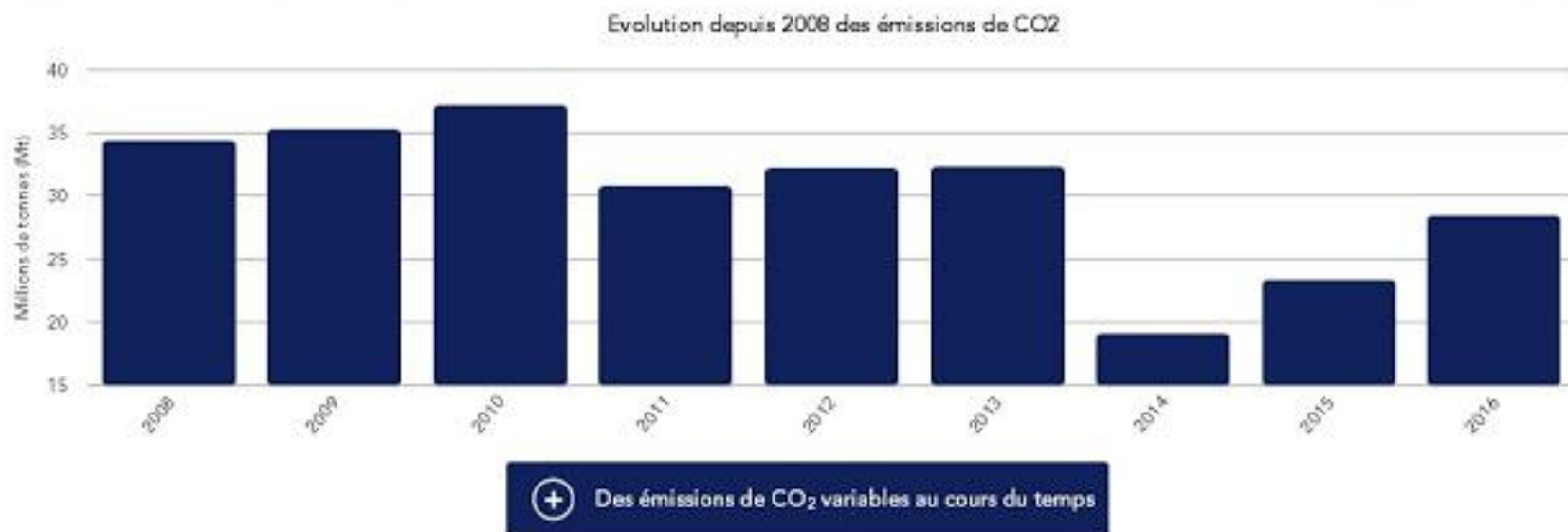
Law on “energy transition for green growth”

- Graph represents the January 2016 electricity production modeled with 10-fold increase in EnR production.
- All “pilotaable” resources must remain available because of variations in EnR production.



Counterproductive aspect of wind power development compared to the objectives for which it is subsidized

- CO2 emissions from French electric fleet increased in 2016, with more than 28 million tons compared to 19 in 2014 (at end of 2016, several nuclear reactors were stopped due to anomalies).
- In Germany, it's more than 300 million.



(Source : <http://bilan-electrique-2016.rte-france.com>)

Mortgage on the future

International Energy Agency has published report on French energy situation (Energy Policies of IEA Countries - 2016 Review, 17 January 2017).

Report highlights that prospects for France's nuclear power in next ten years will be decisive for :

- Country's ability to meet its climate goals;
- And, at the same time maintain its security of supply.

Safety margins are reduced in France, as soon as least power “pilotable” is missing and wind is unable to run properly wind turbines.

In France tomorrow ?

In a quarter of century, intermittent energies such as wind and photovoltaic have not still achieved significant reductions in CO₂ emissions in field of electricity generation.

- How to get out of mismanagement caused by increasing but counter productive injection of intermittent energies ?
- And undermining of national centers of excellence that still produce one of cheapest kWh and least carbon (4th world position on low CO₂ intensity) ?

Awakening of consciousness

European landscape remains characterized by market distortions and lack of logic between :

- Objectives pursued (low-carbon energy mix, security of supply);
- And tools implemented (subsidies for renewable energies, lack of price signals valuing low carbon dimension).

In context of a spot market that is not suited to renewable energies and nuclear energy.

Awakening of consciousness

- End of subsidy mechanisms for renewable energy, introduction of capacity mechanisms and a strong carbon price (with introduction of carbon tax to reduce failures of European ETS market) are necessary, but not sufficient.
- Hinkley Point is an interesting precedent for a sector that can not develop by relying on spot market for electricity, creating a parallel with a long-term contractual market.
- “Contracts for difference” could become a new intervention model for European states in years to come.

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