Energiewende “à la française”? 

Political debate and structural challenges of the French power system transformation

BERLIN, 12.05.2015, D. PESCIA, AGORA ENERGIEWENDE
Who we are

- Independent and non-partisan Think Tank, 18 Experts
- Project duration: 2012-2017 | Financed with 15 million Euro by the Mercator Foundation and the European Climate Foundation
- Mission: How do we make the *Energiewende* in Germany a success story?
- Analyzing, assessing, understanding, discussing, putting forward proposals
1. Structural challenges of the French power system and power market
The nuclear cliff: between 2018-2025, 25 GW nuclear capacities reach the end of their 40 years lifetime

Nuclear power covers about 75% of the French power production (63 GW)

Important investment decisions in the context of an aging nuclear fleet.

Controversy about the costs of the retrofit program (“Grand carénage”).
- 90 Mds €\textsubscript{2010} for 2011-2033 according to Court of Auditors (i.e. 1425 €/kW).
- between 1400 and 3700 €/kW according to WISE (depending on the security standard).

The lifetime extension contributes to increase the generation cost of the French nuclear power (evaluated at about 60 €\textsubscript{2013}/MWh\textsuperscript{1}).

\textsuperscript{1} current economic cost (equivalent, while slightly different, to the LCOE methodology)
High sensitivity of electricity demand to temperature: rationale for the introduction of a capacity mechanism

Peak load (GW) in France as a function of decreasing temperature

Concerns about future adequacy problems since 2008: 1 °C decrease in T° increases peak load by +2.3 GW (electric heating)

About 6 years to develop and implement the capacity mechanism. Adoption of CRM mechanism in 2015; first delivery year 2016

Main features of the mechanism
- incentive to trigger DSM potential
- decentralized mechanisms
- technology neutral
- interconnection taken into account implicitly

Consultation on cross-border participation (to move from implicit to explicit consideration)
A highly concentrated power market: a set of reforms is supposed to increase competition on the retail market

**Market shares of EDF and competitors in 2012 (generation and retail)**

**EDF dominates all market segments.** Most consumers still benefit from regulated tariffs.

**France implemented a power market reform in 2010,** in response to two investigations of the Commission:

- **End of regulated tariffs for industrial consumers** in 2016 (regulated tariffs maintained for households)
- **Regulated access to EDF’s production** (100 TWh) for suppliers at regulated tariff (42€/MWh)

**Little use of the mechanism** (only 15 TWh bought for 1st semester 15): access price too high for new entrants (given the low wholesale prices) and too low for EDF (reinvestments for retro-fit)
EU commitments for renewable energies: France is likely to miss its 2020 targets – unknown beyond

### Installed PV capacities (GW) in France: historic (2000-2014) and potential development (up to 2030)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (GW)</td>
<td>5.3</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

- **Growth corridor 2030**: Path to the 2020 target
- **5.3 GW in 2014**
- **5.4 GW (2020 target)**

DGEC (2014)

### Installed wind capacities (GW) in France: historic (2000-2014) and potential development (up to 2030)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (GW)</td>
<td>9.1</td>
<td>19</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
</tr>
</tbody>
</table>

- **Wind onshore**
- **Wind offshore**
- **19 GW (2020 target)**
- **Trend since 2010**
- **9.1 GW in 2014**

DGEC (2014)
2. Political debate around the French Energy transition bill
The French energy transition bill – a highly political and controversial context – Act I

**“Nuclear nation” challenged by Fukushima’s accident**

**F. Hollande's nuclear commitment** as “political calculation”:
1/ reduce nuclear energy from 75% to 50% by 2025
2/ closing Fessenheim NPP by 2016

- Presidential election campaign
- Fukushima accident
- “nuclear Agreement” Socialist - Green Party
- President’s commitment to close Fessenheim NPP

Agora Energiewende (2015)
The French energy transition bill – a highly political and controversial context – Act II

“Nuclear nation” challenged by Fukushima’s accident

F. Hollande’s nuclear commitment as “political calculation”:
1/ reduce nuclear energy from 75% to 50% by 2025
2/ closing Fessenheim NPP by 2016

Long, controversial and tedious political debate

Social and economics focus of the energy debate

Agora Energiewende (2015)
The French energy transition bill – a highly political and controversial context – Act III

Bill shall be adopted in Mai 15:
- Decreasing share of nuclear energy to 50% (in 2025)
- No reference to closing Fessenheim, but capping nuclear capacities at 63.2 GW (current levels)
- Increasing share of RES in power sector to 40% in 2030
- Reducing overall energy demand by 50% in 2050 vs today

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Presidential election campaign</td>
</tr>
<tr>
<td>2011</td>
<td>Fukushima accident</td>
</tr>
<tr>
<td>2012</td>
<td>„nuclear Agreement“ Socialist - Green Party</td>
</tr>
<tr>
<td>2013</td>
<td>Energy Transition Debate</td>
</tr>
<tr>
<td>2013</td>
<td>government’s preparation of Energy transition Bill</td>
</tr>
<tr>
<td>2014</td>
<td>Adoption of Energy transition bill</td>
</tr>
<tr>
<td>2015</td>
<td>President’s commitment to close Fessenheim NPP</td>
</tr>
<tr>
<td>2015</td>
<td>COP 21 in Paris</td>
</tr>
<tr>
<td>2015</td>
<td>expected final adoption of the bill (June 15)</td>
</tr>
<tr>
<td>2015</td>
<td>5 years mandate President F. Hollande</td>
</tr>
<tr>
<td>2015</td>
<td>3 years to adopt the law</td>
</tr>
<tr>
<td>2015</td>
<td>Bill shall be adopted in Mai 15: (June 15)</td>
</tr>
<tr>
<td>2015</td>
<td>Decreasing share of nuclear energy to 50% (in 2025)</td>
</tr>
<tr>
<td>2015</td>
<td>No reference to closing Fessenheim, but capping nuclear capacities at 63.2 GW (current levels)</td>
</tr>
<tr>
<td>2015</td>
<td>Increasing share of RES in power sector to 40% in 2030</td>
</tr>
<tr>
<td>2015</td>
<td>Reducing overall energy demand by 50% in 2050 vs today</td>
</tr>
</tbody>
</table>

Agora Energiewende (2015)
The French energy transition bill – a highly political and controversial context – Act IV

Bill shall be adopted in Mai 15:
- Decreasing share of nuclear energy to 50% (in 2025)
- No reference to closing Fessenheim, but capping nuclear capacities at 63.2 GW (current levels)
- Increasing share of RES in power sector to 40% in 2030
- Reducing overall energy demand by 50% in 2050 vs today

6 months to adopted the steering instruments (PPE)

Agora Energiewende (2015)
The French energy transition bill – a highly political and controversial context – A new theatre play in 2017?

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Presidential election campaign</td>
</tr>
<tr>
<td>2012</td>
<td>Fukushima accident</td>
</tr>
<tr>
<td>2013</td>
<td>&quot;nuclear Agreement&quot; Socialist - Green Party</td>
</tr>
<tr>
<td>2013</td>
<td>Energy Transition Debate</td>
</tr>
<tr>
<td>2014</td>
<td>Government's preparation of Energy transition Bill</td>
</tr>
<tr>
<td>2015</td>
<td>5 years mandate President F. Hollande</td>
</tr>
<tr>
<td>2015</td>
<td>Adoption of Energy transition bill</td>
</tr>
<tr>
<td>2015</td>
<td>COP 21 in Paris</td>
</tr>
<tr>
<td>2016</td>
<td>President's commitment to close Fessenheim NPP</td>
</tr>
<tr>
<td>2015</td>
<td>Expected final adoption of the bill (June 15)</td>
</tr>
<tr>
<td>2017</td>
<td>New government</td>
</tr>
</tbody>
</table>

**Bill shall be adopted in Mai 15:**

- Decreasing share of nuclear energy to 50% (in 2025)
- No reference to closing Fessenheim, but capping nuclear capacities at 63.2 GW (current levels)
- Increasing share of RES in power sector to 40% in 2030
- Reducing overall energy demand by 50% in 2050 vs today

6 months to adopted the steering instruments (PPE)
3. The mix diversification of the French power system
The French power sector transformation targets lead to more convergence with Germany

French renewable targets in the power sector are in line with German and European targets

<table>
<thead>
<tr>
<th>2030 renewable energy targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>60%</td>
</tr>
<tr>
<td>50%</td>
</tr>
<tr>
<td>40%</td>
</tr>
<tr>
<td>30%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

- EU 2030 Energy and Climate Framework
- German Energiewende
- French Transition énergétique

% RES in gross power consumption
% RES in final energy consumption

Representative week in 2030 for the French and German power mix

**France 2030, week in September**

**Germany 2030, week in September**

EU Commision (2014), French and Germany energy strategies

Agora Energiewende / Fraunhofer IWES (2015)
The road from 2015 to 2030 – what future for the French power mix diversification strategy?

Generation and consumption in France in 2013 and 2030 during two « extreme » weeks with high share of v-RES

Agora Energiewende / Fraunhofer IWES (2015), based on long-term forecasts of RTE
Incorporating 40% renewables in the French power system implies some rescaling of the nuclear fleet and (moderate) changes in its short-term operation.
The French nuclear fleet can respond (technically) in part to increasing flexibility needs but a reoptimization of its operation is crucial to incorporate high share of RES.

Agora Energiewende / Fraunhofer IWES (2015)
More information and studies available at our website

www.agora-energiewende.org
Thank you for your attention!

Questions or Comments? Feel free to contact me:

dimitri.pescia@agora-energiewende.de

Agora Energiewende is a joint initiative of the Mercator Foundation and the European Climate Foundation.