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Role of Nuclear Power in a Cleaner and More Distributed European Power Market

ENYGF 2015
Cité des Sciences et de l’Industrie – Paris
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Mike KIRST
Westinghouse Vice President
Strategy & Government Affairs
Europe, Middle East & Africa
Westinghouse in Europe

- **1962**: First Pressurized Water Reactor (PWR) in Europe was built by Westinghouse.
- **60%**: Of the nuclear power plants in the EU are based on Westinghouse technology.
- **25**: Commercial reactors designed and supplied by Westinghouse across Europe.
- **4,000**: High-skilled and trained people across Europe, plus an additional 1,500 contractors.
- **54 out of the 58 French reactors** are based on Westinghouse licensed technology.
- **65 nuclear reactors in Europe** are currently fuelled by Westinghouse (PWR – including VVER, BWR, AGR and Magnox).
- We have operations in **11 European countries**.
- **Our AP1000® reactor** is the safest, most efficient and reliable design currently available in the worldwide marketplace.
Broad Global Capabilities and Experience

Operating Plants Business
Delivers operating plant products and services, including global field services, instrumentation and control, welding and machining, and installation-related functions.

Decommissioning, Decontamination & Remediation
Deploys global technologies and forms local partnerships to carry out long-term projects.

New Plants & Major Projects
Delivers both new-plant projects and major projects for new and operating plants on a global basis.

Nuclear Fuel & Manufacturing
Designs and delivers fuel for PWR, BWR, VVER and AGR reactors, and oversees manufacturing operations worldwide.

Engineering Center of Excellence
Supports all product lines by driving common engineering capabilities and accelerating innovation.

Westinghouse technology is the basis for nearly 50 percent of nuclear power plants operating worldwide!
Nuclear Industry in Europe

131 Nuclear power plants in the EU

600 million tons of CO₂ per year avoided in the EU due to nuclear generation

55% of the EU’s low-carbon electricity

24/7, 365 days/year

800,000 jobs supported by the nuclear industry in Europe

Did you know?
European Electric Utility Challenges

**Government**
- Unclear EU policies

**Technology**
- Subsidized RES

**Market**
- Weak EU Economy

**Government**
- Germany Energy Shift

**Technology**
- Cheap Coal

**Market**
- Broken ETS

**Government**
- Russia

**Technology**
- (shale) Gas

**Market**
- Low Electricity Price
Electric Utility Profitability

Weak EU Economy → Lower Electricity demand → Oversupply in Electricity Generation → Low Electricity Price

EU policies → Subsidized RES → High RES penetration → Distortion of Technology generation mix

Oversupply CO2 certificates → Low CO2 prices

US Shale Gas boom → Oversupply of Coal → Low Coal Price → Coal Fire station Generation increase

Low Gaz Fire Plant utilization

Lower Electricity demand → Loss of Generating Assets

Mothball of Gaz Fire Stations
EU Nuclear Market Consequences

• How are some EU Nuclear Utilities Responding?
  – Deferrals and cancellations of major upratings and life extension investments
  – New nuclear build delays
  – Utilities striving to lower their operating costs
  – Investments focused on mandatory regulatory changes
European Energy policies are generally driven by three considerations:
- **Combating climate change**
- **Competitiveness** (affordable energy for domestic and industrial consumers); and
- **Security of energy supply**.

Most Member States try to find a balance.

**BUT**

The EU weighs **tackling climate change** ahead of other priorities:
- “20-20-20” (GHG, RES and energy efficiency) targets by 2020.

Conflicting policies (**ETS vs RES vs liberalization etc**):
- **unstable** and **unpredictable** policy framework;
- 27 political interventions has cost utilities **€200bn in shareholder value**

* [Citibank Report]
First Signs of Hope

2030 Energy and Climate Agreement – October 2014

* 40% CO2 reduction from 1990*

* 27% RES (at EU-wide Average)

* 27% Energy Efficiency Target (Indicative, non-binding)

• Key Member States are beginning to understand the limitations of RES and associated costs.

• “Nuclear Magritte” Group letter of 25 June 2014 to European Commission

* Mandatory at Member States Level
Nuclear Generating More than Half of Europe’s Low Carbon Electricity

<table>
<thead>
<tr>
<th>Country</th>
<th>Nuclear Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungary</td>
<td>86%</td>
</tr>
<tr>
<td>France</td>
<td>83%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>77%</td>
</tr>
<tr>
<td>Belgium</td>
<td>77%</td>
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<tr>
<td>Slovakia</td>
<td>73%</td>
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<tr>
<td>Bulgaria</td>
<td>72%</td>
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<tr>
<td>UK</td>
<td>61%</td>
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<tr>
<td>Slovenia</td>
<td>55%</td>
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<td>Finland</td>
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<td>Romania</td>
<td>43%</td>
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<tr>
<td>Spain</td>
<td>40%</td>
</tr>
<tr>
<td>Germany</td>
<td>40%</td>
</tr>
<tr>
<td>Sweden</td>
<td>39%</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>24%</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2014

53%
of low-carbon electricity
What Should Industry Do?

Industry Must Take Strong and Unified Step

- **Zero Discrimination for “Zero Carbon Technologies”**
  - Eliminate Grid Priority for RES
  - Reinforce MS right to Energy Choice
  - Eliminate Discriminatory Taxation on Nuclear

- Eliminate Subsidies or **Expand to ALL**

- Demand that **Total Systems Costs** are Included

- Demand that **Impact Assessments** on all EU Energy and Climate Directives
What Can **YOU** Do?

**Policymaking:**
- Raise Your Voice to National Authorities
- Work with National Nuclear Societies
- Participate in Energy Debates
- Engage Your Leadership

**Operations:**
- Help Bring New Thinking
- How Can We Be More Competitive?
  - Lower O&M Costs
  - Continue to Innovate
  - Accident Tolerant Fuel
  - Load Follow of RES – What will it take?
  - Process Heat – How can we monetize?

**Innovation**
- SMRs – Achieve Economic Value
- Find New Solutions to Fuel Recycling (Maximize Energy/Decrease Waste)
WE Need to Work Together Across Europe

- Lower Capex/R&D Budgets Severely Restrict Innovation
- We need to establish more cross border activities – beyond EU
- We need to work with Academia
- Bring more support from National R&D budgets
- Include the entire life cycle (fuel load to final repository)
YOU ARE THE FUTURE LEADERS OF THIS CRITICAL INDUSTRY

RAISE YOUR VOICE!

THANK YOU