



## **"Nuclear Energy in the EU"**

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Central European Energy Conference, Bratislava 24 November 2014



Energy

## **Lisbon Treaty**





### **Article 194 – Energy:**

- 1. In the context of the functioning of the internal market ..., **Union policy on energy shall aim**, in a spirit of solidarity between Member States, to**
  - a. Ensure the **functioning of the energy market**
  - b. Ensure the **security of energy supply** in the Union
- 2. ...European Parliament and the Council ..., shall establish the measures necessary to achieve the objective ... Such **measures shall not affect a Member State's ... choice between different energy sources** and the general structure of its energy supply**

**=> MS free to choose nuclear**

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**EESS (May 2014)**  


***Nuclear Energy as important contribution to Security of Supply***

**EESS recognises:**

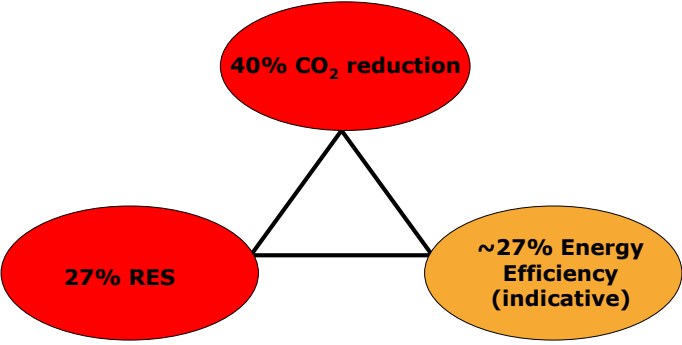
- **electricity produced from nuclear energy constitutes:**
  - **reliable base-load source**
  - **emission free source**
  - **important role for energy security**
- **50% of EU electricity emission free**  
**<=> 23% RES + 27% NE**

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**2030 Energy & Climate Policy** 


**Council Conclusions – 2030 targets**  
 (Oct. 2014) (rel. to 1990)



**Binding at EU level – in most cost-effective manner**

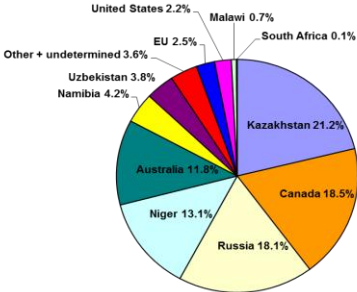
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## **Strength of Nuclear Energy for supply security**


- 'Indigeneous source':  
EU Fuel Cycle
- Diversification potential
- Easy storage of nuclear material: EUP/FA
- Long term diversified contracts



Country/Region	Percentage
United States	2.2%
Malawi	0.7%
South Africa	0.1%
Kazakhstan	21.2%
Canada	18.5%
Russia	18.1%
Niger	13.1%
Australia	11.8%
Namibia	4.2%
Uzbekistan	3.8%
Other + undetermined	3.6%
EU	2.5%

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**Energy Security**
  
 European Commission

- **EESS endorsed by European Council**
- **European Council (October 2014)**  
 "... further to reduce EU's energy dependence from external sources"  
 &  
 Increase its energy security for both **electricity and gas**"

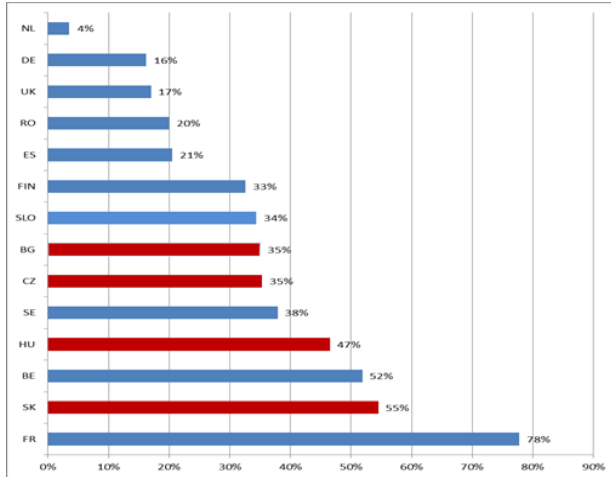
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## However...



### Nuclear power share of total electricity production in the EU (2013)



**100% dependent on the Russian fuel deliveries**

Source: OECD-NEA / ESA

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## Supply Security



### Means to ensure Security of Supply for Nuclear Energy:

- **Diversification** of fuel supply (Enrichment & Fuel Fabrication)
- **Long-term** diversified contracts
- **Stock** for several reloads
- AND** • **Avoid bundling with GAS!**


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EESS



European Commission



European Energy Security Strategy


## European Energy Security Strategy

Commission will systematically take into consideration **diversification of fuel supplies** in its assessment of **new nuclear investment projects** and new draft agreements of contracts with third countries.

- ... New NPPs to be built in the EU using non-EU technology ...
- ... The possibility of **fuel supply diversification** needs to be a **condition for any new investment**,
- ... to be ensured by the Euratom Supply Agency, which acts under the supervision of the Commission
- ... all NPP need diversified fuel supply

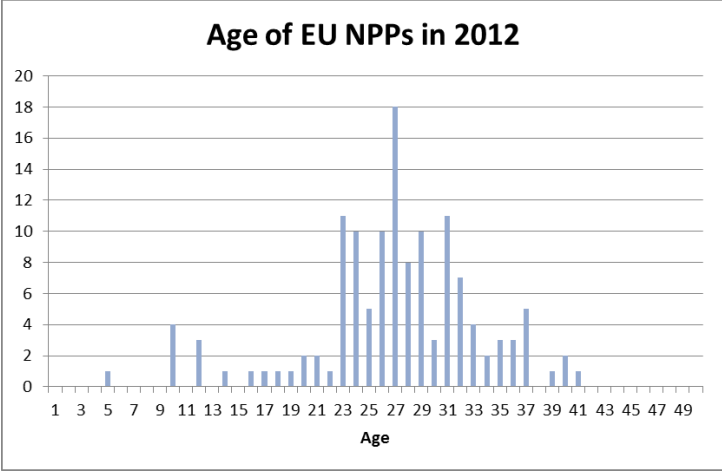
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### Age of EU NPPs in 2012



Age	Frequency
5	1
11	4
12	3
15	1
16	1
17	1
18	1
19	1
20	2
21	2
22	1
23	11
24	10
25	5
26	10
27	18
28	8
29	10
30	3
31	11
32	7
33	4
34	2
35	3
36	3
37	5
38	1
39	1
40	2
41	1

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New build
and/or LTO

## COST OF NUCLEAR ?

(D'Haeseleer Study – Nov 2013 - under ENEF)

=> Capital Cost: most important factor

- **New Build** – *EPR Finland and France*
  - 8 Billions € for 1600 MWe = **5000 €** per KWe installed
  - 60 years at 90%
  - expected "Serie" effect: **3500-4000 €** per KWe installed
- **LTO** – *EDF Figure including Safety Upgrades*
  - 900 Millions € for 900/1000 MWe = **1000 €** per KWe installed
  - +20 years at 80%


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Financing Innovation
in Offshore Wind

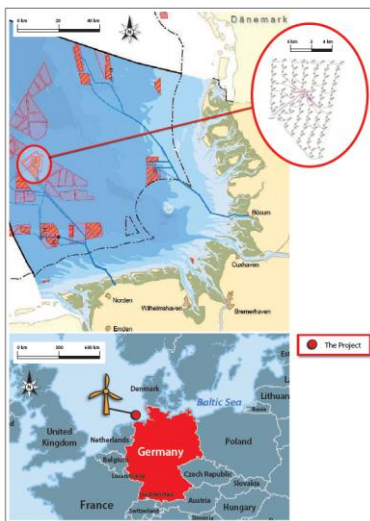
- **Global Tech I Offshore Wind (DE)**
  - First large-scale offshore wind farm in deep waters (~40m, 110 km to coast)
  - 5 MW turbine, tripod foundation
  - 400 MW, ~1500 GWh/a
  - Project cost ~ 2000 MEUR
  - EIB financing ~ 500 MEUR
  - Group of 18 banks

→ 5000€ / Kwe  
(~25y / < 50%)

EIB information







Project: GLOBAL TECH I OFFSHORE WINDPARK - Germany

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## ***LTO → New Build strategy***

- **Gain time → stabilisation of electricity price**
- **Gain experience with 'FOAK' new build**  
=> "fleet price"
- **Innovative financing models**
  - Mancala model
  - Hinkley Point

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## **NEA study**



### **NEA – NDC draft Report "A Review of Nuclear New Build in Relation to Project Structure, Supply Chain and Financing"**

The study combines **conceptual analysis**,  
**expert opinion** and **empirical case studies**.

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**NEA study**



- **jjj**

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**"20% Nuclear Scenario"  
(Energy Roadmap 2050)**

Long Term Operation (100 Units)

New Built (100 Units)  
Several units in construct in parallel

	Long term operation (2015-2035)	New Built (2025-2045)
Investments	900 M€ per Unit	5 B€ per Unit
Jobs 900000 (base)	In addition 50 000 jobs (LTO + ST upgrades)	In addition 250 000 jobs (New Built)
Value added 70 B€/y (base)	In addition 5 B€/y	In addition 25 B€/y

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## EU Regulatory



## Framework

- ✓ "Nuclear **Safety Directive**"
- ✓ "Nuclear **Waste Directive**"
- ✓ **Fund for waste/decommissioning**
- **Improved cooperation to gain further cost efficiency**
  - Safety Regulators – via ENSREG – for pre-licensing
  - Waste management & infrastructure
- **Gain further acceptance for nuclear energy - 'Achilles' heal of NE!**

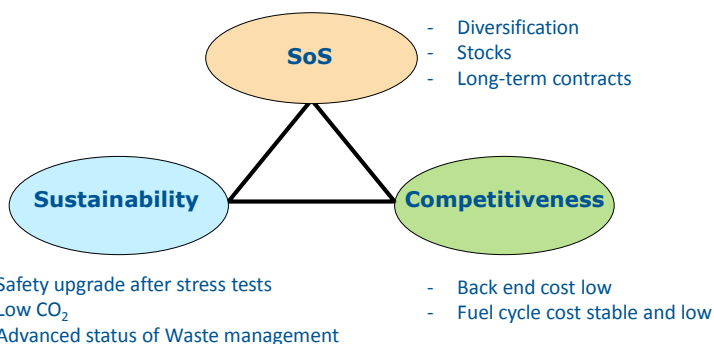
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## Summary



- **Capital cost challenge: build on time and at cost**
- **Nuclear Energy contributes positively to EU energy policy goal**



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*Thank you for your attention!*

<http://ec.europa.eu/euratom/index.html>

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