European Human Resources Observatory for the Nuclear Energy Sector

Massimo FLORE
Established in 1957

7 institutes in 5 countries

2,845 permanent and temporary staff

1,398 scientific publications in 2010

125 instances of support to the EU policy-maker annually

JRC Sites

IRMM Institute for Reference Materials and Measurements

IET Institute for Energy and Transport

ITU Institute for Transuranium Elements

IHCP Institute for Health and Consumer Protection

IPSC Institute for the Protection and Security of the Citizen

ISM Ispra Site Management

IES Institute for Environment and Sustainability

Headquarters

PETTEN GEEL BRUSSELS KARLSRUHE ISpra SEVILLE
provides support to European Union policies and technology innovation to ensure sustainable, safe, secure and efficient energy production, distribution and use and to foster sustainable and efficient transport in Europe.
Organization
Bottom-up Approach
Top-down Approach
Senior Advisory Group Members
Website

European Human Resources Observatory for the Nuclear Energy Sector

Joint Research Centre
Institute for Energy and Transport (IET)

Some observations on the career orientations, mobility and expectations

Top-down workforce demand extrapolation from nuclear energy scenarios

ehron.jrc.ec.europa.eu
Organization

Bottom-up Approach

Top-down Approach
First EHRO-N report on Supply & Demand for Nuclear Expert in EU

Based on the analysis of responses to two surveys

Data assessed with other sources from OECD, IAEA, WNA and Eurostat

PUTTING INTO PERSPECTIVE THE SUPPLY OF AND DEMAND FOR NUCLEAR EXPERTS BY 2020 WITHIN THE EU-27 NUCLEAR ENERGY SECTOR

An EHRO-N report

Veronika Simonovska
Ulik von Estorff

2012
Methodology

1. Desk Research
2. Design and sending out of questionnaires
3. Analysis of responses received
4. Estimation of missing data
5. Putting EHRO-N data into wider context using statistical data available
Supply Side

Research on

- Graduated in 2009 on Nuclear related studies
- Enrolled in the Academic year 2009/2010 on Nuclear related studies

Results

- High Response Rate
- Above 2800 graduated in Nuclear related field
- Around 2300 Students enrolled in Nuclear Related studies
Number of BSc, MSc, PhD graduated in 2009 on nuclear related subjects
Status Demand Side Survey 2014 (Universities)

- Contacted: 174
- Responses: 30
- Response Rate: 17%
Demand Side

Research on

Nuclear experts employed

Need for Nuclear Expert in the future

Results

Large Majority of contacted organizations provided data

38.900 Nuclear experts will be needed in the next 10 years
Total number of nuclear experts employed in 2010

Nuclear experts employed in EU-27 in 2010 divided by age group (received data+estimated data)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>below 35</td>
<td>15200</td>
</tr>
<tr>
<td>35-45</td>
<td>16162</td>
</tr>
<tr>
<td>45-55</td>
<td>21242</td>
</tr>
<tr>
<td>above 55</td>
<td>10435</td>
</tr>
</tbody>
</table>
Need for nuclear experts in the future

<table>
<thead>
<tr>
<th>Time</th>
<th>Series1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>3001</td>
</tr>
<tr>
<td>5 years</td>
<td>15988</td>
</tr>
<tr>
<td>10 years</td>
<td>38900</td>
</tr>
</tbody>
</table>
### Status Supply Side Survey 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>Contacted</th>
<th>Responses</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>36</td>
<td>9</td>
<td>25%</td>
</tr>
<tr>
<td>Vendors &amp; Suppliers</td>
<td>16</td>
<td>5</td>
<td>31%</td>
</tr>
<tr>
<td>Fuel providers</td>
<td>13</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>RWM &amp; Decommissioning</td>
<td>41</td>
<td>11</td>
<td>27%</td>
</tr>
<tr>
<td>Design</td>
<td>72</td>
<td>12</td>
<td>17%</td>
</tr>
<tr>
<td>Consultancies</td>
<td>27</td>
<td>8</td>
<td>30%</td>
</tr>
<tr>
<td>Regulators</td>
<td>26</td>
<td>8</td>
<td>31%</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>57</td>
<td>22</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>288</strong></td>
<td><strong>78</strong></td>
<td><strong>27%</strong></td>
</tr>
</tbody>
</table>
Main Challenges

Attracting more students

Low attractiveness to foreign talent

Large-scale retirements
- Organization
- Bottom-up Approach
- Top-down Approach
The EC Energy Roadmap 2050 and the OECD/IEA Technology Roadmap based nuclear energy demand scenarios
Building New Reactors

Two different generic third generation nuclear reactors are assumed to be constructed in order to fulfil the energy demand.

<table>
<thead>
<tr>
<th>Reactor</th>
<th>Power [MWe]</th>
<th>Efficiency [%]</th>
<th>Load Factor [%]</th>
<th>Lifetime [Years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gen III LWR</td>
<td>1400</td>
<td>36</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>Gen III LWR</td>
<td>1000</td>
<td>36</td>
<td>80</td>
<td>60</td>
</tr>
</tbody>
</table>
Graphical representation of the manpower required for different sizes of nuclear reactors
Comparison with past experience

Capacity being installed at the same time in 1980

- Developing countries
- Japan and S. Korea
- E. Europe
- W. Europe
- North America

20 Years

Graph showing historical data and future projections for construction in Europe.
Nuclear Energy Sector Skills
Thank you!

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