Social-Economic Impact of NPP Construction Projects. Rosatom as a Fully-Integrated Responsible Vendor.

NIASA - Nuclear Empowerment Conference

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BRICS Countries are Actively Developing Nuclear Energy...

<table>
<thead>
<tr>
<th>Country</th>
<th>Operating NPP units</th>
<th>NPP units under construction</th>
<th>NPP construction plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>2</td>
<td>1</td>
<td>6 units by 2030</td>
</tr>
<tr>
<td>Russia</td>
<td>33</td>
<td>9</td>
<td>15 units (~20 GW) by 2030</td>
</tr>
<tr>
<td>India</td>
<td>20</td>
<td>7</td>
<td>16 units (~15 GW) by 2030</td>
</tr>
<tr>
<td>China</td>
<td>15</td>
<td>26</td>
<td>51 units (~57 GW) by 2020</td>
</tr>
<tr>
<td>South Africa</td>
<td>2</td>
<td>-</td>
<td>6-8 units (9,6 GW) by 2030</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Capacity MWe</th>
<th>Capacity MWe</th>
<th>Capacity MWe</th>
<th>Capacity MWe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>1,896</td>
<td>24,164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>4,385</td>
<td>11,881</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>1,800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>2,700</td>
<td>27,640</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Additional gains from NPP construction

- Growth of demand in other sectors of economy
- Job creation
- Electricity export opportunities
- Development of science and education
- Tax payments growth
- Energy security development
- Country’s reputation growth at regional level
- Social infrastructure development
- Industry and construction sector development

Freezing of nuclear energy development is equal to rejection of social and economic development.

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Order volume for NPP construction for Rosatom global projects


~ 15% - Russian supply
~ 30-40% - local content
~ 45-50% - global sourcing

Rosatom needs to re-invent its global supply chain
### Success Story

Rosatom has a long-lasting experience in equipment production and services localization and sourcing

<table>
<thead>
<tr>
<th>Year</th>
<th>Project</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>LOVIISA</td>
<td>First global sourcing project. Became known as “Eastinghouse”, where Siemens and Westinghouse were attracted by Russian organizations. Is considered to be one of the most effective NPPs in the world.</td>
</tr>
<tr>
<td>1980-2000</td>
<td>TEMELIN Czech Republic</td>
<td>In implementation of this project first full scope localization approach was fulfilled. Within the scope of Council for Mutual Economic Assistance nuclear equipment production was developed in Czech Republic, Slovakia, Poland, …</td>
</tr>
<tr>
<td>2002-2011</td>
<td>KUDANKULAM India</td>
<td>Significant local content sourcing, especially in civil construction. Broad localization program is envisaged.</td>
</tr>
<tr>
<td>2011</td>
<td>New proposals for EU countries are based on AES-2006 design</td>
<td>Strong involvement of European contractors. European investors participation is envisaged. Rosatom could be stake holder and financing partner in the project.</td>
</tr>
</tbody>
</table>

#### Local supplier’s share in equipment and services supply

- **1970-1980**: 20%
- **1980-2000**: 30%
- **2002-2011**: 39%
- **2011**: Up to 70%

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Example of Successful Localization Program in Czech Republic:
Key Facts of Current Cooperation

- Czech-Russian Consortium leader for Temelin-3,4 tender is Czech company Skoda JS – producer of reactor pressure vessels
- 350 suppliers targeted as potential suppliers of Temelin project
- 39 Memorandums of Understanding signed with suppliers
- Up to now Czech companies have signed contracts for $220 mln. with Rosatom

Localization program for local suppliers – State of the Art

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Example of Successful Localization Program in Czech Republic: Current Local Supply Chain

Suppliers are influential and system-creative players in Czech Power industry

- **Pressurizer:** VÍTKOVICE PE
- **Pressure vessels:** SKODA JS
- **Polar crane:** SKODA JS
- **Steam generators:** VÍTKOVICE PE
- **High and Low pressure heat exchangers:** VÍTKOVICE PE
- **I&C:** I&C Energo, ZAT, ENVINET and CHEMCOMEX
- **Electrical systems:** I&C Energo
- **Auxiliary prime and secondary systems:** KP RIA, ČKD, partially CHEMCOMEX
- **Lab equipment and tools:** ENVINET
- **Cooling tower:** Chladici veze Praha
- **Civil structure:** PSG Hochtief
- **Vent and air conditioning:** ZVVZ Enven-Engineering, Engineering, MODRANY POWER
- **Vent and air conditioning:**
- **Pumps:** SIGMA GROUP
- **I&C:** I&C Energo, ZAT, ENVINET and CHEMCOMEX

Local companies will procure 70% of total Temelin-3,4 supplies

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Localization Opportunities and Effects for South Africa

### Localization scope
- Civil construction & engineering
- Piping
- Pressure vessels and tanks
- Ventilation
- I&C components
- Electrical components

### Effects (direct)
- 15,000 jobs in peak (9,000 in average)
- $16 bn. revenue of RSA companies
- $3.4 bn. tax income of RSA government

### Effects (indirect)
- “1x10”: 1 job in operating NPP creates 10 jobs in infrastructure
- Access to our global pipeline (80 units by 2030)

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Our estimation is, that companies in South Africa would be currently able to supply ca. 40 % of the planned nuclear power plants.
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# Job Creation Opportunities for South Africa

## Direct employment:

<table>
<thead>
<tr>
<th>Category</th>
<th>People / unit</th>
<th>People / 8 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating personnel</td>
<td>400</td>
<td>3 200</td>
</tr>
<tr>
<td>(shift crews, equipment engineers, training personnel, safety staff)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance personnel</td>
<td>500</td>
<td>2 000</td>
</tr>
<tr>
<td>(belongs to the NPP organization or private maintenance companies)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil construction</td>
<td>3 000</td>
<td>10 500</td>
</tr>
<tr>
<td>(civil construction and montage workers, engineers during the NPP erection)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local production of the equipment</td>
<td></td>
<td>4 500</td>
</tr>
<tr>
<td>(given localization amount of 60%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Indirect employment:

- Services, markets, schools, hospitals, transports, civil constructions, goods production, etc.
Human Resources

The number of employees at the local works (Construction and production of Equipment) has an average total per year of 9,000.

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Estimated Benefits for South Africa from Localization Program during Construction

- **Additional revenues for local companies**
  - Direct: $16 bln.
  - Indirect: $15–32 bln.

- **Additional tax collection**
  - Direct: $3,4 bln.
  - Indirect: $2–4,5 bln.

- **New employees required**
  - Direct: 15 000
  - Indirect: 9 000 – 19 000
BRICS countries are strongly committed to the development of nuclear power

Nuclear power brings more than just energy, but contributes to the overall economic and industrial growth

NPP construction program creates a large number of jobs in nuclear and relevant industries

ROSATOM offers integral solution – construction of NPP, broad localization, financing, HR training, infrastructure development

ROSATOM possesses unique experience and competencies in nuclear power development and is ready to share it with South Africa
Thank You for Your Attention!

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JSC “Rusatom Overseas”

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Phone: +7 (495) 730-08-73
Example of Successful Localization Program in Czech Republic: Background


Under the Agreement, the Soviet Union carried out the transfer of working drawings, production technology, consulting and providing concrete assistance in solving issues arising in the process of manufacturing of the equipment, including supply of spare parts.

Deliveries were realized from:

- **People's Republic of Bulgaria**: Biosecurity, capacitors, axial and artesian pumps
- **German Democratic Republic**: Overhead travelling cranes, transport and technological equipment
- **Czechoslovak Socialist Republic**: Reactor plants, steam turbines, steam generators, pipelines of the big diameter
- **Socialist Federal Republic of Yugoslavia**: Overhead travelling cranes, nutritious and special pumps, the equipment of the multiple forced circulation circuit and drum-separators for NPP with RBMK reactors

Initially, the USSR was preparing localization supply chain for the Czech Republic to build 4 NPP units
Key Activities of Rosatom – Full Cycle of Nuclear Energy

Guaranteed supply of complete life-cycle products and services

Flexible capabilities of NPP supply from components and services to turn-key and BOO projects

Being a state corporation Rosatom is taking advantage of unique industry access to privilege resources

* Boxes include names of key Rosatom’s subsidiaries in the relevant sector

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Appendix 2.
Rosatom Global Operations

#1 in key segments

#1 in uranium deposits

#1 in uranium enrichment

#1 in new NPPs construction

#1 Russian electricity generation company, 24.2 GWe installed capacity

5 continents. More than 40 countries.

Europe
Finland, Sweden, the Netherlands, Belgium, Germany, France, Spain, GB, Switzerland, Czech Republic, Slovakia, Hungary, Lithuania, Bulgaria, Slovenia

CIS
Russia, Ukraine, Kazakhstan, Belorussia, Armenia

North America
USA, Canada, Mexico

Asia
China, Japan, South Korea, Vietnam, India, Bangladesh, Mongolia

Latin America
Venezuela, Argentina, Brazil

MENA
Turkey, Libya, Morocco, Algeria, Egypt, Iran, Jordan

Africa
Namibia, South Africa, Tanzania

Australia

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