Assessing the role of SMRs in Türkiye for promoting new employment opportunities within the context of the Green Transformation and Sustainable Development Goals

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WHO AM I?

NEVRIYE SIMGE OZGULEC

- Assistant Specialist in Human Resources Field in Republic of Türkiye Ministry of Energy and Natural Resources
  - Working on mainly establishing the human resource policy of Türkiye’s nuclear energy implementation program.
  - Still works extensively with the Ministry, participating in working groups and developing guidance documents in Training and HRD about Türkiye's nuclear sector.
- Master Degree in Master of Public Administration(Human Resource) at University of Birmingham / United Kingdom – Dissertation about human resource development in newly established nuclear power plants
- Bachelor Degree in Political Science and Public Administration at Istanbul University
# Table of Contents

1. Why I chose that topic?
2. What are SDGs and How they implement in Türkiye’s system
3. Green Transformation and SMR
4. Türkiye’s background about sustainable development studies in nuclear field
5. Why Türkiye needs SMR?
6. How Türkiye works on SMR?
7. SMR Working Groups
8. National Human Resources Network in Türkiye and SMRs
9. Turkish Nuclear Education Policies
10. From high-school level policies in Nuclear
11. Nuclear Education in Turkish Universities
12. Nuclear Education in National and International Level
13. Nuclear workforce for public sector
14. Double-Degree Programs between Russia and Türkiye Universities
15. Educated workforce from Russia
16. Can SMRs be solution for increasing young generation employment in Nuclear sector?
17. Technical and maintenance workforce strategies
18. Private sector collaboration for Nuclear sector
19. Further Researches

Conclusion
1. Why I chose that topic?

- Mostly SMRs has been discussed about technical part and how they can be developed technically, technologically or environmental issues.

However;

- There are very few studies about employment about SMRs and effects on SDGs
2. What are SDGs and How they implement in Türkiye’s system
3. Green Transformation and SMR

The realization of green transformation is seen as the most important step in the prevention of energy-related global crises and demand crises. In this context, orientation towards sustainable and self-sufficient energy sources is important. With this orientation, there was a consensus on the unsustainability of fossil fuels due to the damage they cause to the environment. Within the scope of the 2050 European Green Agreement and green transformation, SMR (Small Modular Reactor) technology has also become popular with nuclear power plants, and in this context, policies have been made by the European Union on the sustainability and generalization of SMRs. SMR technology is a nuclear reactor technology that can be installed on a smaller scale and more flexible locations. SMRs, which can be installed in different places such as land, sea (floating SMR) and submarine, are electricity generating reactors. While SMR technology offers an alternative energy source and energy opportunity for remote and rural areas, it has also become an important sector and an important technology discussed in the field of nuclear energy in terms of less complex security structures and supporting environmentalist order.
4. Türkiye’s background about sustainable development studies in nuclear field

The publication called ‘Sustainable Development and Nuclear Energy’ was published by the Turkish Atomic Energy Agency in 2000.

Source:
5. Why Türkiye needs SMR?

- Economical concerns
- Safety concern
- Mobility of SMRs
- Current available workforce for SMRs
- Available infrastructure
- Industrial development
- Technological growth
There is a working group that was established this year and stakeholders were involved and worked collaboratively. This group includes:

1. Nuclear Regulatory Authority as regulatory body
2. Türkiye Nuclear Energy Company as private sector
3. Republic of Türkiye Ministry of Energy and Natural Resources as NEPIO
## 7. SMR Working Groups

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Türkiye’s Energy Roadmap</td>
</tr>
<tr>
<td>2</td>
<td>Technology Selection</td>
</tr>
<tr>
<td>3</td>
<td>Field Development and Infrastructure Development</td>
</tr>
<tr>
<td>4</td>
<td>Licensing</td>
</tr>
<tr>
<td>5</td>
<td>Market Analysis</td>
</tr>
<tr>
<td>6</td>
<td>SMR Ecosystem, Project Company, Investors and Stakeholder Analysis</td>
</tr>
<tr>
<td>7</td>
<td>Financing and Income Model</td>
</tr>
<tr>
<td>8</td>
<td>Localization, Technology Transfer, Supply Chain and Human Resources</td>
</tr>
<tr>
<td>9</td>
<td>Construction, Operation and Waste Management</td>
</tr>
<tr>
<td>10</td>
<td>Nuclear Liability</td>
</tr>
<tr>
<td>11</td>
<td>SMR Draft Law Proposal</td>
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</tbody>
</table>
8. National Human Resources Network in Türkiye and SMRs

- Submission of the summary report explaining objectives, possible benefits, roles and structures of the network to the Minister Office of Energy Ministry.

Main objective of establishing the network is to achieve sustainable human resource development to satisfy the need of nuclear sector through interaction and coordination among government, industry and academia.

- Expected benefit from the network is to provide a consultative platform for all stakeholders to ensure more efficient and effective planning, implementing and monitoring HRD activities in field of nuclear energy. So, the network makes:
  - Efficiently utilization of limited resources (money and human)
  - Easily share information,
  - Accurately identifying needs,
  - Promptly respond to issues
From high school to post-graduate level, Ministry of Energy and Natural Resources supports educational development for nuclear operations.
10. From high-school level policies in nuclear

- Ministry of Education has approved the module of ‘Introduction Nuclear Energy’
- There is an optional ‘Russian’ language class.

June 2020

- Ministry of Education, Ministry and Energy and Natural Resources, Akkuyu NPP, Titan2-IC İctas Construction have signed collaboration Protocol

October 2020

- Per August 2021, train for trainers education are given to related lecturers
- 7 pilot high school were involved in this project under protocol.

2021
### 11. Nuclear Education in Turkish Universities

<table>
<thead>
<tr>
<th>University</th>
<th>Bsc</th>
<th>Msc</th>
<th>PhD</th>
<th>Field</th>
<th>Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hacettepe Univ. (in Ankara)</td>
<td></td>
<td></td>
<td></td>
<td>Nuclear Engineering</td>
<td>1977, 1982</td>
</tr>
<tr>
<td>Istanbul Technical Univ. (Research reactor wt 250 kW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1961, 2003</td>
</tr>
<tr>
<td>Sinop Unv</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2015</td>
</tr>
<tr>
<td>Ege Univ. (in Izmir)</td>
<td></td>
<td></td>
<td></td>
<td>Industrial applications of nuclear, environmental radiation detection</td>
<td>1966</td>
</tr>
<tr>
<td>Hacettepe Univ. (in Ankara)</td>
<td></td>
<td></td>
<td></td>
<td>Radiation physics and its applications</td>
<td>2003</td>
</tr>
<tr>
<td>Akdeniz Univ. (in Antalya)</td>
<td></td>
<td></td>
<td></td>
<td>Radiation physics and its applications</td>
<td>2013</td>
</tr>
<tr>
<td>Ankara Univ. (in Ankara)</td>
<td></td>
<td></td>
<td></td>
<td>Medical applications, health physics, radiation protection and monitoring</td>
<td>2006</td>
</tr>
<tr>
<td>Istanbul Univ. (in İstanbul)</td>
<td></td>
<td></td>
<td></td>
<td>Nuclear Physics</td>
<td>1981</td>
</tr>
<tr>
<td>Gazi University (in Ankara)</td>
<td></td>
<td></td>
<td></td>
<td>Nuclear Science</td>
<td>2022</td>
</tr>
<tr>
<td>Mus Alparslan University (in Mus)</td>
<td></td>
<td></td>
<td></td>
<td>Nuclear Energy and Energy Systems</td>
<td>2018</td>
</tr>
</tbody>
</table>
Since 2006, 317 Turkish students have been sent to universities in Russia for undergraduate education in nuclear engineering to work in the operation of Akkuyu NPP.

BSc Nuclear Engineering Universities:
1) Hacettepe University
2) Sinop University
13. Nuclear workforce for public sector

Republic of Türkiye Ministry of Education provides different type of scholarships for students to complete their education in abroad.

<table>
<thead>
<tr>
<th>Name of organization</th>
<th>Number and years of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkish Energy Nuclear and Mineral Research Agency (TENMAK)</td>
<td>-</td>
</tr>
<tr>
<td>Nuclear Regulatory Authority (NDK)</td>
<td>-</td>
</tr>
<tr>
<td>The Electricity Generation Corporation (EÜAŞ)</td>
<td>-</td>
</tr>
<tr>
<td>The General Directorate of Nuclear Energy and International Projects</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
</tr>
</tbody>
</table>
14. Double-Degree Programs between Russia and Türkiye Universities

- İstanbul Technical University (İTÜ)
- Ministry of Energy and Natural Resources
- MEPhI National Research Nuclear University
- Hacettepe University
- Peter the Great St. Petersburg Polytechnic University
- Akkuyu NPP
- Rosatom
15. Educated workforce from Russia

- As long-term perspective, by the end of 2027, 600 Turkish engineers are targeted to receive training at universities and facilities in Russia.

- Since 2006, 317 Turkish students have been sent to universities in Russia for undergraduate education in nuclear engineering. Graduates of these students started to work on the project.

- As of 2021, a total of 71 Turkish students have been working with Akkuyu NPP and 47 of them completed their education and started to work on the project.

- For the 2023-2024 academic year, 65 students have been selected to study their masters in Russia.
16. Can SMRs be solution for increasing young generation employment in Nuclear sector?

• Main purpose: To direct talented young people to the nuclear sector.

• Adaptation of the young generation to the nuclear sector is a big problem in the world, but there are solutions for this problem in our country as well.

• Our Ministry, TUBITAK (Scientific and Technological Research Council of Turkey), YÖK (Council of Higher Education), Akkuyu NPP has contacted with the aim of developing scholarship opportunities for young people and creating policies.
17. Technical and maintenance workforce strategies

- Collaboration with İŞKUR (Türkiye Employment Agency)
- Providing development in local area (Mersin)
- National workforce development plans for Mersin area.
- Building communication channels with local stakeholders.
- Providing local and industrial decentralization in the area.
- Collaboration with local universities. (Mersin University etc.)
18. Private sector collaboration for Nuclear sector

- Ankara Chamber of Industry – Nuclear Industry Cluster (NUKSAK)
- Türkiye Nuclear Energy Company (TUNAS)
- Association of Turkish Electricity Industry (TESAB)
- NUTED Nuclear Technical Support Joint Stock Company (NUTED)
- NIATR Nuclear Industry Association (NIATR)
19. Further Researches

• More SMR groups will be involved in the sector.
• To study more about macro and micro economical effects of SMRs.
• To use IAEA's tools for calculating further aspects.
• To build more collaboration with Russian and other international actors.
Conclusion

• People want to work for green energy jobs and they are eager to make a difference in the world about climate change. For talent attraction Türkiye should emphasize more about green Energy and green transformation role for growing of the nuclear sector.

• Türkiye has many collaborations with national and international stakeholders about potential SMR industries. Türkiye should increase to stakeholders connection more for decent work and economic growth.

• According reports of public sector and Akkuyu NPP, they support to gender equality in sector and for SMR growth gender equality should be more promoted and women should be attracted in sector.

• Türkiye should implement SMR into Turkish university’s education curriculum. Moreover, it should be given specialized importance for SMRs in MSc and PhD level.
King Regards,