



MISSION REPORT

ON

**THE INTEGRATED NUCLEAR INFRASTRUCTURE
REVIEW (INIR) - PHASE 1**

Counterpart:

Estonia National Nuclear Energy Working Group

on behalf of

the Ministry of Climate

of the Government of the Republic of Estonia

23 – 30 October 2023

Tallinn, Estonia

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1. EXECUTIVE SUMMARY

The Government of the Republic of Estonia, a state in the Baltic region of northern Europe, has a population of 1.33 million people (2023). Estonia has been a Member State of the European Union since 2004 and the International Atomic Energy Agency (IAEA) since 1992.

The territory of Estonia covers 45 339 km². The total installed power generating capacity is 2337 MW(e), about 60% from oil shale and the rest from renewables. The Estonian Government has made the decision to stop generating power from oil shale as soon as possible. The country's long term development strategy 'Estonia 2035', adopted by the Riigikogu (Parliament) in 2021, sets the goal of achieving climate neutrality by 2050. The long term climate policy strategy document 'General Principles of Climate Policy until 2050' is being updated to integrate the same goal.

Since 1990, greenhouse gas emissions have decreased by approximately 70%, due to the transformation of the economy. The Estonian Government sees the importance of continued support measures and investments to help the country achieve its climate goals, maintain the competitiveness of its electricity production, and strengthen the security of supply.

On 5 November 2020, the Government of the Republic of Estonia established the Nuclear Energy Working Group as the Nuclear Energy Programme Implementing Organization (NEPIO) to review the nuclear infrastructure required for a nuclear power programme. In 2021, the NEPIO was initially formed and led by the Ministry of Environment with the Decree of the Minister on 20 April 2021. In July 2023, the new Ministry of Climate was formed by joining the Ministries of Environment and Economic Affairs and Communications. The Ministry of Climate is responsible for the comprehensive implementation of the green reform. Currently, the Ministry of Climate, through the Environmental Board, is responsible for overseeing radiation safety activities in Estonia and coordinates with other appropriate agencies.

The Deputy Secretary General of the Ministry of Climate chairs the NEPIO, and most Estonian ministries are represented on the NEPIO. The NEPIO's mandate is to consider the introduction of nuclear power, taking into account the nuclear infrastructure required for the nuclear power programme based on the IAEA's Milestones Approach, and the developments of Small Modular Reactor (SMR) technologies.

The NEPIO is tasked to develop a comprehensive report by the end of 2023 with recommendations to the Government to make a knowledgeable decision regarding a nuclear power programme. To achieve this end, the NEPIO commissioned a wide range of studies to identify the work required.

In March 2022, the Republic of Estonia through the Ministry of Environment, requested the IAEA to carry out a Phase 1 Integrated Nuclear Infrastructure Review (INIR) mission. The INIR mission was conducted from 23 to 30 October 2023, in Tallinn, Estonia.

The NEPIO Chair, Mr Antti Tooming, Deputy Secretary General of the Ministry of Climate and Ms Aline Des Cloizeaux, Director of the IAEA Division of Nuclear Power in the

Department of Nuclear Energy, provided opening remarks for the mission. From the Estonian side, the mission was coordinated by Ms Marily Jaska, Advisor, the Environmental Management and Radiation Department of the Ministry of Climate. The INIR team was led by Mr Eric Mathet of the IAEA Nuclear Infrastructure Development Section and consisted of staff from the IAEA Departments of Nuclear Energy, Nuclear Safety and Security, and Safeguards, as well as international experts recruited by the IAEA.

The INIR mission and associated activities were funded through a combination of a contribution from the Republic of Estonia, funds from the IAEA Department of Technical Cooperation, and the Nuclear Infrastructure Development Section.

The INIR mission was conducted in a cooperative and open atmosphere. The INIR team concluded that Estonia has developed a comprehensive set of studies to enable the Government to make a knowledgeable decision regarding the nuclear power programme.

In order to assist Estonia in making further progress in its infrastructure development, the INIR team made 6 Recommendations and 6 Suggestions. The INIR team also identified 3 Good Practices that may benefit other countries considering the introduction of nuclear power.

Based on the Recommendations and Suggestions, the key areas for further action are summarized below:

- **The NEPIO needs to complete the comprehensive report and prepare to coordinate the nuclear power programme**

The NEPIO has commissioned a wide range of studies to identify the work required to develop a nuclear power programme. The NEPIO needs to complete its comprehensive report which, based on these studies, will recommend a way forward. The comprehensive report should include a clear timeline showing the major activities that need to be completed in order to give clear guidance on timescales and responsibilities for all organisations involved.

If the programme moves forward, the NEPIO will need to broaden its membership to ensure coordination of all organisations involved in the programme. The NEPIO will also need competencies to guide, oversee, and coordinate the work to meet the expectations of Estonia's nuclear power programme.

- **Estonia needs to give further consideration to the development of its legal and regulatory framework**

Estonia is party to almost all relevant international legal instruments and has initiated the review of its legal and regulatory framework to support a potential future nuclear power programme.

Estonia currently has a Radiation Act and plans to develop a Nuclear Law to cover the additional requirements of a nuclear power programme. Estonia needs to further analyze the implications of having two acts as compared to one comprehensive Nuclear Law. Estonia also

needs to determine the appropriate position of the future regulatory body in the governmental structure to help ensure its independence.

Estonia has also identified the need to ensure that the future regulatory body has the appropriate authority and resources to cover safety, security, and safeguards. As it will take some time to enact the Nuclear Law and associated regulations, Estonia needs to consider putting in place an interim mechanism that allows for the initial development of the future regulatory framework.

- **Estonia needs to finalize its plans and policies to support the next phase of the programme**

Estonia has developed several studies to support the country's considerations regarding the introduction of nuclear power. The NEPIO has developed a two-track strategy to support the future human resource needs of the key organizations. If the decision is taken to move to Phase 2, it is encouraged to initiate the early development of the long term national human resource strategy and organizational workforce plans.

Estonia needs to give further consideration to the process for site characterisation and licensing, including the role of the future owner/operator. It also needs to develop a policy for industrial involvement to support national participation in the nuclear power programme, and a structured plan to strengthen its State System of Accounting for Control (SSAC) of Nuclear Material.

1. INTRODUCTION

The Government of the Republic of Estonia, a state in the Baltic region of northern Europe. Estonia has been a Member State of the European Union since 2004 and the International Atomic Energy Agency (IAEA) since 1992.

The territory of Estonia covers 45 339 km². The total installed power generating capacity is 2337 MW(e), about 86% from oil shale and the rest from renewables. The Estonian Government has made the decision to stop generating power from oil shale as soon as possible. The country's long term development strategy 'Estonia 2035', adopted by the Riigikogu (Parliament) in 2021, sets the goal of achieving climate neutrality by 2050. The long term climate policy strategy document 'General Principles of Climate Policy until 2050' is being updated to integrate the same goal.

Since 1990, greenhouse gas emissions have decreased by approximately 70%, due to the transformation of the economy. The Estonian Government sees the importance of continued support measures and investments to help the country achieve its climate goals, maintain the competitiveness of its electricity production, and strengthen the security of supply.

On 5 November 2020, the Government of the Republic of Estonia established the Nuclear Energy Working Group as the Nuclear Energy Programme Implementing Organization (NEPIO) to review the nuclear infrastructure required for a nuclear power programme. In 2021, the NEPIO was initially formed and lead by the Ministry of Environment with the

Decree of the Minister on 20 April 2021. Members of the Nuclear Energy Working Group are high-level representatives (Secretary General, Deputy Secretary General and Head of Department) of the Ministry of the Environment, the Ministry of Finance, the Ministry of Economic Affairs and Communications, the Ministry of Social Affairs, the Ministry of Education and Research, the Ministry of Foreign Affairs, the Ministry of the Interior and the Ministry of Defence. In July 2023, the Ministry of Environment and part of Ministry of Economic Affairs and Communications was reorganized into the Ministry of Climate, which now has the responsibility of the NEPIO. The Deputy Secretary of the Ministry of Climate chairs the NEPIO. Furthermore, a segment of the Ministry of Finance responsible for regional planning underwent a reorganization and became part of the Ministry of Regional Affairs and Agriculture.

On 28 March 2022, the Republic of Estonia, through the Ministry of Environment, requested the IAEA carry out a Phase 1 Integrated Nuclear Infrastructure Review (INIR) mission in Estonia. Under the coordination of the NEPIO, Estonia prepared a preliminary Self-Evaluation Report (SER) and submitted it to the IAEA on 30 April 2023. The IAEA conducted a combined SER Support and Pre-INIR mission to Estonia from 6 to 8 June 2023 in Tallinn, Estonia. Based on the suggestions provided by the SER Support mission, Estonia updated its SER and submitted a final SER on 2 September 2023. Additional supporting documents were shared by Estonia with the INIR team during the course of the mission (see Appendix 3).

The INIR Phase 1 mission was conducted from 23 to 30 October 2023 to evaluate the status of the development of the national infrastructure for a nuclear power programme.

The NEPIO Chair, Mr Antti Tooming, Deputy Secretary General of the Ministry of Climate and Ms Aline Des Cloizeaux, Director of the IAEA Division of Nuclear Power in the Department of Nuclear Energy, provided opening remarks for the mission. From the Estonian side, the mission was coordinated by Ms Marily Jaska, Advisor, the Environmental Management and Radiation Department of the Ministry of Climate. The INIR team was led by Mr Eric Mathet of the IAEA Nuclear Infrastructure Development Section and consisted of staff from the IAEA Departments of Nuclear Energy, Nuclear Safety and Security, and Safeguards, as well as international experts recruited by the IAEA. Appendix 2 lists INIR Team Members and Estonia counterparts.

The INIR mission and associated activities were funded through a combination of a contribution from the Republic of Estonia, funds from the IAEA Department of Technical Cooperation and the Nuclear Infrastructure Development Section.

2. OBJECTIVES OF THE MISSION

The main objectives of the INIR mission were to:

- Evaluate the development status of the national infrastructure to support the nuclear power programme according to the IAEA publication entitled *Milestones in the Development of a National Infrastructure for Nuclear Power*, IAEA Nuclear Energy Series No. NG-G-3.1

(Rev. 1), and the evaluation conditions described in the IAEA publication *Evaluation of the Status of National Infrastructure Development*, IAEA Nuclear Energy Series No. NG-T-3.2 (Rev. 1).

- Identify the areas needing further actions to reach Milestone 1: Ready to make a knowledgeable commitment to a nuclear power programme;
- Provide recommendations and suggestions which can be used by Estonia and national institutions to prepare an action plan.

Relevant IAEA documents are listed in Appendix 3.

3. SCOPE OF THE MISSION

The INIR mission evaluated the status of the nuclear power infrastructure in Estonia covering all of the 19 Infrastructure Issues relative to the conditions identified in the above publications for Phase 1.

4. WORK DONE

Prior to the mission, the INIR team reviewed the self-evaluation report and supporting documentation that included relevant national laws, regulations, studies, and reports. The INIR team sought input from IAEA staff members with relevant expertise working with Estonia. INIR team meetings were conducted prior to the mission in Vienna, Austria from 19 to 20 October 2023 and in Tallinn on 22 October 2023.

The INIR mission was conducted from 23 to 30 October 2023. The meetings were held at the Ministry of Climate in Tallinn. The main interviews were conducted over four days. Estonia was well prepared for the mission and managed its participation in the review effectively. During the interviews, the Estonia counterparts provided an update on the current status of issues where progress had been made since the SER was finalized, and provided additional supporting documentation requested by the INIR team.

The preliminary draft report was prepared by the INIR team and discussed with the counterparts. The main mission results were presented to representatives of the Government in an exit meeting on 30 October 2023. The preliminary draft report was delivered to the counterparts during the exit meeting.

The results of the mission are summarized in Section 5 and presented in tabular form in Section 6 for each of the 19 Infrastructure Issues in Phase 1. Appendix 1 provides the evaluation results for each issue.

5. MAIN CONCLUSIONS

The INIR mission was conducted in a cooperative and open atmosphere. The INIR team concluded that Estonia has developed a comprehensive set of studies to enable the Government to make a knowledgeable decision regarding the nuclear power programme.

In order to assist Estonia in making further progress in its infrastructure development, the INIR team made 6 Recommendations and 6 Suggestions. The INIR team also identified 3 Good Practices that may benefit other countries considering the introduction of nuclear power.

Based on the Recommendations and Suggestions, the key areas for further action are summarized below:

- **The NEPIO needs to complete the comprehensive report and prepare to coordinate the nuclear power programme**

The NEPIO has commissioned a wide range of studies to identify the work required to develop a nuclear power programme. The NEPIO needs to complete its comprehensive report which, based on these studies, will recommend a way forward. The comprehensive report should include a clear timeline showing the major activities that need to be completed in order to give clear guidance on timescales and responsibilities for all organisations involved.

If the programme moves forward, the NEPIO will need to broaden its membership to ensure coordination of all organisations involved in the programme. The NEPIO will also need competencies to guide, oversee, and coordinate the work to meet the expectations of Estonia's nuclear power programme.

- **Estonia needs to give further consideration to the development of its legal and regulatory framework**

Estonia is party to almost all relevant international legal instruments and has initiated the review of its legal and regulatory framework to support a potential future nuclear power programme.

Estonia currently has a Radiation Safety Act and plans to develop a Nuclear Law to cover the additional requirements of a nuclear power programme. Estonia needs to further analyze the implications of having two acts as compared to one comprehensive Nuclear Law. Estonia also needs to determine the appropriate position of the future regulatory body in the governmental structure to help ensure its independence.

Estonia has also identified the need to ensure that the future regulatory body has the appropriate authority and resources to cover safety, security, and safeguards. As it will take some time to enact the Nuclear Law and associated regulations, Estonia needs to consider putting in place an interim mechanism that allows for the initial development of the future regulatory framework.

- **Estonia needs to finalize its plans and policies to support the next phase of the programme**

Estonia has developed several studies to support the country's considerations regarding the introduction of nuclear power. The NEPIO has developed a two-track strategy to support the future human resource needs of the key organizations. If the decision is taken to move to Phase 2, it is encouraged to initiate the early development of the long term national human resource strategy and organizational workforce plans.

Estonia needs to give further consideration to the process for site characterisation and licensing, including the role of the future owner/operator. It also needs to develop a policy for industrial involvement to support national participation in the nuclear power programme, and a structured plan to strengthen its State System of Accounting for Control of Nuclear Material.

RECOMMENDATIONS:

R-1.3.1 The NEPIO should issue the comprehensive report that, should it recommend a positive national decision, defines, and justifies a national strategy for nuclear power.

R-4.1.1 The NEPIO should complete its analysis of the funds required from government for Phase 2 and 3 and include the information in the comprehensive report.

R-5.2.1 Estonia should further analyse the risks and benefits and their implications of having two acts that establish the legal framework for safety, security, and safeguards and define the responsibilities and functions for its future regulatory body, as compared to one comprehensive Nuclear Law.

R-6.2.1 The NEPIO should develop a plan to strengthen the SSAC to support the nuclear power programme that includes outreach to relevant stakeholders to inform them about international safeguards obligations.

R-7.1.1 Estonia should determine an appropriate position of the regulatory body in the governmental structure to ensure its independence with the necessary mandate to define the final content of the regulations.

R-18.1.1 The NEPIO should develop a policy for national industrial involvement in the nuclear power programme.

SUGGESTIONS:

S-1.1.1 Estonia is encouraged to make a clear statement on its commitment to safety, security and non-proliferation.

S-1.2.1 Estonia is encouraged to broaden the membership of the NEPIO to ensure the necessary coordination between all the relevant stakeholders.

S-1.3.1 The NEPIO is encouraged to review the current timeline for development of nuclear power to ensure it provides clear guidance to all those involved in the programme.

S-7.1.1 Estonia is encouraged to consider putting in place an interim mechanism that allows for the initial development of the future regulatory body prior to the enactment of the Nuclear Law.

S-10.2.1 The NEPIO is encouraged to initiate the early development of the long term national human resource development strategy and workforce plans needed for the key organizations.

S-12.1.1 Estonia is encouraged to give further consideration to the process for site selection, characterisation, and licensing the site.

GOOD PRACTICES:

GP-1.2.1 The NEPIO commissioned a comprehensive set of detailed studies with the support of external experts. These studies provide the NEPIO with necessary information to be presented to the Government to support a knowledgeable decision.

GP-10.2.1 Estonia developed a two-track strategy to support the future human resource needs of the key organizations. This will allow recruitment of the appropriate skills from outside the country to support the initial phases of the programme, while recruiting and training the Estonian workforce. This approach aims to ensure the short-term and long term success of the nuclear power programme.

GP-12.1.2 In the siting studies, Estonia expanded its review to consider possible locations for the geological disposal of spent nuclear fuel. This gives greater confidence in the intended strategy for waste disposal and also in discussing waste management issues with the public.

6. EVALUATION RESULTS FOR PHASE 1

For the purposes of the INIR mission results, the following definitions are used:

Significant* actions needed:

The review observations indicate that important work still needs to be initiated or completed to meet the condition.

Minor* actions needed:

The review observations indicate that some additional work or steps are needed to meet the condition or that plans for the next phase need to be enhanced.

No actions needed:

The available evidence indicates that all the work to meet the condition has been completed.

* The judgment whether the actions are significant, or minor is based on the importance of the work to the overall programme and/or the resources needed to complete it. The classification is done through a consensus of the INIR team and is not based solely upon the judgment of any individual team member.

RECOMMENDATIONS:

Recommendations are proposed when the expectations of the condition have not been met. A recommendation should:

- Emphasize “what” needs to be done, not “how”;
- Be based on the IAEA Milestones Approach / Evaluation Methodology;
- Be succinct, self-explanatory and achievable;
- Be supported by the Review Observation text—a “gap” must be identified; already planned work can still be a recommendation if it is required to reach the milestone.

SUGGESTIONS:

Suggestions propose the consideration of new or different approaches to develop infrastructure and enhance performance, or to point out better alternatives to current work. A suggestion:

- Should be clear and self-explanatory;
- Should be supported by the Review Observation text;
- May relate to work already under consideration for the next phase.

GOOD PRACTICES:

A good practice is identified in recognition of an outstanding practice or arrangement, superior to those generally observed elsewhere. It is more than fulfilment of the conditions or expectation, and worthy of the attention of other countries involved in the development of nuclear infrastructure as a model in the drive for excellence.

It should be noted that the results summarized in the following tables neither validate the country actions and programmes, nor certify the quality and completeness of the work done by a country.

| | | | |
|--|-----------------------|--------------|-----------|
| 1. National position | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 1.1. Long term commitment made and importance of safety, security and non-proliferation recognized | | X | |
| 1.2. The Nuclear Energy Programme Implementing Organization (NEPIO) established | | X | |
| 1.3. National strategy defined | x | X | |
| 2. Nuclear safety | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 2.1. Key requirements of nuclear safety understood | | | x |
| 2.2. Support through international cooperation initiated | | | x |
| 3. Management | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 3.1. Need for appropriate leadership and management systems recognized | | | x |
| 4. Funding and financing | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 4.1. Strategies for funding established | | X | |
| 4.2. Potential strategies for financing identified | | | x |

| | | | |
|---|-----------------------|--------------|-----------|
| 5. Legal framework | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 5.1. Adherence to all relevant international legal instruments planned | | | x |
| 5.2. Plans in place for development of comprehensive national nuclear law | | X | |
| 5.3. Plans in place to enact and/or amend other legislation affecting the nuclear power programme | | | x |
| 6. Safeguards | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 6.1. Terms of international safeguards agreement in place | | | x |
| 6.2. Strengthening of the State System of Accounting for and Control of nuclear material (SSAC) planned | | X | |
| 6.3. Recommendations from any previous reviews or audits being addressed | | | x |
| 7. Regulatory framework | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 7.1. Development of an adequate regulatory framework planned | x | X | |
| 8. Radiation protection | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 8.1. Enhancements to radiation protection programmes planned | | | x |
| 9. Electrical grid | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 9.1. Electrical grid requirements considered | | | x |

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|--|-----------------------|--------------|-----------|
| 10. Human resource development | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 10.1. Necessary knowledge and skills identified, and gaps in current capability assessed | | | x |
| 10.2. Development of human resources planned | | X | |
| 11. Stakeholder involvement | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 11.1. Open and transparent stakeholder involvement programme initiated | | | x |
| 12. Site and supporting facilities | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 12.1. General survey of potential sites conducted and candidate sites identified | x | | |
| 13. Environmental protection | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 13.1. Environmental requirements considered | | | x |
| 13.2. Framework for environment protection reviewed | | | x |
| 14. Emergency planning | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 14.1. Requirements of, and resources for, developing an emergency response capability recognized | | | x |
| 14.2. Recommendations from any previous reviews or audits being addressed | | | x |

| | | | |
|--|-----------------------|--------------|-----------|
| 15. Nuclear security | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 15.1. Nuclear security requirements recognized and the actions of all relevant organizations coordinated | | | x |
| 15.2. Recommendations from any previous reviews or audits being addressed | | | x |
| 16. Nuclear fuel cycle | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 16.1. Options for nuclear fuel cycle (front-end and back-end) considered | | | x |
| 17. Radioactive waste management | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 17.1. The requirements for management of radioactive waste from NPP recognized | | | x |
| 17.2. Options for disposal of all radioactive waste categories understood | | | x |
| 18. Industrial involvement | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 18.1. National policy developed with respect to industrial involvement | x | | |
| 19. Procurement | Phase 1 | | |
| Condition | Actions Needed | | |
| | SIGNIFICANT | MINOR | NO |
| 19.1. Requirements for purchasing NPP services recognized | | | x |

APPENDIX 1: REVIEW OBSERVATIONS, RECOMMENDATIONS AND SUGGESTIONS FOR PHASE 1

| | | |
|---|--|----------------|
| 1. National Position | | Phase 1 |
| Condition 1.1: Long term commitment made and importance of safety, security and non-proliferation recognized | | |
| Summary of the condition to be demonstrated | A clear statement adopted by the government of its intent to develop a nuclear power programme and of its commitment to safety, security and non-proliferation, with evidence that their importance is embedded in the ongoing work programme. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) A clearly stated government commitment; (2) Evidence of clear responsibilities for each issue, with government coordination of activities. | |
| Observations | | |
| <p>In December 2019, the Ministry of the Environment submitted to the Estonian Government a memorandum on ‘Possibilities for the Introduction of Nuclear Energy in Estonia’.</p> <p>The country’s long term development strategy Estonia 2035, which was adopted by the <i>Riigikogu</i> (Parliament) in 2021, sets the goal of achieving climate neutrality by 2050. The long term climate policy strategy document entitled ‘General Principles of Climate Policy until 2050’ is being updated to integrate the same goal.</p> <p>Estonia’s 2030 National Energy and Climate Plan (NECP 2030) sees small modular reactors as one of the alternative ways to produce electricity in Estonia. Also, as one of the possible future trends for energy, the construction of a nuclear power plant has been highlighted by the National Spatial Plan ‘Estonia 2030+’.</p> <p>Preparation of the new Estonian Energy Sector Development Plan until 2035 (ENMAK 2035) is ongoing and due to be issued in 2025. ENMAK 2035 will consider the introduction of nuclear power as one of the possible scenarios.</p> <p>The Government of Estonia has not made a decision or adopted clear statement of its intent to develop a nuclear power programme. There are currently no documents or laws that specifically refer to a nuclear program or the associated obligations for the country. The INIR team was informed that the decision would be subject to the approval of the Parliament expected by mid–2024.</p> <p>As part of its mandate to address the 19 Issues of the Milestones Approach, the NEPIO has addressed the issues related to safety, security and safeguards as shown in its self-evaluation and the supporting documents. However, the Government's statement lacks clarity in explicitly emphasizing the significance of safety, security, and non-proliferation for the programme. The INIR team noted that going forward, the programme would benefit from such a statement.</p> | | |

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| Areas for further action | Significant | No |
| | Minor | Clear statement of government commitment to safety, security and non-proliferation. |
| RECOMMENDATIONS | | |
| R-1.1.1 | | |
| SUGGESTIONS | | |
| S-1.1.1 Estonia is encouraged to make a clear statement on its commitment to safety, security, and non-proliferation. | | |
| GOOD PRACTICES | | |
| GP-1.1.1 | | |
| 1. National Position Condition 1.2: The NEPIO established | | Phase 1 |
| Summary of the condition to be demonstrated | <p>The NEPIO:</p> <ul style="list-style-type: none"> (a) Has clear terms of reference that call for a comprehensive review of all the issues relevant to making a decision to proceed with a nuclear power programme; (b) Is recognized by all relevant ministries as having that role; (c) Reports to a senior minister or directly to the head of government; (d) Has appropriate human and financial resources; (e) Involves all relevant stakeholders, including the country's major utilities, the regulatory body for security and radiation safety, other relevant government agencies, legislative representatives and other decision makers. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) The charter establishing the NEPIO and to whom it reports; (2) Evidence that the roles and responsibilities of the NEPIO are known by all its members and by other government ministries; (3) A document defining objectives and timescales and an adequate scope of investigations; (4) A clear description of how the NEPIO operates in terms of funding, planning, reporting, scope of studies and use of consultants; (5) Evidence that the NEPIO has adequate skills to address all issues either directly or through commissioning specialist studies; | |

| | |
|--|---|
| | <p>(6) Evidence of relevant interactions between the head of NEPIO and appropriate ministries, such as those responsible for energy and the environment.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <p>— Describe the involvement of any project development organizations in the NEPIO activities.</p> |
| <p>Observations</p> <p>The NEPIO was established as an inter-ministerial working group by the Ministry of Environment with the Decree of the Minister on 20 April 2021. The NEPIO was led by the Secretary General of the Ministry of the Environment until June 2023 and from July 2023, it has been under the leadership of the Deputy Secretary General of the Ministry of Climate.</p> <p>In addition to the Ministry of Climate, members include the Environmental Board (current regulatory authority for radiation protection and nuclear safety), the Ministry of the Interior, the Ministry of Regional Affairs and Agriculture (formerly until July 2023 the Ministry of Finance), the Ministry of Justice, the Ministry of Education and Research, Consumer Protection and Technical Regulatory Authority, the Ministry of Defence, the Ministry of Foreign Affairs, the Ministry of Social Affairs and the Government Office.</p> <p>The terms of reference of the NEPIO were approved with the Decree of Secretary General of the Ministry of the Environment on 18 June 2021. The mandate of the NEPIO is to form coordinated views, including with the members of the public, on the possibilities of adopting nuclear energy in Estonia and to submit its conclusions and proposals to the Government of the Republic.</p> <p>The NEPIO was instructed to deliver an interim report by September 2022, and a comprehensive report, on the basis of which the Government can make a ‘Decision in Principle’ on the implementation of nuclear energy, has to be completed by the end of 2023. The final report is going to formulate recommendations on whether or under what conditions nuclear power plants could be built in Estonia.</p> <p>The budget of the NEPIO was incorporated into the budget of the Ministry of the Environment for the period of 2022–2023.</p> <p>The minutes of NEPIO meetings are documented and are publicly available.</p> <p>The NEPIO established two sub-working groups on spatial planning and on nuclear security and emergency preparedness and response. Those working groups gathered stakeholders beyond the NEPIO’s nominated members. The NEPIO also sub-contracted several studies performed with the support of external experts on:</p> <ul style="list-style-type: none"> — Legal framework; — Regulatory framework and human resource development; — Safeguards; | |

- Radiation protection;
- Stakeholder involvement;
- Site and supporting facilities;
- Emergency planning and nuclear security;
- Radioactive waste management.

Fermi Energia AS, a project development organization (not part of the NEPIO), contributed to the work of the NEPIO on technical (site and technology), commercial (cost, schedule and financing) and HR development matters. State-owned companies like ELERING AS and As-Low-As-Reasonably-Achievable (A.L.A.R.A. Ltd.) have participated in the outsourced work although not part of the NEPIO. The INIR team noted that including all key stakeholders in the NEPIO would assist with the successful implementation of the nuclear power programme.

The INIR team was informed that the NEPIO had a systematic process to review and approve the studies commissioned to organisations/companies or performed by Fermi Energia AS. Regular coordination meetings provided insights and feedback throughout the performance of the contracts. The final versions were reviewed with NEPIO’s working groups who were tasked to provide conclusions on what could be the potential solutions for Estonia. These studies provide the NEPIO with the necessary information to be presented to the Government for a knowledgeable decision.

| | | |
|---------------------------------|--------------------|--|
| Areas for further action | Significant | No |
| | Minor | Involvement of relevant organisations in the NEPIO |

RECOMMENDATIONS

R-1.2.1

SUGGESTIONS

S-1.2.1 Estonia is encouraged to broaden the membership of the NEPIO to ensure the necessary coordination between all the relevant stakeholders.

GOOD PRACTICES

GP-1.2.1 The NEPIO commissioned a comprehensive set of detailed studies with the support of external experts. These studies provide the NEPIO with the necessary information to be presented to the Government to support a knowledgeable decision.

1. National Position

Condition 1.3: National strategy defined

Phase 1

Summary of the condition to be demonstrated

A comprehensive report, defining and justifying the national strategy for nuclear power, including:

(a) An analysis of energy demand and energy alternatives;

| | |
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| | <p>(b) An evaluation of the impacts of nuclear power on the national economy, for example gross domestic product and employment;</p> <p>(c) A preliminary technology assessment to identify technologies that are consistent with national expectations;</p> <p>(d) Consideration of siting possibilities and grid capacity;</p> <p>(e) Consideration of financing options, ownership options and operator responsibilities;</p> <p>(f) Consideration of long term costs and obligations relating to spent fuel, radioactive waste and decommissioning;</p> <p>(g) Consideration of the human resource needs and external support needs of the regulatory body and the owner/operator;</p> <p>(h) Recognition that there remains a non-zero possibility of a severe accident and the need to deal with the consequences of such an accident will need to be addressed;</p> <p>(i) Consideration of the demands of each of the infrastructure issues and a plan for how they will be met in the next phase of development.</p> <p>Note: Any prefeasibility study conducted during Phase 1 can provide significant input to the comprehensive report, although it is important that the report fully address all 19 infrastructure issues.</p> |
| <p>Examples of how the condition may be demonstrated</p> | <p>(1) List of the studies that are feeding into the report(s)</p> <p>(2) Current status and conclusions</p> <p>(3) Contents list for the report(s)</p> <p>(4) Executive summary of the report(s)</p> <p>(5) Evidence of ministerial review of the report(s)</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any plans for use of SMRs other than electricity production, e.g., desalination, district heating, hydrogen production, other; — Describe any considerations on the interface between the NPP and co-located non-nuclear facilities in the case of non-electrical application (e.g., ownership, safety, security, economics, siting, licensing of co-located non-nuclear facilities); — Describe any plans to build several units of SMRs in sequence at the same site. |
| <p>Observations</p> <p>A comprehensive report, to enable the government to make an informed decision on the implementation of a nuclear power programme, has to be completed by the end of 2023. The final comprehensive report</p> | |

will cover all 19 Infrastructure Issues and will formulate recommendations on whether or under what conditions nuclear power plants could be built in Estonia.

Following government approval, the report will be forwarded to the Parliament for a ‘Decision in Principle’ creating an enabling environment to prepare the necessary infrastructure for possible nuclear projects, advancing the nuclear programme to Phase 2 of the IAEA Milestones Approach. Studies for the Estonian Energy Sector Development Plan until 2035 and NEPIO’s nuclear energy considerations are currently focused on electricity production to guarantee base load and dispatchable power for Estonia after phasing out from oil shale.

The NEPIO has developed a provisional timeline for the nuclear power programme. The INIR team noted that the timeline does not appear to be consistent with the planned activities of the programme and thus needs to be reviewed and updated to give clear guidance to all those involved.

The INIR team was informed that the NEPIO is preparing a budget and implementation timeline for the period 2024–2035 (Phases 2 and 3), which encompasses the expected timeline for implementing the nuclear program up to the commencement of SMR operation. It will be consolidated by the NEPIO for inclusion in the comprehensive report.

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| Areas for further action | Significant | Comprehensive report |
| | Minor | Nuclear power programme development timeline |

RECOMMENDATIONS

R-1.3.1 The NEPIO should issue the comprehensive report that, should it recommend a positive national decision, defines, and justifies a national strategy for nuclear power.

SUGGESTIONS

S-1.3.1 The NEPIO is encouraged to review the current timeline for development of nuclear power to ensure it provides clear guidance to all those involved in the programme.

GOOD PRACTICES

GP-1.3.1

| 2. Nuclear Safety | | Phase 1 |
|---|--|----------------|
| Condition 2.1: Key elements of nuclear safety understood | | |
| Summary of the condition to be demonstrated | The key requirements for nuclear safety, specified in the IAEA safety standards, are understood by the NEPIO and other relevant stakeholders, and their implications are recognized. | |
| Examples of how the condition may be demonstrated | <p>(1) Evidence that the NEPIO has an understanding of, and commitment to, nuclear safety and the principles described in IAEA Safety Standards Series No. SF-1, Fundamental Safety Principles [8], and is aware of how nuclear safety requirements are taken into account in various designs of nuclear power plants (NPPs);</p> <p>(2) Evidence that the responsibility for nuclear safety is recognized, for example in consideration of leadership, funding and expertise;</p> <p>(3) Evidence that the need to develop adequate capability and skills in nuclear safety is recognized;</p> <p>(4) Evidence of familiarity with IAEA safety standards and other States' practices, and recognition of the need for, and commitment to, the development of national safety standards.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe how NEPIO and other organizations follow the international developments in safety requirements specific to SMR designs considered; — Describe the approach in any project development organizations to develop capacity in nuclear safety. | |
| Observations | | |
| <p>Estonia hosted an Integrated Regulatory Review Service (IRRS) Mission in 2016 and a Follow-up Mission in March 2019, for the radiation safety regulatory framework. Furthermore, Estonia participates actively in meetings of the Contracting Parties to the Convention on Nuclear Safety. The studies conducted by Estonia in Phase 1 to support its infrastructure development took into account several IAEA Safety Standards.</p> <p>The NEPIO and key stakeholders in Estonian organisations improved their understanding on nuclear safety by participating in seminars in Estonia and abroad, study trips to the United States, Japan, Finland and France and bilateral meetings with regulators in Finland, Japan, Canada, and the United States. In addition, Fermi Energia AS, with the support of the JAIF International Cooperation Centre (JICC) from Japan, organized technical seminars in Estonia for the NEPIO and other organisations which included safety aspects.</p> | | |

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| <p>The INIR team was informed that the Environmental Board, in coordination with universities, is gathering information on key safety aspects of SMRs from the IAEA SMR Regulators’ Forum reports, outcomes from SMR regulatory reviews in the United States and Canada and participation in various events.</p> <p>Fermi Energia AS follows closely the IAEA SMR Regulators’ Forum recommendations and guidelines. In addition to IAEA safety requirements, both the European Atomic Energy Community (EURATOM) directives and the Western European Nuclear Regulators Association (WENRA) safety objectives regarding the current approach to evaluation of nuclear safety are also considered by Fermi Energia AS.</p> | | |
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-2.1.1 | | |
| SUGGESTIONS | | |
| S-2.1.1 | | |
| GOOD PRACTICES | | |
| GP-2.1.1 | | |
| 2. Nuclear Safety | | Phase 1 |
| Condition 2.2: Support through international cooperation initiated | | |
| Summary of the condition to be demonstrated | The need for international cooperation and open exchange of information related to nuclear safety as an essential element is recognized and demonstrated. | |
| Examples of how the condition may be demonstrated | <p>(1) Evidence of review of options for bilateral or regional cooperation and specific actions for selected cooperation started, especially with countries with an established nuclear power programme</p> <p>(2) Implementation of a national technical cooperation programme with the IAEA and evidence of government financial support including nuclear safety aspects</p> <p>Additional guidance for SMR projects for Phase 1: — Describe any involvement of NEPIO and other organizations in various international initiatives and forums covering nuclear safety for SMRs.</p> | |

Observations

The Environmental Board of Estonia signed bilateral Memorandums of Understanding (MoUs) with the Radiation and Nuclear Safety Authority of Finland (STUK) in May 2019 and with the Canadian Nuclear Safety Commission (CNSC) in May 2023. These MoUs have general provisions that address nuclear safety and facilitate exchange of information in this area. The INIR team was informed that a MoU is also planned with the United States Nuclear Regulatory Commission.

The INIR team was informed that the implementation of these MoUs has allowed the Environmental Board to exchange information on the regulatory framework in Canada and Finland as well as the outcomes of the Canadian regulatory evaluation of SMR designs.

NEPIO held several meetings with governmental organisations from France, Japan, Canada, Germany, and the United Kingdom on possible cooperation activities.

Estonia collaborates with the IAEA. Building capacity on nuclear safety is included into the Estonian Country Programme Framework (CPF) for the period of 2022–2027.

Estonia is planning to participate in the European SMR Partnership, IAEA SMR Regulators' Forum, WENRA (Western European Nuclear Regulators Association) and WANO (World Association of Nuclear Operators) activities.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS**R-2.2.1****SUGGESTIONS****S-2.2.1****GOOD PRACTICES****GP-2.2.1**

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|--|---|----------------|
| 3. Management | | Phase 1 |
| Condition 3.1: Need for appropriate leadership and management systems recognized | | |
| Summary of the condition to be demonstrated | There is a commitment to leadership and management systems that will ensure success and promote a safety and security culture as well as the peaceful use of nuclear technologies. There are plans to ensure the knowledge gained by the NEPIO is transferred to the future regulatory body and the owner/operator of the programme. | |
| Examples of how the condition may be demonstrated | <p>(1) Plans to ensure appointment of leaders with the appropriate training and experience to plan, procure, construct and operate an NPP as well as to ensure the leadership and management of nuclear safety, security and safeguards;</p> <p>(2) Evidence that the importance of nuclear safety and security culture in each of the organizations to be established is recognized;</p> <p>(3) Evidence that the importance of ensuring the peaceful use of nuclear technology is recognized;</p> <p>(4) Evidence of a clear understanding of management system requirements;</p> <p>(5) A plan to implement management systems in future key organizations is consistent with the appropriate standards and guidance.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <p>— Describe the arrangements for transferring knowledge previously gained by any project development organizations to NEPIO and future organizations.</p> | |
| Observations | | |
| <p>The NEPIO is aware of the requirements for leadership and management for safety in accordance with the IAEA Safety Standard GSR Part 2 and guides, notably General Safety Guides GS-G-3.1, GSG-12, and GSG-13. The regulatory body has hosted an IRRS mission that included a review of its leadership and management for safety. Fermi Energia AS currently has a staff of 20 and several of them have experience of working in the nuclear industry. Fermi Energia AS is committed to developing a future owner/operator organization with high safety culture and has core values of openness, honesty, and integrity. As examples of their approach, the INIR team was informed that Fermi Energia AS have a safety moment during the weekly Monday meetings and conduct internal seminars on safety culture to ensure everyone (from office staff to managers) understand the topic. They are developing procedures for developing, improving, and reviewing safety culture.</p> | | |

Regarding future leaders, both the regulatory body and Fermi Energia AS plan initially to recruit experienced senior leaders from foreign nuclear programmes. In parallel they are developing potential future leaders using several international leadership development programmes. The NEPIO has a core team of about 10 potential future leaders who are involved in these programmes and other exchange opportunities. They plan to increase this number as the programme develops.

The management system of the Environmental Board applies a process management model and processes cover all the important activities of the organization. Their continuous development is one of the principles of the system. Feedback from customers and various stakeholders is an important part of the management system of the Environmental Board. One staff member of the Climate and Radiation Protection department is responsible for the operation and review of their Quality Management System.

Following a decision to proceed with a nuclear power program, the leadership team of the new regulatory body, will develop a project plan to establish and implement a Management System (MS). The initial development will focus on the current workflow and evolve as needed in the later phases of the programme.

The NEPIO recognises that the management system should:

- Consist of processes and internal guides;
- Ensure that responsibilities are properly discharged;
- Foster and support a safety culture;
- Provide for monitoring and improvement of internal processes;
- Include processes for assessment, review and audit.

It notes that documents should be structured at three levels:

- Organisation manual (vision, mission, goals, policy statements, responsibilities, and accountabilities);
- Process descriptions;
- Working-level documents (procedures, instructions, forms, and templates, etc).

It also notes that the process model should consist of three main sets of processes: management processes, core processes (regulations and guides, authorization of facilities and activities, review and assessment, inspection and enforcement, emergency planning and response, stakeholder communication and consultation) and support processes.

The INIR team was informed that the resource plan for the future regulatory body is relatively high level and does not specify the resources that will be allocated to MS development.

Fermi Energia AS has developed the Fermi Energia Management System (FMS) top manual that describes the overall structure of the management system, including leadership principles, organization functions, decision making and high-level processes and tools. FMS Development Plan is under development and should be completed by the end of the year. It will describe all the processes that need to be developed and when they need to be developed to reach safe and stable nuclear power generation.

As part of the development work, they have mapped the requirements of the relevant ISO standards and IAEA requirements. They have also held several workshops to discuss what processes need to be developed and when.

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| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-3.1.1 | | |
| SUGGESTIONS | | |
| S-3.1.1 | | |
| GOOD PRACTICES | | |
| GP-3.1.1 | | |

| 4. Funding and Financing | | Phase 1 |
|--|---|----------------|
| Condition 4.1: Strategies for funding established | | |
| Summary of the condition to be demonstrated | <p>Mechanisms have been defined for funding a range of key activities that are specific to a nuclear power programme but may not be the fiscal responsibility of the owner/operator. The activities include:</p> <ul style="list-style-type: none"> (a) Establishing the legal framework; (b) Activities of the regulatory body for safety, security and safeguards; (c) The government’s stakeholder involvement programme; (d) Siting and environmental protection activities that are the responsibility of the government; (e) Emergency preparedness and response (EPR); (f) Education, training and research; (g) Any required improvements to the electrical grid, if such improvements are the government’s responsibility; (h) Any proposed incentives and direct government support to promote localization; (i) Storage and disposal of radioactive waste, including spent fuel; (j) Decommissioning of the NPP. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) Clear statements of how the above areas will be funded, based on a consideration of options (2) Evidence that the scale of the costs of each of these activities has been recognized <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe the studies to assess the funding requirements for the radioactive waste and spent fuel management from SMRs considered (e.g., cost per megawatt). | |
| Observations | | |
| <p>The NEPIO’s activities to date have been funded from the budget of the Ministry of Climate (former Ministry of the Environment) together with an additional amount allocated from the state budget. Research and development funds from European Union Structural Funds are also used for certain topics.</p> <p>The NEPIO is developing an ‘investment plan’ which will identify the key areas needing funding and an estimated budget for each year of Phase 2 and 3. The cost estimates will be based on the analysis documents and input from relevant ministries. Currently the plan includes initial estimates for establishing and staffing the regulatory body, hiring consultancy support, costs for supporting universities in development of courses, and increasing of NEPIO staff. These initial estimates are being</p> | | |

reviewed for consistency with the detailed plans, and the costs of other areas (e.g., emergency planning and security and additional input from the Ministry of Education), as well of potential Technical Support Organization (TSO), support for the regulator, will also need to be included.

The INIR team noted the importance of completing this work and including the conclusions in the comprehensive report.

The plan will present cost estimates as a range rather than fixed values.

The ‘investment plan’ will also discuss the sources of funding. As well as government funding, other potential sources may include the European Union’s structural funds, and the IAEA’s technical cooperation funds. The intention is to complete the plan by the end of November.

The INIR team was informed that in the longer-term Estonia intends to fund the costs of the new regulatory body through a combination of licence fees and direct government funding.

The INIR team noted that the IAEA publication on *Resource Requirements for Nuclear Power Infrastructure Development*, IAEA Nuclear Energy Series No. NG-T-3.21, may be useful in the review and finalization of the current information.

The grid operator (ELERING AS) has carried out a study (see Issue 9) and has already identified the costs related to grid connection and strengthening. These costs will be the responsibility of the owner/operator.

A national fund will be created to accumulate provisions for the cost of spent nuclear fuel and decommissioning.

The operator will be responsible for funding the costs of operational waste. The INIR team was informed that the intention is to include facilities for storage, processing and disposal of low and intermediate level waste in the initial construction project. The facilities will be designed to take the waste produced over the lifetime of the plant. The initial NPP design currently considered by Fermi Energia AS will include storage facilities for 8 years of spent nuclear fuel. Fermi Energia AS is planning to include construction of an interim storage facility as part of the initial construction.

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| Areas for further action | Significant | No |
| | Minor | Government funding for Phase 2 and 3 |

RECOMMENDATIONS

R-4.1.1 The NEPIO should complete its analysis of the funds required from government for Phase 2 and 3 and include the information in the comprehensive report.

SUGGESTIONS

S-4.1.1

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| GOOD PRACTICES | |
| GP-4.1.1 | |
| 4. Funding and Financing | |
| Condition 4.2: Potential strategies for financing identified | |
| Phase 1 | |
| Summary of the condition to be demonstrated | <p>Potential options have been identified with financial and risk management strategies, which together:</p> <ul style="list-style-type: none"> (a) Create sufficient confidence for lenders and investors to support an NPP project; (b) Ensure the long term viability of the owner/operator to fulfil all its responsibilities. <p>Note: A large part of the government’s role in nuclear power financing, if the government is not directly a sponsor of the project, relates to financial risk reduction.</p> |
| Examples of how the condition may be demonstrated | <p>A review of financing options and risk management strategies, considering the long term economics and risks associated with the NPP and including the extent of government funding, equity partners and borrowing, among other things.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe how potential ownership, financial and risk management strategies consider the plans for the utilization of the SMRs. |
| Observations | |
| <p>The NEPIO considerations are based on the assumption that the private sector will be responsible for the financing of the NPP. However, the potential scenario where the State holds equity in the project is also considered.</p> <p>Fermi Energia AS believes it is feasible to finance the development phase of the project through Estonian private investors, international financial investors, and regional utility investors. Both Latvenergo and Vattenfall AB have an interest in the project, particularly after the recent disruption of gas and electricity supply and the termination of the Fennovoima project.</p> <p>Fermi Energia AS plans to develop a set of a risk management measures to avoid the need for sovereign guarantees for lenders.</p> <p>Fermi Energia AS will gradually increase its share capital and the number of shareholders between 2023 and 2029. They are also open to Estonian state participation when the state has made a decision</p> | |

to implement nuclear energy as part of its strategy to achieve decarbonization, security of supply of electricity and economic development for a ‘Just Transition’ in the oil shale mining region of Ida-Virumaa.

Fermi Energia AS has conducted a financing strategy study with Vattenfall AB and a market study with Latvenergo AS. These studies have identified the key issues related to financing the project and ensuring its viability.

Fermi Energia AS aim to have above 50% of power generation covered with long term (15 year) fixed price Power Purchasing Agreements (PPAs). They are also open to the use of Contract for Difference mechanisms to minimize investment risk.

Fermi Energia AS has signed MoUs with 95 industrial companies in Estonia and Latvia for 15 PPAs covering more than 500 GWh of generation. It intends to develop and agree ‘conditional PPA’s’ with several consumers. Once the construction licence has been given, the intention is that these will automatically transfer to actual PPA’s.

Whilst NEPIOs nuclear energy considerations are focused on electricity production, recent developments and plans by Fermi Energia AS are also considering district heating. Fermi Energia AS believes that district heating can offer at least 50% lower cost compared to biomass or fossil fuel heating and is aligned with decarbonization and resource efficiency policies of Estonia.

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| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-4.2.1 | | |
| SUGGESTIONS | | |
| S-4.2.1 | | |
| GOOD PRACTICES | | |
| GP-4.2.1 | | |

| 5. Legal Framework Condition 5.1: Adherence to all relevant international legal instruments planned | | Phase 1 |
|--|--|----------------|
| Summary of the condition to be demonstrated | <p>There is an understanding of the requirements of the relevant international legal instruments, their implications and a commitment to adhere to them. The following instruments are covered:</p> <ul style="list-style-type: none"> (a) Convention on Early Notification of a Nuclear Accident (INFCIRC/335); (b) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (INFCIRC/336); (c) Convention on Nuclear Safety (INFCIRC/449); (d) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the ‘Joint Convention’) (INFCIRC/546); (e) Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev.1) and Amendment thereto (INFCIRC/274/Rev.1/Mod.1); (f) Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/500); (g) Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/566); (h) Convention on Supplementary Compensation for Nuclear Damage (INFCIRC/567); (i) Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (INFCIRC/402); (j) Comprehensive safeguards agreement — based on The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153 (Corrected)); (k) Additional protocol — following the provisions of Model Protocol Additional to the Agreement(s) Between States(s) and the International Atomic Energy Agency for the Application of Safeguards (INFCIRC/540 (Corrected)); (l) Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) Plans for when each of the instruments will be adhered to (2) Identification of the actions that will need to be undertaken and the required timescales (3) Evidence that the resources required are understood and have been defined <p>Additional guidance for SMR projects for Phase 1:</p> | |

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| | <ul style="list-style-type: none"> — Describe any investigation of issues relevant to international legal instruments adopted under the auspices of other international organizations related to transportable reactors (e.g., International Maritime Organization); — Describe any investigation of issues relevant to the civil liability legal framework for transportable reactors (e.g., transfer of liability). |
|--|---|

Observations

Estonia is currently a party to all international legal instruments covered under this condition with the exception of the two following conventions related to civil liability for nuclear damage:

- Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/566); and
- Convention on Supplementary Compensation for Nuclear Damage (INFCIRC/567).

Estonia is currently drafting its Nuclear Law which is expected to be consistent with the Vienna Convention and the Protocol, however, the INIR team was informed that Estonia will continue to analyse the Convention on Supplementary Compensation for Nuclear Damage (CSC). The INIR team was informed that the final decision on which nuclear liability instrument(s) the country will join, will be influenced by the selection of potential technology providers as some of them might require the adherence to the CSC. The INIR team was also informed that should Estonia need to join the CSC in the future due to a specific technology selection, the Nuclear Law would be amended as necessary.

Since Estonia currently has no operating nuclear power plants on its territory, Estonia is not obligated to implement the provisions of the Convention on Nuclear Safety or the Joint Convention that relate to nuclear power plants (NPPs) or spent nuclear fuel and radioactive waste management resulting from the operation of NPPs. These obligations, which will apply to a potential future nuclear power program, are understood by the country.

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|---------------------------------|--------------------|----|
| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-5.1.1

SUGGESTIONS

S-5.1.1

GOOD PRACTICES

GP-5.1.1

| 5. Legal Framework Condition 5.2: Plan in place for development of a comprehensive national nuclear law | | Phase 1 |
|--|---|----------------|
| Summary of the condition to be demonstrated | <p>There is an understanding of the requirements of the comprehensive national nuclear law that needs to be enacted, a plan with the actions and timescales for development and enactment, together with a commitment from the government to achieve the stated plan. The plan includes the need for the law to:</p> <ul style="list-style-type: none"> (a) Establish an independent nuclear regulatory body with adequate human and financial resources, and a clear and comprehensive set of functions; (b) Identify responsibilities for safety, security and safeguards; (c) Formulate safety principles and rules (radiation protection, nuclear installations, radioactive waste and spent fuel management, decommissioning, mining and milling, EPR and the transport of radioactive material); (d) Formulate nuclear security principles; (e) Give appropriate legal authority to, and define the responsibilities of, the regulatory body and all competent authorities establishing a regulatory control system (authorization, inspection and enforcement, review and assessment, and development of regulations and guides); (f) Implement IAEA safeguards, including a State system of accounting for and control of nuclear material (SSAC); (g) Implement import and export control measures for nuclear and radioactive material and items; (h) Establish compensation mechanisms for nuclear damage. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) A plan on how the law will be developed and approved (2) A summary of how each of the areas listed above will be addressed within the law (3) Interactions with the IAEA and the other relevant organizations <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any investigation of issues relevant to the licensing process for SMRs depending on the deployment options considered (e.g. applicable licensing steps, acceptance of licenses issued in other countries); — Describe any considerations of nuclear liability limits for SMR operators. | |

Observations

The NEPIO hired a consultant to develop a ‘mapping’ of the legal framework to inform the future development of the nuclear power programme.

This study proposed three options for the further development of the legal framework:

- The current Radiation Act will remain in force, and the Nuclear Law will regulate nuclear matters.
- The current Radiation Act will remain in force, and two more laws will be introduced - the Nuclear Law and the Nuclear Operator’s Liability Act.
- A new Nuclear Law will be created, incorporating requirements for all radiation activities and nuclear energy-related aspects into a single comprehensive law, which will also replace the Radiation Act.

The NEPIO decided to proceed with the first option and related requirements will be divided between the existing Radiation Act and the new Nuclear Law, respectively. The scope of the Radiation Act will be narrower, focusing on the regulation of non-nuclear radiation activities and radiation safety issues.

The INIR team was informed that the justification for this decision was to prevent changes to the existing licensing process that has worked for 20 years (currently >500 licensees) and to limit the overall size of the law. The process of drafting the Nuclear Law is currently underway and it covers nuclear safety, security, safeguards, and liability.

The INIR team noted the need to ensure that there are no gaps, unnecessary overlaps, and inconsistencies between the two laws, as well as a clear delineation of the functions of the regulatory body with other bodies and competent authorities. In this context, the INIR team also noted that having two laws that define responsibilities and function for the same regulator body may lead to duplication and/or conflicting requirements that could be avoided by having one comprehensive Nuclear Law.

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|---------------------------------|--------------------|---------------------------|
| Areas for further action | Significant | No |
| | Minor | Comprehensive Nuclear Law |

RECOMMENDATIONS

R-5.2.1 Estonia should further analyse the risks and benefits and their implications of having two acts that establish the legal framework for safety, security, and safeguards and define the responsibilities and functions for its future regulatory body, as compared to one comprehensive Nuclear Law.

SUGGESTIONS

S-5.2.1

GOOD PRACTICES

GP-5.2.1

| 5. Legal Framework | | Phase 1 |
|---|---|----------------|
| Condition 5.3: Plans in place to enact and/or amend other legislation affecting the nuclear power programme | | |
| Summary of the condition to be demonstrated | <p>There is an understanding of which legislation that affects the nuclear power programme needs to be enacted and/or amended, the timescales for its development and approval, together with a commitment from the government to achieve the stated plan. The legislation to be considered includes that on:</p> <ul style="list-style-type: none"> (a) Environmental protection; (b) EPR; (c) Occupational health and safety of workers; (d) Protection of intellectual property; (e) Local land use controls; (f) Foreign investment; (g) Taxation, fees, electricity tariffs and incentives; (h) Roles of national and local governments; (i) Stakeholders and public involvement; (j) International trade and customs; (k) Financial guarantees and any other required financial legislation; (l) R&D. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) A plan on how the legislation will be developed and approved; (2) A summary of how each of the areas listed above will be addressed within the proposed legislation; (3) Interactions with the IAEA and the other relevant organization. | |
| <p>Observations</p> <p>Through the legal ‘mapping’ analysis, the NEPIO identified other national legislation that may need to be enacted or amended for the nuclear power programme. These include, among others, the following:</p> <ul style="list-style-type: none"> — Environmental Protection: <ul style="list-style-type: none"> ▪ General Part of the Environmental Code Act; ▪ Industrial Emissions Act; ▪ Water Act; ▪ Environmental Charges Acts; ▪ Regulation No. 102 dated 01.10.2015; ▪ Planning Act; ▪ Regulation No. 133 dated 17.12.2015. — Emergency Preparedness and Response: <ul style="list-style-type: none"> ▪ Emergency Act. — Occupational Health and Safety of Workers <ul style="list-style-type: none"> ▪ Occupational Health and Safety Act. | | |

- Local Land Use Controls
 - Acquisition of Immovables in Public Interest Act;
- Foreign Investment
 - Law on Assessment of Credibility of Foreign Investments;
- Taxation, Fees, Electricity Tariffs and Incentives
 - Electricity Market Act;
 - Energy Sector Organisation Act;
 - State Fees Act;
- Roles of National and Local Governments
 - Government of the Republic Act;
- Stakeholders and Public Involvement
 - Environmental Impact Assessment and Environmental Management System Act;
 - Public Information Act;
- International Trade and Customs
 - Strategic Goods Act;
- Financial Guarantees and Any Other Required Financial Legislation
 - Radiation Act;
 - General Part of the Economic Activities Code Act;
 - Recognition of Foreign Professional Qualifications Act;
- Research and Development
 - National Radiation Safety Development Plan.

The INIR team was informed that the NEPIO will establish a dedicated working group to develop a timetable for revising the legislation. The necessary amendments will be divided into specific topics:

- Modifications of Legal Substance (e.g., necessary changes to the Electricity Market Act, Planning Act, Rescue Act etc.)
- Institutional Amendments (such as changes to the Government of the Republic Act, Statutes of Ministry of Climate, Environmental Board and other governmental authorities);
- Technical Amendments (such as replacement of references to Environmental Board with references to the New Regulator).

The INIR team was informed that the necessary proposed amendments will be introduced in the Parliament as a package together with the draft new Nuclear Law and the selected liability instrument(s).

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-5.3.1

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| SUGGESTIONS |
| S-5.3.1 |
| GOOD PRACTICES |
| GP-5.3.1 |

| 6. Safeguards | | Phase 1 |
|--|---|----------------|
| Condition 6.1: Terms of international safeguards agreement in place | | |
| Summary of the condition to be demonstrated | <ul style="list-style-type: none"> (a) The Member State has a comprehensive safeguards agreement with associated subsidiary arrangements in force with the IAEA; (b) If the Member State currently has concluded a small quantities protocol to its comprehensive safeguards agreement, a plan needs to be developed setting out the necessary steps to rescind the small quantities protocol in a timely manner; (c) The Member State is aware of the requirements of the additional protocol; if the Member State has made the decision to ratify the additional protocol but has not already done so, a plan is in place for the timely ratification. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) Plans for rescinding the small quantities protocol and/or for ratification of the additional protocol, including the actions that need to be taken, clear assignment of responsibilities and understanding of the resources and the required timescales; (2) Evidence that the need for outreach activities is recognized to ensure that all existing and future entities having to report to the State authority for safeguards are aware of their roles and obligations. | |
| <p>Observations</p> <p>Estonia is party to the Treaty on the Non-Proliferation of Nuclear Weapons and the Euratom Safeguards Agreement (INFCIRC/193) and the Additional Protocol. Estonia's Environmental Board submits information required under most articles of the Additional Protocol to the IAEA and to EURATOM, while EURATOM submits some information required under other articles of the Additional Protocol to the IAEA.</p> <p>The INIR Team was informed that subsidiary arrangements entered into force on 1 March 2014 under INFCIRC/193.</p> | | |
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-6.1.1 | | |
| SUGGESTIONS | | |
| S-6.1.1 | | |

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| GOOD PRACTICES | |
| GP-6.1.1 | |
| 6. Safeguards | Phase 1 |
| Condition 6.2: Strengthening of the SSAC planned | |
| Summary of the condition to be demonstrated | The Member State has a plan describing how the existing SSAC will be strengthened or adjusted to deal with the increase of activities and resources, as well as the need for enhancement of capabilities. |
| Examples of how the condition may be demonstrated | <p>(1) Evidence that the NEPIO includes a representative knowledgeable in the requirements of the comprehensive safeguards agreement;</p> <p>(2) A plan produced by the NEPIO covering the enforcement of national legislation, policies and procedures relevant to safeguards; the development of the legislation itself is covered under infrastructure issue No. 5, legal framework;</p> <p>(3) Evidence that approaches undertaken by one or more States with existing nuclear power programmes have been reviewed and the information gained has been adapted for the national context.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any (planned) interactions regarding safeguards obligations with State/Regional Authority Responsible for Safeguards, IAEA and potential technology providers. — Describe any investigation of issues relevant to safeguards regarding the SMR designs/modes of deployment considered (e.g., fuel type, sealed core, transportable reactors). |
| Observations | |
| <p>Studies commissioned by the NEPIO have assessed the existing SSAC, including the relevant legal and regulatory framework, and provided recommendations that should be taken to strengthen the SSAC in later phases in support of a potential nuclear power programme if the Government makes a positive ‘Decision in Principle’. These recommendations take IAEA guidance and the experience of other countries into account.</p> <p>The INIR Team was informed that currently there is no plan in place to enhance the existing SSAC that details responsibilities or timelines for executing the study recommendations.</p> | |

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| <p>The INIR team noted the importance of conducting outreach to increase the overall awareness of international safeguards among the relevant stakeholders involved in the programme.</p> <p>Estonia has considered general issues relevant to safeguards regarding SMRs and noted the importance of safeguards by design (SBD). The INIR Team was informed that Estonia has had three bilateral consultations with the IAEA since 2021 regarding how to address safeguards as part of the process of potentially developing a new nuclear power programme, which included discussions regarding SMR technologies and SBD. The country plans to continue these discussions with the IAEA and other relevant stakeholders, such as EURATOM, should the Government make a positive ‘Decision in Principle’.</p> | | |
| Areas for further action | Significant | |
| | Minor | Plan to strengthen SSAC |
| RECOMMENDATIONS | | |
| R-6.2.1 The NEPIO should develop a plan to strengthen the SSAC to support the nuclear power programme that includes outreach to relevant stakeholders to inform them about international safeguards obligations. | | |
| SUGGESTIONS | | |
| S-6.2.1 | | |
| GOOD PRACTICES | | |
| GP-6.2.1 | | |
| 6. Safeguards | | Phase 1 |
| Condition 6.3: Recommendations from any previous reviews or audits being addressed | | |
| Summary of the condition to be demonstrated | If any reviews or audits have been conducted on the existing safeguards provisions, there is evidence that the actions resulting from it are progressing. | |
| Examples of how the condition may be demonstrated | Action plans resulting from a review or audit with progress identified indicating the required timescales, responsibilities and resources required. | |
| Observations | | |
| No review or audit has been conducted on the existing safeguards provisions. | | |
| Areas for further action | Significant | No |
| | Minor | No |

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| RECOMMENDATIONS |
| R-6.3.1 |
| SUGGESTIONS |
| S-6.3.1 |
| GOOD PRACTICES |
| GP-6.3.1 |

| 7. Regulatory Framework | | Phase 1 |
|--|---|---------|
| Condition 7.1: Development of an adequate regulatory framework planned | | |
| <p>Summary of the condition to be demonstrated</p> | <p>The prospective senior managers of the regulatory body have been identified. There are plans to develop a regulatory framework for nuclear safety, nuclear security and safeguards that matches the overall plan for the NPP, and includes:</p> <ul style="list-style-type: none"> (a) Designation of an effectively independent competent regulatory body with clear authority, adequate human and financial resources, and strong government support; (b) Assignment of core safety, security and safeguards regulatory functions for developing regulations, review and assessment, authorization, inspection, enforcement and public information; (c) Authority and resources to obtain technical support as needed; (d) A clear definition of the relationship of the regulatory body to other organizations (e.g., technical support organizations and environmental agency); (e) Clearly defined responsibilities of licensees; (f) Authority to implement international obligations, including IAEA safeguards; (g) Authority to engage in international cooperation; (h) Provisions to protect proprietary, confidential and sensitive information; (i) Provisions for stakeholder involvement and communication with the public. <p>There are agreed terms of reference for each regulator and a clear definition of roles of, and interfaces with, other regulators. There is recognition of the need for integrating existing security and radiation safety regulations with new regulations for NPPs.</p> <p>Note: Plans to develop competence are addressed under Infrastructure Issue No. 10, Human Resource Development.</p> | |
| <p>Examples of how the condition may be demonstrated</p> | <ul style="list-style-type: none"> (1) Evidence of what has been done, or is planned, to develop the experience of the senior regulators; (2) Proposals on the overall approach to assessment, licensing, inspection and enforcement, among other things; (3) Plans to develop the regulatory body for safety, security and safeguards; (4) Plans to develop the required regulations; (5) Evidence of interaction and cooperation with established regulatory organizations; | |

- (6) Plans to enhance or develop appropriate technical support organizations (see also infrastructure issue No. 10, human resource development) to support the regulatory body;
- (7) Plans to secure support from international regulatory organizations.

Additional guidance for SMR projects for Phase 1:

- Describe any plans to recognize safety assessments and licensing decisions done in other countries including vendor country;
- Describe any investigations of availability of technical support to regulatory body focusing on the SMR designs considered;
- Describe regulatory approach and plans to oversee the manufacturing of long-lead items including prefabricated modules.

Observations

The NEPIO has identified the need for the establishment of a new regulatory body with the mandate to oversee the safety, security and safeguards for activities involving the use of nuclear energy and radioactive materials in Estonia. The INIR team was informed that Estonia intends to recruit prospective senior managers/advisors who have experience working in foreign regulatory bodies or other relevant organizations.

While Estonia had intended to position its new regulatory body within the Ministry of the Environment, this Ministry was recently reorganized into the Ministry of Climate, which has the responsibility for national energy policy. As a result, the final positioning of the future regulatory body needs to be further studied with due consideration for its independence.

The Nuclear Act will create the Regulatory Body and assign the regulatory functions. Subsequently, the regulatory body will develop regulations and issue non-binding regulatory guides to describe methods and criteria for compliance with regulations.

The NEPIO has already identified a list of regulations to be developed, which was provided to the INIR team. The INIR team was informed that the list was identified based on IAEA guidance and feedback collected from the experience of countries considering SMRs such as Canada and Finland.

The INIR team was informed that the enactment of the Nuclear Law will not enter into force before 2026 due to the time necessary for its finalization, revision by other relevant stakeholders and the approval and enactment process of the Parliament. Considering that the ‘Decision in Principle’ is expected to take place in 2024, the INIR team noted that it would be useful to have an interim solution that allows for staffing and training for the future regulatory body, and the development of draft regulations prior to its formal establishment.

The INIR team was informed that the current practice in Estonia is to subject draft regulations to a consultation process with resulting comments addressed by the government. The INIR team considers that the representatives of the future regulatory body, as the responsible organization to ensure compliance with those regulations, should have a prominent role in the team that reviews and agrees on the final version of the regulations that will be issued at the ministerial level.

The NEPIO envisages that the regulatory body will be funded by the Government budget and by fees applied to licensees. In the earlier phases of the programme, the regulatory body will be fully funded by the Government budget and the estimated costs will be included in the comprehensive report.

The new regulatory body will incorporate the staff of the Climate and Radiation Department of the Environment Board plus additional human resources to perform its mandate (see Issue 10).

Due to limited resources, the regulatory body will need to outsource work to technical support organisations (TSOs) including the drafting of regulatory guides.

The future approach for licensing the NPP will consist of four steps: siting [spatial planning process], construction, operation, and decommissioning. Estonia plans a cooperation with an experienced regulator that has already licensed a similar reactor.

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| Areas for further action | Significant | Regulatory independence |
| | Minor | Development of regulatory framework |

RECOMMENDATIONS

R-7.1.1 Estonia should determine an appropriate position of the regulatory body in the governmental structure to ensure its independence with the necessary mandate to define the final content of the regulations.

SUGGESTIONS

S-7.1.1 Estonia is encouraged to consider putting in place an interim mechanism that allows for the initial development of the future regulatory body prior to the enactment of the Nuclear Law.

GOOD PRACTICES

GP-7.1.1

| 8. Radiation Protection | | Phase 1 |
|--|--|----------------|
| Condition 8.1: Enhancements to radiation protection programmes planned | | |
| Summary of the condition to be demonstrated | <p>The needed enhancements to the existing radiation protection programme to address NPP operation have been identified, including consideration of transport of radioactive materials and radioactive waste management. They consider both the increase in scale and the need to cover new technical issues.</p> <p>Note: This issue is closely linked to the Infrastructure Issue No. 7, Regulatory Framework. In particular, the development of regulations and whether the existing regulatory body will expand its role or whether the infrastructure issues will be addressed by a separate organization.</p> | |
| Examples of how the condition may be demonstrated | <ol style="list-style-type: none"> (1) Evidence of discussions with specialists from other countries; (2) Identification of the main areas requiring enhancement; (3) Recognition that additional competences will be required to review proposed designs against the requirement to control contamination and to reduce exposures to as low as reasonably achievable, also known as ALARA; (4) Recognition that the programme for dose assessment will need to be significantly expanded; (5) Plans for who will be responsible for the main elements of a radiation protection programme. | |
| Observations | | |
| <p>Estonia currently utilizes radiation sources in medicine, industry, and research, as well as manages radioactive waste. Estonia’s existing national (including legal) infrastructure and capabilities regarding radiation protection is dedicated to these activities and practices.</p> <p>The NEPIO contracted STUK International Oy to develop a study on the required expansion of the infrastructure for radiation protection if Estonia embarks on a nuclear power programme. The conclusions of the study will be included in the comprehensive report of the NEPIO.</p> <p>The study identifies areas where enhancements or expansion will be needed. These areas include:</p> <ul style="list-style-type: none"> — General Requirements for Organisation; — Requirements in Radiation Protection; — Dosimetry; — Radiation Measurements; — Dose Assessments; — Lay-out, Shielding, and Zoning; | | |

— Radiochemistry and Chemistry.

Potential subject areas for regulations in radiation protection field were also identified:

- Permissible dose levels and limits for workers and the public during the operation and decommissioning of a nuclear power plant;
- Requirements for optimization of radiation protection.

The additional capacities on radiation protection that the study identify to meet the needs of the nuclear energy programme are:

- Establish programmes in cooperation with the states that have an existing nuclear programme;
- Establish national training programmes at local universities.

The INIR Team was informed that the current regulatory body, the Environmental Board, is responsible for providing radiation protection services in Estonia, including individual dose monitoring and environmental monitoring. The NEPIO expects that the monitoring capacity needed to support the future regulatory body and operating organization would need to be expanded for the introduction of the nuclear power programme.

The NEPIO acknowledges that the new regulatory body will need more radiation protection experts to meet the demands of a nuclear power programme. It is also expected that some radiation protection services would be provided by a TSO and other potential service providers in the future, with authorization from the regulatory body.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-8.1.1

SUGGESTIONS

S-8.1.1

GOOD PRACTICES

GP-8.1.1

| 9. Electrical Grid | | Phase 1 |
|---|--|----------------|
| Condition 9.1: Electrical grid requirements considered | | |
| Summary of the condition to be demonstrated | <p>A preliminary study of the grid system has been conducted covering:</p> <ul style="list-style-type: none"> (a) Capability and reliability to take the output from the NPP; (b) Ability to withstand loss of the output; (c) Reliability to minimize the risk of loss of power to the NPP from the grid. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) An analysis of the grid covering: <ul style="list-style-type: none"> (a) The expected grid capacity; (b) The historical stability and reliability of the electrical grid; (c) The historical and projected variation in energy demand. (2) Evidence of consideration of: <ul style="list-style-type: none"> (a) Available NPP designs to identify those with output consistent with required grid performance and reliability ('grid code'), with due consideration taken for safety aspects; (b) Potential NPP sites and their impact on grid operation; (c) The anticipated growth of grid capacity; (d) The potential for local or regional interconnectors to improve grid characteristics. (3) Preliminary plans to enhance the grid to meet NPP requirements. | |
| Observations | | |
| <p>The grid operator ELERING AS is a state company responsible for the operation of the transmission system and the dispatch and control of generating units. ELERING AS is not a formal member of NEPIO, but they interact when necessary. The largest generation company is state owned, and some private companies operate smaller units. The largest distributor is state owned, and large consumers are allowed to buy energy directly from generating companies, although this has not yet been the case.</p> <p>The net capacity of the Estonia national grid is 2.3 GW. The Estonian electricity system is part of the large synchronous operational united system BRELL, which comprises the AC power lines that integrates Estonia with Latvia, the Russian Federation, Lithuania, and Belarus. Estonia, Lithuania, and Latvia have a joint project to switch from BRELL to the Central European Synchronous Area (CESA) by the beginning of 2025. The INIR team was informed that Estonia plans to expand the existing high voltage links to Finland and Latvia, which will further increase the grid stability.</p> <p>According to the Security of Supply Report 2022, the country has a very high transmission grid reliability, over 99.998% in 2022 with a consistent track record in the past 10 years. The INIR team was informed that the current and planned frequency control mechanisms are sufficient to provide the necessary stability in case of loss of output of a 350 MWe NPP.</p> | | |

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| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-9.1.1 | | |
| SUGGESTIONS | | |
| S-9.1.1 | | |
| GOOD PRACTICES | | |
| GP-9.1.1 | | |

| 10. Human Resources Development | | Phase 1 |
|---|--|----------------|
| Condition 10.1: Necessary knowledge and skills identified, and gaps in current capability assessed | | |
| Summary of the condition to be demonstrated | <p>A broad assessment of the typical staffing needs of each of the key organizations and their technical support has been completed together with an assessment of improvements required in the current capability of the country to meet the projected need. The assessment covers the full range of scientific, technical, managerial and administrative disciplines and considers:</p> <ul style="list-style-type: none"> (a) Current human resource competences and capabilities; (b) Estimated required competence and capability; (c) Availability of domestic and foreign capacity for education and training; (d) Additional education, recruitment, training and experience that will be required (gap analysis), including specialist training in nuclear safety, nuclear security, safeguards, radiation protection, spent fuel and radioactive waste management, management systems and EPR; (e) Which facilities and programmes need to be established for education, training and experience building; (f) Which research capability needs to be developed; (g) A senior leaders development programme. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) An analysis identifying the competences and number of staff needed, covering all the future organizations. The analysis needs to include: <ul style="list-style-type: none"> (a) Bulk workforce needs per phase; (b) A breakdown by knowledge, skills and discipline per phase; (c) The flow of workforce to other projects (e.g., future NPPs). (2) An analysis of existing human resource capabilities and the ability to attract experienced staff from other countries. (3) An assessment of the capability of existing education and training facilities. <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any discussion with potential technology providers/vendors on the operating scheme and necessary staffing for the SMR designs considered. | |
| Observations | | |
| <p>The NEPIO commissioned a human resource development study that provides an assessment of and recommendations for the development of the human resources to support the potential introduction of</p> | | |

nuclear power into Estonia's energy mix. The analysis provides an initial estimate for the staffing needs for the regulatory body and the owner/operator organization for Phases 2 and 3 as well as for operation of the NPP. These estimates were based on IAEA guidance documents as well as benchmarks from existing owner/operator organizations and regulatory bodies.

The report also presents the main activities for both organizations for Phases 2 and 3, as well as typical organizational structures and a functional staffing analysis.

The INIR team was informed that the NEPIO, and this report, took a technology neutral and conservative approach to determine the staffing needs of the key organizations. The regulatory body's staff will be supported by TSOs, as necessary, to conduct specific activities in Phases 2 and 3. The INIR team was informed that Estonian universities are already well linked with partners through different networks, one of the most important being the European Universities Initiative which supports collaboration between the institutions. These networks will be used to support the programme. In addition, Estonia has concluded MoUs with countries with nuclear power plants to support the future training needs of the key organizations.

Fermi Energia AS has conducted additional analysis for staffing the future owner/operator organization based on the information available from GE Hitachi together with some assumptions regarding outsourcing certain activities and the possibility for fleet services in the European region. The INIR team was informed that KSU in Sweden would host a training centre that could be used to support the development of the owner/operator.

The INIR team was informed that if the country decides to move to Phase 2, more detailed analysis of the staffing needs for the key organizations will be undertaken.

The NEPIO's report includes an assessment of the scientific, technical, managerial, and administrative skills that are available in Estonia, noting that additional engineers and other professionals may be required to support the programme. In response to this general need, Estonia has created a new 'Engineering Academy' initiative that will support the development of Science-Technology-Engineering-Math (STEM) programmes in primary, secondary, and higher-level institutions.

The NEPIO also identified that there are currently few individuals in Estonia with nuclear-specific competencies beyond those in the organizations currently providing services in the field of radiation protection and radioactive waste management. Although the Environmental Board has established requirements for training and re-training radiation safety specialists, support from the Estonian education system is required to maintain the level of radiation protection and safety competence in the country.

There are currently 31 vocational education institutions and five universities of applied sciences that offer vocational education and six public universities in Estonia and the country invests 6.4% of its GDP in education. There is also an Estonian Qualifications Authority that is tasked with identifying the skills and professions needed today as well as in the future, which could be a beneficial organization to support the nuclear power HR skills development programme.

| | | |
|---|---|----------------|
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-10.1.1 | | |
| SUGGESTIONS | | |
| S-10.1.1 | | |
| GOOD PRACTICES | | |
| GP-10.1.1 | | |
| 10. Human Resources Development | | Phase 1 |
| Condition 10.2: Development of human resources planned | | |
| Summary of the condition to be demonstrated | <p>Outline plans have been agreed to:</p> <ul style="list-style-type: none"> (a) Enhance national education and training; (b) Develop a detailed human resource development plan for each key organization; (c) Integrate the plans to develop a national strategy including the development of an initial core leadership group. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) Plans to develop human resources required including: <ul style="list-style-type: none"> (a) Identification of national organizations that could support human resource development; (b) Enhancement of education and training infrastructure; (c) Development of national competences (through schools, universities, institutes and industry); (d) Non-national human resources that are needed to augment national resources and how they will be secured; (e) International cooperation and vendor support; (f) Leadership development. (2) Strategies for the recruitment and retention of staff. (3) Recognition of the need for qualification and certification programmes for personnel. (4) Evidence that key stakeholder organizations have participated in the development and review of the plans. | |

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| | <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any considerations/discussions to support capacity building, given the limited capability and experience of small sized technology providers/vendor companies in this area; — Describe any sources identified for delivering support to build capacity for the specific competences needed in the regulatory body for the SMR designs considered. |
| <p>Observations</p> <p>Estonia’s current human resource development strategy provides initial considerations related to the human resources needed to support the nuclear power programme. Following a decision to proceed, nationally coordinated actions will be initiated to establish education and training pipelines for the development of Estonian nationals to meet the near-term needs of the nuclear regulatory body, the owner/operator, and other entities, including:</p> <ul style="list-style-type: none"> — Scholarships for study abroad; — University curricula development; — Qualifications development and reskilling of labour force; — Vocational training for technologists and operators; — IAEA training and secondments; — Programmes to develop awareness of nuclear safety, security, and safeguards principles (e.g., FIRST Programme from U.S.); — Job-specific training; — Cooperative relationships with experienced countries; — Close cooperation with the vendor country; — Collaboration with the Canadian and Finnish regulators. <p>The INIR team was informed that there are currently four main strategies under the Ministry of Education and Research:</p> <ol style="list-style-type: none"> 1. Education Strategy; 2. Research, Development, Innovation Strategy and Entrepreneurship Strategy; 3. Youth Sector Development Plan; 4. Language Strategy. If the country decides to proceed with the nuclear power programme, a specific strategy to support human resource development will be important. <p>The INIR team was informed that if a positive decision is taken the NEPIO, under the leadership of the Ministry of Education and Research, will form a new sub-working group on human resource development. This sub-working group will be tasked to develop a long term human resource strategy and coordinate the development of the specific workforce plans of each organization.</p> <p>The strategy will be focused on two tracks:</p> | |

- Recruitment of nuclear skills from outside of the country to perform critical leadership and expert functions to support the initial launch of the programme; and
- Development of Estonian national capacity to meet the longer-term needs of the programme and to ensure its sustainability.

The INIR team noted that this strategy and associated plans will be needed at the beginning of Phase 2 to support the coordinated development of the competencies needed in the key organizations of the nuclear power programme. The INIR team also noted that Estonia needs to consider including the future owner/operator organization(s) within the NEPIO and the relevant sub-working groups to support coordinated human resource development (see Issue 1.2).

Regarding the development of the future owner/operator organization, Fermi Energia AS noted that it awards two scholarships a year for master’s studies in nuclear engineering at foreign universities. Fermi Energia AS has also partnered with Tallinn University of Technology and the University of Tartu to develop a course to introduce nuclear energy and nuclear safety to students. These courses are running for their 4th and 2nd year in a row respectively. It will also make use of ‘nuclearization’ programmes and micro degree programmes to support the qualification of mechanical, electrical, and process engineers. Fermi Energia AS also plans to use the KSU training centre in Sweden as well as on the job training with GE Hitachi to support the development of its workforce.

While the new regulatory will not formally be created until the passage of the new Nuclear Law, the INIR team was informed that mechanisms will be put in place to initiate hiring for this organization to support its preliminary activities in Phase 2 prior to the enactment of the law (see Issue 7.1). Staff will be recruited progressively during Phase 2 to achieve the staffing targets that were identified for Phase 3. For those activities that require specific expertise, the future regulatory body intends to use TSOs, as needed, to support the organization.

The government, regulatory body, and owner/operator organization also plans to develop further partnerships with academic and vocational training institutions to develop programmes that align with the competencies needed for the nuclear power programme and the workforce plans of each organisation. The long term human resource development strategy will also consider the need to develop the Estonian national capacity as well as how to acquire expertise through the use of TSOs for certain tasks, while maintaining a “knowledgeable customer” capability within the organizations.

| | | |
|---------------------------------|--------------------|--|
| Areas for further action | Significant | No |
| | Minor | Long term national human resource development strategy and workforce plans |

RECOMMENDATIONS

R-10.2.1

SUGGESTIONS

S-10.2.1 The NEPIO is encouraged to initiate the early development of the long term national human resource development strategy and workforce plans needed for the key organizations.

GOOD PRACTICES

GP-10.2.1 Estonia developed a two-track strategy to support the future human resource needs of the key organizations. This will allow recruitment of the appropriate skills from outside the country to support the initial phases of the programme, while recruiting and training the Estonian workforce. This approach aims to ensure the short-term and long term success of the nuclear power programme.

| 11. Stakeholder Involvement | | Phase 1 |
|--|---|----------------|
| Condition 11.1: Open and transparent stakeholder involvement programme initiated | | |
| Summary of the condition to be demonstrated | <p>Stakeholder involvement strategy and plan, with the required resources and competence, implemented by the NEPIO based on transparency and openness. The public, and other relevant interested parties, receive information about the benefits and risks of nuclear power, including the non-zero potential for severe accidents.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe the roles of and the interactions between NEPIO and any project development organizations in public communication activities. | |
| Examples of how the condition may be demonstrated | <ol style="list-style-type: none"> (1) A clear mandate for the NEPIO to engage with stakeholders; (2) Actions to disseminate information in the context of the national energy outlook, policy and needs, and pros and cons of all sources of energy, using a range of effective tools; (3) Evidence of a professional communication team available to the NEPIO, with appropriate financial resources; (4) Results of surveys to determine the public’s knowledge and receptiveness to nuclear power; (5) Approaches to address public concerns, including waste management and severe accidents; (6) Evidence of activities at the local, regional and national level; (7) A plan for ongoing interaction with the public, in particular, opinion leaders, media, local and national governmental officials and neighbouring countries; (8) Plans for regular opinion polls managed by specialist companies (9) A training programme to enable identified spokespersons to interact with stakeholders. | |
| <p>Observations</p> <p>As part of its mandate, the NEPIO is tasked to develop a communications and engagement plan to neutrally inform the public and other stakeholders about the benefits and risks of nuclear power and to monitor public opinion. In 2022, the NEPIO contracted a consultant to develop a coordinated and comprehensive stakeholder engagement and communication plan. The plan included elements of stakeholder involvement, such as media analysis, public opinion polling, key messaging, stakeholder mapping, and principles of communication. As a result of this analysis, the NEPIO has developed a communication strategy implementation plan for 2023 and is actively conducting stakeholder involvement activities. These include, among others, press releases, public opinion polling, engagement</p> | | |

with journalists and local municipalities, participation in conferences and related events, engagement with universities, and social media campaigns.

In February 2022, the NEPIO conducted opinion polling through a consulting company. According to the survey 59% of the public supported the adoption of nuclear energy, while 22% expressed opposition and 19% had not formed their position. More than half of the Estonian population considered themselves familiar with the general principles of nuclear power. Additional monitoring surveys were conducted in April and May 2023. The next public opinion poll is planned to take place in November 2023.

In April 2023, the Estonian Parliament formed a Nuclear Energy Support Group, which currently engages 22 members (20% of all parliamentarians) of the Parliament and established a regular coordination meeting scheduled with the NEPIO. The NEPIO is also reporting to the environmental committee and to the economic committee of the Parliament.

In May 2023, the NEPIO held 5 meetings for local municipalities representatives and residents in different areas identified in the preliminary site selection survey to provide members of the public information on the survey results and planned activities in analysing potential use of nuclear power in Estonia.

In August 2023, panel discussions on the potential of nuclear energy were conducted at the Estonian Opinion Festival. A public information day on nuclear energy is planned for November.

A representative of the Estonian Green Movement, nominated by the Estonian Chamber of Environmental Associations, is represented in the sub-working group of the NEPIO for spatial planning and has participated in discussions, seminars, training courses, and panel discussions.

In addition to the activities of the NEPIO, Fermi Energia AS has taken an active role in stakeholder involvement during this Phase including:

- Organizing visits to nuclear power plants in Sweden and Finland;
- Conducting public information meetings for residents living in areas where the construction of the proposed NPP is being considered;
- Arranging local and national opinion polling regarding the nuclear power programme;
- Establishing nuclear energy related courses at the Tallinn University of Technology and the University of Tartu to raise awareness and knowledge among the students;
- Participating in media discussions, writing news articles, and communicating with the public via social media platforms;
- Establishing a nuclear energy information center in the municipality of Kunda that is visited by residents, students, NGOs, fire brigades, and business associations;
- Participating in public debates that include the Estonian Green Movement.

Since one potential region for siting a nuclear power plant is located in an area that is primarily Russian speaking, both the NEPIO and Fermi Energia AS provide information and updates about the potential nuclear power programme in Russian language.

While Fermi Energia AS and the NEPIO currently have separate public communication strategies and plans, information is regularly shared between the parties.

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|---------------------------------|--------------------|----|
| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-11.1.1

SUGGESTIONS

S-11.1.1

GOOD PRACTICES

GP-11.1.1

| 12. Site and supporting facilities | | Phase 1 |
|--|---|----------------|
| Condition 12.1: General survey of potential sites conducted and candidate sites identified | | |
| Summary of the condition to be demonstrated | Exclusion and avoidance criteria (covering safety, security, cost, socioeconomic issues, engineering and the environment) have been identified and regional analysis to identify candidate sites has been conducted. The analysis includes the impact of external hazards on security and emergency response capability. Consultations with stakeholders have been part of the process. | |
| Examples of how the condition may be demonstrated | <p>(1) A report covering:</p> <ul style="list-style-type: none"> (a) Safety and security criteria for initial NPP site selection; (b) National criteria (e.g., socioeconomic and environmental); (c) Engineering and cost criteria. <p>(2) An assessment report issued and approved identifying:</p> <ul style="list-style-type: none"> (a) Regional analysis and identification of potential sites; (b) Screening of potential sites and selection of candidate sites. <p>(3) Evidence that the resources that were used for NPP site selection are competent and have experience with NPP site selection.</p> <p>(4) Plans for the work that will be required in Phase 2 to select and justify the site.</p> <p>(5) Evidence that safety and security related activities conducted (e.g., site evaluation and environmental impact studies) are included within the framework of an effective management system.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe the plant parameter envelope considered in siting activities; — Describe any considerations related to transportation of large pre-fabricated items; — Identify the number of units assumed in siting activities; | |
| Observations | | |
| <p>In January 2022, the NEPIO established the Sub-working Group on Spatial Planning to manage a preliminary study on potential locations for a nuclear power plant and disposal site.</p> <p>The INIR team was informed that the work was carried out by a competent Estonian company supported by an expert on the siting process for NPPs. The company has a quality management system</p> | | |

that ensured the quality and future availability of all the data collected. The data is analysed using GIS software and the data and tool were provided to the NEPIO.

The study derived a conservative plant parameter envelope based on publicly available information and additional information received from vendors for six reference reactor types (Nuward, UK SMR, NuScale, BWRX-300, SC-HTG, Integral MSR). The study considered both an open cooling system and a closed cooling system and assumed that the nuclear power plant (made up of SMR units) could produce 600 - 1200 MW of electricity. In addition, possible locations for the geological disposal site for spent nuclear fuel (geological repository or deep boreholes) and near surface disposal site for intermediate and low-level waste, were investigated.

The work was performed in three stages:

1. The initial task was to develop appropriate exclusion and discretionary criteria for conducting preliminary analysis of potential locations;
2. The second stage was to use solely the exclusion criteria, plus a criterion related to availability of cooling water, to identify possible regions with socioeconomic considerations;
3. The third stage was to consider for each region the socio-economic benefits that a nuclear power plant would bring.

The studies identified 15 potential areas for siting the NPP. The reports of the work have been approved by the sub-working group and the NEPIO and are publicly available.

The third stage considered the socio-economic benefits from locating an NPP in the region and concluded that the construction of an NPP would pose the most positive socio-economic impact to four regions. One is located in the west of the country and three in the east of the country. Based on discussions with local stakeholders, the regions in the east are more favourably disposed to nuclear power. These are: Loksa, Toila, and Kunda.

Separately, Fermi Energia AS have conducted a siting study using a similar methodology and have identified three potential sites.

Once the government has made the decision to include the potential for nuclear in the energy mix, the next steps according to the current Spatial Planning Law will be:

- Fermi Energia AS will apply to the spatial planning process for a site to install an NPP and will pay for the work required to complete the process;
- The Government will initiate a site selection process. They will propose the criteria to be used and their weightings for public consultation. Fermi Energia AS will participate in the development of appropriate criteria;
- The Government will then request bids to carry out the site selection work and the results will define the site that will be allocated to Fermi Energia AS. The process requires significant communication and input from a wider range of stakeholders;
- Fermi Energia AS will make available to the contractor their analysis of specific features of the sites (for example related to provision of cooling water);

— Where further data are required, the contractor will carry out or subcontract the work required.

The conclusion of this work will be the confirmation of the site that will be allocated to the Fermi Energia AS project.

The INIR team was informed that the Ministry of Regional Affairs and Agriculture is considering streamlining the process by reviewing the site selection phase.

The next stage of the process will be site characterisation which would still be managed through the spatial planning process.

The INIR team noted that in most countries site characterisation is managed by the future operating organisation, (rather than through the government planning process), which then submits a detailed report to the regulatory body for review. In Estonia, it is currently not clear whether Fermi Energia AS will manage the site characterisation and submit information for review by the regulator or whether site characterization will be managed by the Ministry of Regional Affairs and Agriculture.

| | | |
|---------------------------------|--------------------|---|
| Areas for further action | Significant | Plans for site selection and characterisation |
| | Minor | No |

RECOMMENDATIONS

R-12.1.1

SUGGESTIONS

S-12.1.1 Estonia is encouraged to give further consideration to the process for site selection, characterisation, and licensing the site.

GOOD PRACTICES

GP-12.1.1 In the siting studies, Estonia expanded its review to consider possible locations for the geological disposal of spent nuclear fuel. This gives greater confidence in the intended strategy for waste disposal and also in discussing waste management issues with the public.

| 13. Environmental Protection | | Phase 1 |
|---|---|----------------|
| Condition 13.1: Environmental requirements considered | | |
| Summary of the condition to be demonstrated | The NEPIO has considered the main environmental requirements related to the siting of an NPP, including land use, water use, water quality and the impacts of low level radioactive effluents. | |
| Examples of how the condition may be demonstrated | <ol style="list-style-type: none"> (1) Identification of key requirements for siting and during construction; (2) Evidence of discussions by specialists with States operating nuclear power; (3) Evidence that the non-radiological environmental issues, such as water use, transport of materials, disposal of hazardous waste, additional environmental monitoring requirements and construction impact, have been considered and taken into account by the NEPIO. | |
| <p>Observations</p> <p>The NEPIO undertook a preliminary analysis of potential locations for a nuclear power plant and a disposal site for spent nuclear fuel in which environmental aspects were analysed.</p> <p>Criteria related to water usage were examined within the hydrographic criteria category (availability of cooling water, depth of water table, etc.) and under the environmental hazards category (rising sea levels, flood risk). Specific environmental aspects (e.g., low-level radioactive effluents from the nuclear power plant, non-radiological releases, heat discharges, water quality) will be examined in more detail in subsequent stages.</p> <p>Specific criteria were divided into two groups:</p> <ul style="list-style-type: none"> — Exclusionary criteria: nature reserves, Natura 2000 sites, valuable forest habitats on state land, and on private land (with contracts), locations of protected plant, mushroom, and lichen species (I-III category) with buffer zones, locations of I conservation category animal species, salmon rivers and rivers affecting salmon rivers; — Discretionary criteria: limited management zones of shores and banks, limited management zones of a protected areas, limited-conservation area, green network areas and corridors connecting large core areas, locations of II and III conservation category animal species, locations of III conservation category protected plant species with buffer zones. <p>The discretionary criteria are associated with those attributes relating to issues, events, phenomena, hazards, or other considerations, for which protective engineering or other solutions are available, e.g., resettlement of protected species. Discretionary criteria will be evaluated and ranked by weighting of various attributes in a matrix form.</p> | | |

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| The Environmental Impact Assessment and Environmental Management System Act provide the legal grounds and procedure for the assessment of likely or significant environmental impact. | | |
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-13.1.1 | | |
| SUGGESTIONS | | |
| S-13.1.1 | | |
| GOOD PRACTICES | | |
| GP-13.1.1 | | |
| 13. Environmental Protection | | Phase 1 |
| Condition 13.2: Framework for environmental protection reviewed | | |
| Summary of the condition to be demonstrated | The NEPIO has reviewed the suitability of the State's existing framework for environmental protection and for meeting its international obligations. | |
| Examples of how the condition may be demonstrated | <ul style="list-style-type: none"> (1) Procedures developed for the elaboration, reporting and assessment of environmental studies for nuclear and other related facilities; (2) Evidence of interactions by specialists with States operating nuclear power. | |
| Observations | | |
| <p>Estonia signed and ratified various international obligations aimed at environmental protection.</p> <p>As a member of the European Union (EU), Estonia is bound by EU environmental legislation, including directives and regulations that cover areas such as air quality, water management, waste management, and nature conservation.</p> <p>Estonia is a party to several United Nations and European conventions related to environmental protection. These international obligations collectively shape Estonia's approach to environmental protection, guiding its policies, regulations, and actions to safeguard the environment and contribute to global sustainability.</p> | | |

Estonia’s framework ensures that a comprehensive environmental assessment is carried out with the appropriate involvement and consideration of various concerned bodies during strategic planning and development activities in the country.

For the nuclear power programme, the comprehensive procedure of conducting an environmental impact assessment (EIA) will continue to fall within the scope of the Environmental Impact Assessment and Environmental Management System Act. The collaboration and interaction between the environmental regulatory body and the nuclear regulatory body in the process of reviewing radiological impacts will be defined in the Nuclear Law.

In 2022, Fermi Energia AS commissioned a study to support its understanding of the development of an EIA as well as considerations for the EIA process in Estonia. This study was based on the experience of Finland and provided lessons learned and recommendations that could be used to support Fermi Energia AS in implementing its responsibilities in the EIA process in Estonia.

The INIR team was informed that under Spatial Planning Act, the EIA process is led and approved by the government. All concerned authorities are listed in the Environmental Impact Assessment and Environmental Management System Act. The EIA is conducted by a licensed expert and an expert team with input from the future owner/operator.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-13.2.1

SUGGESTIONS

S-13.2.1

GOOD PRACTICES

GP-13.2.1

| 14. Emergency Planning Condition 14.1: Requirements of, and resources for, developing an emergency response capability recognized | | Phase 1 |
|--|--|----------------|
| Summary of the condition to be demonstrated | <p>(a) The NEPIO is aware of the EPR arrangements and capabilities that will be required for the nuclear power programme. It has evaluated existing EPR arrangements and capabilities in the country and is aware of the major gaps that will need to be addressed;</p> <p>(b) The NEPIO has identified the main organizations and resources that will need to be involved in the establishment of adequate national EPR capabilities;</p> <p>(c) The lead for the execution of the action plan and the action plan coordination framework has been identified.</p> <p>Notes:</p> <p>1. The process of developing adequate EPR will be initiated in Phase 2 and will be largely carried out in Phase 3;</p> <p>2. The requirements of the conventions on early notification and assistance are covered under infrastructure issue No. 5, legal framework.</p> | |
| Examples of how the condition may be demonstrated | <p>Report summarizing existing EPR arrangements and capabilities and identifying those to be enhanced and/or developed as well as identifying the main organizations and resources that will need to be involved in the establishment of adequate national EPR capabilities.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <p>— Describe any considerations of EPR arrangements related to locating SMRs in remote areas or densely populated areas, or for transportable NPPs.</p> | |
| <p>Observations</p> <p>The National Emergency Act serves as the legal framework for emergency preparedness and response, including nuclear and radiological emergencies. There is an approved Emergency Response Plan, which is revised once every two years. The country has an Emergency Response system covering large industrial plants and infrastructure facilities. A standing steering committee dedicated to chemical, biological, radiological, and nuclear issues (CBRN Steering Committee) is chaired by the Internal Security Service.</p> | | |

Estonia has signed bilateral MoUs with the Radiation and Nuclear Safety Authority of Finland (STUK) and with the State Environmental Service of Latvia (VVD) for cooperation and exchange of information on radiation and nuclear safety and regulatory matters, which includes cooperation in preparedness for and response to nuclear or radiological incidents and emergencies. A bilateral MoU has also been signed with the Canadian Nuclear Safety Commission.

Estonia participates regularly in international exercises, and in 2019–2020 conducted a two-part national exercise.

An analysis on the existing capabilities on Emergency Preparedness was performed by national consultants (International Centre for Defence Studies (ICDS)), resulting in the report ‘*Nuclear Security and Emergency Preparedness*’. This study mapped the current situation, identified the organisations involved and issued recommendations for the development of a national security policy and strategy for NPPs.

In 2023, a sub-working group (SWG) on Nuclear Security and Emergency Preparedness was formed to validate the ICDS Study and take into account the requirements arising from the IAEA GRS Part 7 as well as other IAEA Safety Standards. This SWG performed an analysis for each of the 18 organizations involved in Emergency Preparedness and Response, identifying competency gaps to be addressed. The SWG is currently working on defining time schedules and budgets for the necessary actions to be taken by these organizations.

During the remainder of Phase 1 the execution of the action plan of each organization will be supervised by the SWG. If Estonia decides to proceed with the nuclear programme this coordination of the action plan will be transferred to the future nuclear regulator.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-14.1.1

SUGGESTIONS

S-14.1.1

GOOD PRACTICES

GP-14.1.1

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|--|----------------|
| 14. Emergency Planning | Phase 1 |
| Condition 14.2: Recommendations from any previous reviews or audits being addressed | |

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| Summary of the condition to be demonstrated | If any reviews or audits have been undertaken of the existing framework, there is evidence that the actions resulting from it are progressing. | |
| Examples of how the condition may be demonstrated | Presentation of any action plans resulting from a review or audit with progress identified. | |
| Observations Estonia hosted an IRRS mission in September 2016, which provided 3 recommendations related to emergency preparedness and response. In the follow-up mission in 2019, two of the recommendations were closed and one recommendation remains open, pending the revision of the National Emergency Plan. | | |
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-14.2.1 | | |
| SUGGESTIONS | | |
| S-14.2.1 | | |
| GOOD PRACTICES | | |
| GP-14.2.1 | | |

| 15. Nuclear Security | | Phase 1 |
|---|--|----------------|
| Condition 15.1: Nuclear security requirements recognized and the actions of all relevant organizations coordinated | | |
| Summary of the condition to be demonstrated | <p>The NEPIO recognizes the importance of nuclear security, based on a national threat assessment and principles of prevention, detection and response. All competent authorities that are involved in nuclear security have been identified and there is a coordinating body or mechanism established that brings together all of the organizations that have responsibility for nuclear security.</p> <p>Note: The need to establish legislation and a regulatory framework is addressed under Infrastructure Issues Nos 5 and 7, Legal Framework and Regulatory Framework, respectively.</p> | |
| Examples of how the condition may be demonstrated | <ol style="list-style-type: none"> (1) Evidence of familiarity with IAEA Nuclear Security Series publications and other States’ practices; (2) Clear identification of all organizations that have roles and responsibilities for nuclear security and of the work that will need to be carried out in the subsequent phases; (3) Evidence that nuclear security considerations for siting have been defined and have been considered as part of the siting assessment (see infrastructure issue No. 12, site and supporting facilities); (4) Evidence that international cooperation and assistance is being used ; (5) Evidence that the need to address the interface with safety and safeguards is recognized. <p>Additional guidance for SMR projects for Phase 1:</p> <p>— Describe any security considerations related to co-locating SMR in an industrial zone or locating SMR in a remote location, etc.</p> | |
| Observations | | |
| <p>The primary obligations of Estonia with respect to nuclear security are established by the Convention on the Physical Protection of Nuclear Material and its Amendment (CPPNM/A).</p> <p>Currently, the responsibility for ensuring compliance with Estonia’s nuclear security commitments is mandated to the Estonian Internal Security Service (ISS). The Environmental Board also has a role in nuclear security due to its responsibility for regulating physical protection for its licensees through its authorization process and supporting with necessary radiological measurements and analyses.</p> | | |

Estonia has a standing steering committee dedicated to chemical, biological, radiological, and nuclear issues (CBRN Steering Committee), which is chaired by ISS. In March 2023, a sub-working group (SWG) on Nuclear Security and Emergency Preparedness and Response was established under the NEPIO. The SWG was tasked by the NEPIO to analyse the internal security aspects and emergency preparedness related to the potential nuclear power programme and provide a report to the government. This report was completed and provided to the NEPIO to pass on to the government, along with a summary that was made available to the public. Since its task is complete, the work of the SWG will be discontinued for the time being but will be continued in Phase 2 if there is a positive decision adopted on nuclear energy.

If Estonia decides to proceed with the development of the nuclear power programme, the national threat assessment principles will be used to develop the design basis threat for the nuclear power plant.

The INIR team was informed that the competent authority for the CPPNM/A and the coordinating authority for nuclear security will be the new regulatory body once it is established by the new Nuclear Law. The new regulatory body will also become a member of the CBRN Steering Committee and there will be close coordination between those two stakeholders.

Estonia has had some initial discussions regarding security considerations for SMRs, which are limited due to the confidential nature of the information. As the project moves forward, arrangements will be made to enable more in-depth discussions on this topic with the vendor as well as with the Canada Nuclear Safety Commission, which is currently licensing the preferred technology.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-15.1.1

SUGGESTIONS

S-15.1.1

GOOD PRACTICES

GP-15.1.1

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|--|----------------|
| 15. Nuclear Security | Phase 1 |
| Condition 15.2: Recommendations from any previous reviews or audits being addressed | |

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| Summary of the condition to be demonstrated | If any reviews or audits have been undertaken of the existing framework, there is evidence that the actions resulting from it are progressing. |
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| Examples of how the condition may be demonstrated | Presentation of any action plans resulting from a review or audit with progress identified. | |
| Observations No previous reviews or audits of the existing framework were conducted. | | |
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-15.2.1 | | |
| SUGGESTIONS | | |
| S-15.2.1 | | |
| GOOD PRACTICES | | |
| GP-15.2.1 | | |

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|---|---|----------------|
| 16. Nuclear Fuel Cycle | | Phase 1 |
| Condition 16.1: Options for nuclear fuel cycle (front end and back end) considered | | |
| Summary of the condition to be demonstrated | At a strategic level, options have been considered for the front end and back end of the fuel cycle. For the front end, options for uranium sourcing and fuel manufacture and supply have been addressed. For the back end of the fuel cycle, spent fuel storage needs and capacities (on-site and off-site) and possible reprocessing have been considered. | |
| Examples of how the condition may be demonstrated | <p>(1) A document:</p> <ul style="list-style-type: none"> (a) Identifying available national natural resources and capacities for individual steps in the nuclear fuel cycle; (b) Identifying potential sources of supply and services; (c) Assessing available options for a national fuel cycle strategy, taking into account non-proliferation issues. <p>(2) A document clearly demonstrating that the NEPIO understands the long term commitments related to the back end of the nuclear fuel cycle and has considered the options and their implications. The document needs to address the need for adequate capacity for spent fuel storage at the reactor site, the possibility of interim storage of spent fuel at a dedicated facility and any plans for reprocessing;</p> <p>(3) Clear allocation of responsibilities for development of the fuel cycle policy and strategy (front end and back end) to be undertaken during Phase 2.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any investigation of issues relevant to production and transportation of fresh nuclear fuel for the SMR designs/modes of deployment considered (e.g., higher enrichment fuels); — Describe any considerations related to the long term sustainability of supply of fresh nuclear fuel for the SMR designs/modes of deployment considered (e.g., diversification of suppliers, security of supply); — Describe any investigation of issues relevant to management (storage, transportation, reprocessing) of spent fuel from the SMR designs/modes of deployment considered (e.g. transportation of | |

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|--|--|
| | complete reactor core, spent fuel with higher enrichment and higher burnups, necessary regulatory requirements). |
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Observations

The interim report to the Government considers developments in the area of SMRs pertaining to the front and back end of the fuel cycle, including an overview of the management of spent nuclear fuel in different countries.

The study commissioned by the NEPIO provides estimations of high-level radioactive waste (HLW) volumes, using the BWRX300 as a reference. It also describes the technological options and research on the ultimate disposal of spent fuel and HLW from reprocessing, as well as options for financing spent nuclear fuel and HLW management and disposal of spent fuel and financial aspects relating to the safety of radioactive waste management (several countries financing schemes are presented). For the front end of the fuel cycle, Fermi Energia AS is planning that the fresh nuclear fuel will be supplied through Vattenfall Nuclear Fuel AB.

The INIR team was informed that alternative solutions were also considered by Fermi Energia AS for the fresh fuel supply such as direct procurement from GE Hitachi.

For the back end of the nuclear fuel cycle, long term on-site storage of the spent fuel is envisaged, until the disposal solution is defined and implemented. Reprocessing of the spent nuclear fuel (SNF) is seen as an option, but the decision is deferred to a later stage.

Two disposal options are considered for the HLW and SNF – deep geological repository (DGR) and deep borehole disposal. A preliminary study commissioned by Fermi Energia AS in 2021 concluded that deep borehole solution in Estonian context is technically feasible.

The INIR Team was informed that the licencing requirements will only permit mature, validated, and proven solutions for both the front end and back end of the fuel cycle.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-16.1.1

SUGGESTIONS

S-16.1.1

GOOD PRACTICES

GP-16.1.1

| 17. Radioactive Waste Management | | Phase 1 |
|--|--|----------------|
| Condition 17.1: The requirements for management of radioactive waste from NPPs recognized | | |
| Summary of the condition to be demonstrated | The NEPIO understands the significantly increased requirements for the processing, storage and disposal of high, intermediate and low-level radioactive waste from a nuclear power programme and has developed options for the management of radioactive waste, taking into account existing arrangements. | |
| Examples of how the condition may be demonstrated | <p>A document addressing possible approaches to the management of radioactive waste arising from NPP operation and decommissioning, the capabilities and resources needed, and the options and technologies for its processing, handling, storage and disposal. If reprocessing is being considered, this needs to include the management of high level waste. Regulatory framework and financing schemes are addressed under infrastructure issues Nos 7 and 4, regulatory framework, and funding and financing, respectively.</p> <p>Additional guidance for SMR projects for Phase 1:</p> <ul style="list-style-type: none"> — Describe any considerations of managing radioactive waste coming from multiple SMR sites (e.g., multiple owners, on-site management, off-site/central management); — Describe any considerations of managing new forms of radioactive waste that may be produced in SMRs considered. | |
| Observations | | |
| <p>The only operational facility for managing radioactive waste in Estonia is located at the Paldiski site, a former Union of Soviet Socialist Republics (USSR) nuclear submarine training centre, with 2 PWR reactor compartments encased in reinforced concrete (sarcophagi). Most of Estonia’s existing radioactive waste dates to the Soviet period – the former Paldiski nuclear object, the radioactive waste repository in Tammiku and the NORM repository in Sillamäe. Currently, the primary generators of radioactive waste are medical, industrial and research institutions holding a radiation practice licence.</p> <p>The long term safe storage of the reactor compartments at Paldiski is foreseen to continue until 2040. In conjunction with this strategy, a disposal site will be established by 2040 at the latest, and it will accommodate only the legacy and current waste streams.</p> <p>The management of radioactive waste generated by the nuclear power plant will be responsibility of the owner/operator during the lifetime of the plant. The current intention is to treat and store the radioactive waste generated by the nuclear power plant at a facility separate from Paldiski, potentially on the site of the nuclear power plant.</p> | | |

The interim report provides an overview of the principles and challenges of radioactive waste management as well as the currently available technological solutions. The report considers options for management (processing, storage, and disposal) of high, intermediate, and low-level radioactive waste for a nuclear power programme, including several case studies. The selection amongst these options will depend on the planned fuel cycle, reactor technology, local conditions, and other factors.

The study commissioned by the NEPIO provides estimations of HLW volumes, using the BWRX-300 reactor as a reference. It also describes various types of low and intermediate-level radioactive waste generated during the lifetime and decommissioning of a conventional reactor.

The NEPIO is planning to develop a national policy and strategy for spent fuel and radioactive waste management, as well as the related regulatory framework, to address the nuclear power programme needs. The INIR Team was informed that the Nuclear Law will include principles of radioactive waste management, responsibilities, and waste fund collection principles.

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| Areas for further action | Significant | No |
| | Minor | No |

RECOMMENDATIONS

R-17.1.1

SUGGESTIONS

S-17.1.1

GOOD PRACTICES

GP-17.1.1

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| 17. Radioactive Waste Management | Phase 1 |
| Condition 17.2: Options for disposal of all radioactive waste categories understood | |

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| Summary of the condition to be demonstrated | The NEPIO understands the options for disposal of each of the different waste categories. Although the specific routes for disposal of the different waste categories (including spent fuel if considered as waste) can be decided later, the need to select and plan for adequate options is recognized. |
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| Examples of how the condition may be demonstrated | A document indicating that the NEPIO understands options for disposal of different radioactive waste categories and options for funding these activities. |
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Observations

The generic options for disposal of different radwaste categories are highlighted in two studies commissioned by NEPIO and they are focused on:

- Assessing the existing capabilities, regulatory framework and experience with radioactive waste handling, storage, transport, and disposal in Estonia;
- Estimating based on publicly available information the volumes of low and intermediate-level waste and the variety of isotopes expected from nuclear power facilities for several SMR designs;
- Documenting the technological options and research on the ultimate disposal of spent fuel and high-level waste from reprocessing;
- Financial aspects related to radioactive waste management including options for financing spent fuel and high-level waste management;
- Providing recommendations for the development of the national radioactive waste management policy.

Two disposal options are considered for HLW and spent nuclear fuel: deep geological repository (DGR) and deep borehole disposal. A preliminary study conducted for Fermi Energia AS indicated that deep borehole solution in Estonian context is technically feasible.

The INIR Team was informed that no decisions have been made regarding final disposal of spent nuclear fuel at this time, and that the licencing requirements will only permit mature, validated, and proven disposal technologies to be implemented in Estonia.

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| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-17.2.1 | | |
| SUGGESTIONS | | |
| S-17.2.1 | | |
| GOOD PRACTICES | | |
| GP-17.2.1 | | |

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| 18. Industrial Involvement | | Phase 1 |
| Condition 18.1: National policy with respect to industrial involvement developed | | |
| Summary of the condition to be demonstrated | A policy for national involvement in the nuclear power programme has been developed, taking into account current industrial capacity and technical services, current and required quality standards, and potential investment requirements. The policy may include short term and longer-term targets for industrial involvement. | |
| Examples of how the condition may be demonstrated | <p>(1) A survey of companies with the potential to participate in the nuclear power programme for construction, equipment provision or support services, with a review of their ability to satisfy the requirements of a nuclear power programme;</p> <p>(2) Meetings with, or training of, potential suppliers to explain standards and qualifications required, review feasibility of involvement, and identify required actions and funding requirements.</p> | |
| Observations | | |
| <p>Estonia has no national policies regarding objectives and targets for engaging the local industry in the nuclear power programme. The INIR team was informed that if a positive decision to proceed with nuclear power is reached the NEPIO plans to prepare a national policy creating an enabling environment for the development of local suppliers. Other options mentioned could include utilizing the opportunities provided by the Estonian Business and Innovation Agency (EAS) or revising the Estonia Industrial Policy 2035.</p> <p>According to Fermi Energia AS, localization is fundamental for controlling costs and reducing overall risks of the project. It has performed a study to assess the potential service providers from the Estonian industry. The organization has interacted actively with major national companies to evaluate their background, experience, certifications, and production capabilities.</p> <p>The study also addresses requirements, standards, and codes. Some of the prospective companies already have nuclear experience, having been involved in projects in Finland, the United Kingdom, and other countries. In 2022, Fermi Energia AS organized a Supply Chain Workshop involving industry experts and representatives from the Estonian industry. This workshop included discussions on industrial codes and standards, regulatory and licensing approaches, etc.</p> <p>The INIR team was informed that Fermi Energia AS has arranged visits from several companies that are part of the supply chain for the prospective vendor to evaluate the possible participation of Estonian companies in the project.</p> | | |

Fermi Energia AS has also engaged with local industry associations such as the Federation of Estonian Engineering Industry (representing manufacturing and steelworks companies) and the Estonian Electronics Industry Association (Electrical and electronics industries).

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| Areas for further action | Significant | National Policy for Industrial Involvement |
| | Minor | No |

RECOMMENDATIONS

R-18.1.1 The NEPIO should develop a policy for national industrial involvement in the nuclear power programme.

SUGGESTIONS

S-18.1.1

GOOD PRACTICES

GP-18.1.1

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| 19. Procurement | | Phase 1 |
| Condition 19.1: Requirements for purchasing NPP services recognized | | |
| Summary of the condition to be demonstrated | Recognition of the requirements associated with purchasing services. | |
| Examples of how the condition may be demonstrated | (1) Appropriate procurement of consulting services in Phase 1; (2) Evidence that the issues related to services for Phase 2 activities are recognized, allowing for both national and foreign suppliers. | |
| Observations | | |
| <p>The procurement of goods, services and works follow the EU regulations, and for public authorities also the Public Procurement Act.</p> <p>All public procurements are processed through a centralized State Support Service Centre, which provides competition and transparency. All proceedings are public.</p> <p>Many studies were procured during Phase 1, relating to areas such as: Legal Framework, Regulatory Framework, Human Resource Development, Safeguards, Radiation Protection, Stakeholder Involvement, Siting, and Radioactive Waste Management. The specifications, Terms of Reference (ToR) and bid evaluation criteria for these services were prepared by small core groups within the NEPIO, sent to NEPIO for their review, and submitted to the Service Centre.</p> <p>For Phase 2, as demand for services increases, NEPIO plans to have dedicated staff to coordinate the procurement process.</p> <p>Fermi Energia AS has dedicated procurement staff. As a private company, is not subject to public regulations, and procures services through standard commercial processes. However, for technology selection the company opted to replicate in part the public procedure, using evaluation criteria to assess the bid proposals.</p> | | |
| Areas for further action | Significant | No |
| | Minor | No |
| RECOMMENDATIONS | | |
| R-19.1.1 | | |
| SUGGESTIONS | | |
| S-19.1.1 | | |
| GOOD PRACTICES | | |
| GP-19.1.1 | | |

APPENDIX 2: LISTS OF THE INIR TEAM MEMBERS AND COUNTERPARTS

| INIR MISSION REVIEW TEAM | |
|--------------------------|---|
| Aline Des Cloizeaux | IAEA, Director, Division of Nuclear Power |
| Eric Mathet | Team Leader, IAEA |
| Michelle Scott | Mission Coordinator, IAEA |
| Jessica Rahim | IAEA |
| Matthew Van Sickle | IAEA |
| Paula Calles Vives | IAEA |
| Teodros Hailu | IAEA/Observer |
| Felicia Dragolici | IAEA |
| José Ferraz Bastos | International Expert |
| Stephen Mortin | International Expert |
| Marcelo Gomes da Silva | International Expert |

| PARTICIPANTS FROM GOVERNMENT OF THE REPUBLIC OF ESTONIA | | |
|---|---|--|
| | INFRASTRUCTURE ISSUE | REPRESENTATIVE/ RESPONSIBLE ORGANIZATION(S) |
| 1 | National Position (23 October 2023) | <ul style="list-style-type: none"> ▪ Antti Tooming, Deputy Secretary General of the Ministry of Climate ▪ Timo Tatar, Deputy Secretary General of the Ministry of Climate ▪ Kalev Kallemets, CEO, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |

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| 2 | <p>Nuclear Safety (24 October 2023)</p> | <ul style="list-style-type: none"> ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS |
| 3 | <p>Management (23 October 2023)</p> | <ul style="list-style-type: none"> ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |
| | <p>Funding and Financing (25 October 2023)</p> | <ul style="list-style-type: none"> ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kalev Kallemets, CEO, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |
| 5 | <p>Legal Framework (23 October 2023)</p> | <ul style="list-style-type: none"> ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Heddi Lutterus, Deputy Secretary General of the Ministry of Justice ▪ Rene Lauk, Lawyer of the of the Ministry of Climate ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Sten Veidenbaum, TRINITI Law Firm, Attorney-at-Law ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |

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| 6 | <p>Safeguards (24 October 2023)</p> | <ul style="list-style-type: none"> ▪ Siiri Koidla, Senior officer, Radiation Protection Bureau, Environmental Board ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kõöp, Head of Safety, Fermi Energia AS |
| 7 | <p>Regulatory Framework (23 October 2023)</p> | <ul style="list-style-type: none"> ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Maarja Allmaa, Chief Specialist, Division on Building Right of the Consumer Protection and Technical Regulatory Authority ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kõöp, Head of Safety, Fermi Energia AS |
| 8 | <p>Radiation Protection (25 October 2023)</p> | <ul style="list-style-type: none"> ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kõöp, Head of Safety, Fermi Energia AS |

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| 9 | <p>Electrical Grid (26 October 2023)</p> | <ul style="list-style-type: none"> ▪ Rein Vaks, Head of the Energy Department of the Ministry of Economic Affairs and Communications ▪ Oleg Tšernobrovkin, Head of Energy System Planning Unit, ELERING AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |
| 10 | <p>Human Resource Development (25 October 2023)</p> | <ul style="list-style-type: none"> ▪ Renno Veinthal, Deputy Secretary General of the Ministry of Education and Research ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Külli All, Head of the Area of skills and qualifications policy, Ministry of Education and Research ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |
| 11 | <p>Stakeholder Involvement (26 October 2023)</p> | <ul style="list-style-type: none"> ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kalev Kallemets, CEO, Fermi Energia AS ▪ Agnes Aaslaid, Adviser, Public Relations Department, Ministry of the Climate ▪ Diana Revjako, Executive board member, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |

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| 12 | <p>Site and Supporting Facilities (24 October 2023)</p> | <ul style="list-style-type: none"> ▪ Alan Rood, Adviser for Regional Planning at the Ministry of Regional Affairs and Agriculture ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kaspar Kõöp, Head of Safety, Fermi Energia AS |
| 13 | <p>Environmental Protection (26 October 2023)</p> | <ul style="list-style-type: none"> ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Diana Revjako, Executive board member, Fermi Energia AS ▪ Margit Tennokene, Head Specialist, Nature Conservation Department, Ministry of the Climate ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kõöp, Head of Safety, Fermi Energia AS |
| 14 | <p>Emergency Planning (24 October 2023)</p> | <ul style="list-style-type: none"> ▪ Aigo Allmäe, Ministry of the Interior ▪ Teet Koitjärv, Advisor to Climate and Radiation Department, Environmental Board ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kõöp, Head of Safety, Fermi Energia AS |

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| 15 | Nuclear Security (24 October 2023) | <ul style="list-style-type: none"> ▪ Aigo Allmäe , Ministry of the Interior ▪ Teet Koitjärv, Advisor to Climate and Radiation Department, Environmental Board ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |
| 16 | Nuclear Fuel Cycle (25 October 2023) | <ul style="list-style-type: none"> ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS |
| 17 | Radioactive Waste Management (25 October 2023) | <ul style="list-style-type: none"> ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Alari Kruusvall, A.L.A.R.A ltd |

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| <p>18</p> | <p>Industrial Involvement (25 October 2023)</p> | <ul style="list-style-type: none"> ▪ Anu Koppel, Supply Chain Manager, Fermi Energia AS ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |
| <p>19</p> | <p>Procurement (24 October 2023)</p> | <ul style="list-style-type: none"> ▪ Marily Jaska, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Ilmar Puskar, Head of the Climate and Radiation Department of the Environmental Board ▪ Reelika Runnel, Advisor of the Environmental Management and Radiation Department of the Ministry of Climate ▪ Henri Ormus, Member of the Management Board, Fermi Energia AS ▪ Kaspar Kööp, Head of Safety, Fermi Energia AS |

APPENDIX 3: REFERENCES

Documents Provided by Estonia:

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2. KSU – Nuclear Training and Safety Centre, Nuclear Seminar, 20-22 October 2021, Booklet, PDF file (2021);
3. ELERING AS, Strategy 2024-2030. On the Way to a Climate-Neutral Energy System (October 2023);
4. ELERING AS, Strategy 2024-2030. National Itinerary for the Foundational Infrastructure for Responsible Use of Small Modular Reactor Technology (FIRST) Study Tour for Estonia (September 2023);
5. MINISTRY OF CLIMATE. Estonian Nuclear Energy Working Group Activities and INIR Preparation, Energy Working Group presentation, Tallinn (October 2023);
6. MINISTRY OF ECONOMIC AFFAIRS AND COMMUNICATION, Estonian Industry Needs Joint Efforts of the State and Entrepreneurs to Grow, 1 September 2023; Link: <https://www.mkm.ee/en/estonian-industry-needs-joint-efforts-state-and-entrepreneurs-grow> | Majandus- ja Kommunikatsiooniministeerium (mkm.ee);
7. MINISTRY OF ECONOMIC AFFAIRS AND COMMUNICATION, The Industrial Policy 2035, (in Estonian), Tallinn (2023).

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1. INTERNATIONAL ATOMIC ENERGY AGENCY, Milestones in the Development of a National Infrastructure for Nuclear Power, Nuclear Energy Series No. NG-G-3.1 (Rev. 1), IAEA, Vienna (2015);
2. INTERNATIONAL ATOMIC ENERGY AGENCY, Evaluation of the Status of National Nuclear Infrastructure Development, Nuclear Energy Series No. NG-T-3.2 (Rev. 1), IAEA, Vienna (2016);
3. INTERNATIONAL ATOMIC ENERGY AGENCY, Guidelines for Preparing and Conducting an Integrated Nuclear Infrastructure Review (INIR), Services Series No. 34, IAEA, Vienna (2017).

APPENDIX 4: ABBREVIATIONS

| | |
|---------|---|
| ALARA | As-Low-As-Reasonably-Achievable |
| BWR | Boiling Water Reactor |
| CBRN | Chemical, Biological, Radiological, Nuclear |
| CESA | Central European Synchronous Area |
| CNSC | Canadian Nuclear Safety Commission |
| CSA | Comprehensive Safeguards Agreement |
| CBD | Convention on Biological Diversity |
| CEO | Chief Executive Officer |
| CNSC | Canadian Nuclear Safety Commission |
| CPF | Country Programme Framework |
| CPPNM/A | Convention on the Physical Protection of Nuclear Material and its Amendment |
| CSC | Convention on Supplementary Compensation for Nuclear Damage |
| DGR | Deep Geological Repository |
| EIA | Environmental Impact Assessment |
| EPREV | Emergency Preparedness Review |
| EPR | Emergency Preparedness and Response |
| EIA | Environmental Impact Assessment |
| ENMAK | Estonian Energy Sector Development Plan |
| EPR | Emergency Preparedness and Response |
| EPREV | Emergency Preparedness Review |
| EU | European Union |
| EURATOM | European Atomic Energy Community |
| FE | Fermi Energia AS |
| FMS | Fermi Energia Management System |

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|-------|---|
| FOAK | First of a Kind |
| FIRST | Foundational Infrastructure for Responsible Use of Small Modular Reactor Technology |
| HLW | High-Level Radioactive Waste |
| HR | Human Resources |
| IAEA | International Atomic Energy Agency |
| ICDS | International Centre for Defense Studies |
| INI | Intercontinental Nuclear Institute |
| ILW | Intermediate Level Waste |
| INIR | Integrated Nuclear Infrastructure Review |
| IRRS | Integrated Regulatory Review Service Mission |
| KAPO | Estonian Internal Security Service |
| LLW | Low Level Waste |
| MS | Management System |
| MWe | Megawatt Electric |
| MoU | Memorandums of Understanding |
| NATO | North Atlantic Treaty Organization |
| NEPIO | Nuclear Energy Programme Implementing Organization |
| NICPB | National Institute of Chemical Physics and Biophysics |
| NPP | Nuclear Power Plant |
| NPRWM | National Action Plan for Radioactive Waste Management |
| NPT | Treaty on the Non-Proliferation of Nuclear Weapons |
| NSG | Nuclear Suppliers Group |
| NSRDP | National Radiation Safety Development Plan |
| OPG | Ontario Power Generation |
| PWR | Pressurized Water Reactor |
| PPA | Power Purchase Agreements |

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|--------|--|
| SBD | Safeguards By Design |
| SER | Self-Evaluation Report |
| SMR | Small Modular Reactor |
| SNF | Spent Nuclear Fuel |
| SSAC | State System of Accounting for and Control of Nuclear Material |
| STUK | Radiation and Nuclear Safety Authority of Finland |
| SWG | Sub-working Group |
| TC | Technical Cooperation |
| TSO | Technical Support Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VVD | State Environmental Service of Latvia |
| WANO | World Association of Nuclear Operators |
| WENRA | Western European Nuclear Regulators Association |
| WNU | World Nuclear University |