Appendix 1

International consultation document

Kuopion Energia Oy

Environmental impact assessment of a small modular reactor (SMR) plant

Environmental impact assessment programme

Annex 1 International consultation summary document

March 2026

AFRY Finland Oy's project number is 101029349.

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1 PARTY RESPONSIBLE FOR THE PROJECT AND PURPOSE OF THE PROJECT

Kuopion Energia Oy is planning a small-scale nuclear power plant in Kuopio in the North Savo region. Two alternative plant sites are under review, Hepomäki and Sorsasalo. The purpose of the small-scale nuclear power plant, i.e. a Small Modular Reactor (SMR) plant, is to produce district heat for the district heating network of the City of Kuopio.

Kuopion Energia Oy is a wholly owned energy company of the City of Kuopio, with operations such as energy production, district heating and district cooling. Energy production is carried out mainly at the Haapaniemi combined heat and power plant, where wood is the principal fuel and peat is still used to a limited extent. The older unit of the power plant is expected to be decommissioned in around 2035, and small-scale nuclear power is regarded as a viable future option for district heat production.

The aim is to complete the EIA procedure for the project during the spring of 2027. According to the current plan, the decision on proceeding with the SMR plant project will be made during 2030. The construction phase is estimated to take around five years, and the planned commissioning of the SMR plant is expected around 2035.

2 DESCRIPTION OF THE PROJECT

The SMR plant considered in the project is a heat-only plant for district heat production. The EIA procedure examines an SMR plant with a maximum thermal output of approximately 150 megawatts (MW), with a maximum of four reactors producing only district heat. A schematic illustration of the heat-only plant intended for district heat production is presented in the accompanying figure (Figure 1).

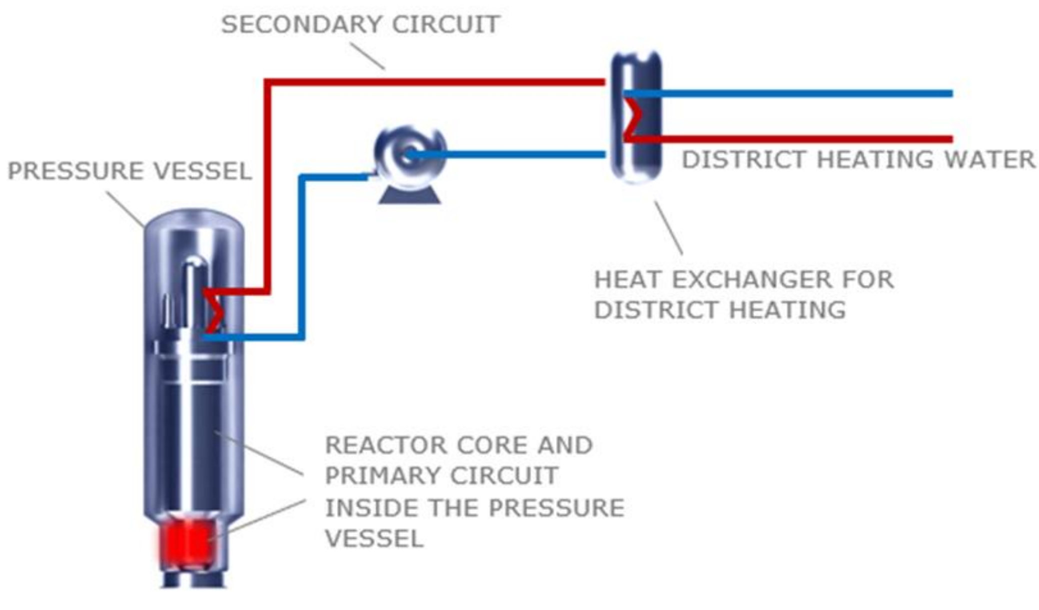

Figure 1. Schematic illustration of a small-scale heat-only nuclear power plant for district heat production.

The SMR plant is used for supplying the district heating base load, meaning it is operated mainly at a steady full output. When necessary, the small modular reactor can also be operated more flexibly at lower power levels in accordance with the plant's operating conditions. For example, during the summer, when the demand for district heat is low, the plant needs to be operated at a lower power level. A heat-only small modular reactor used for district heat production does not require cooling water from a water body, and therefore does not discharge heat into the aquatic environment.

The SMR plant would consist of up to four reactor units. The planned combined heat output of the reactors at the plant is up to 150 MW. The efficiency of the plant is estimated to be up to 95%, so it is possible to produce a maximum of around 143 MW of heat to the district heating network.

The SMR plant is planned to be built in Kuopio (Figure 2), where it has two alternative locations, Hepomäki and Sorsasalo (Figure 3). District heat produced in the SMR plant will be transferred to Kuopion Energia's district heating network via a new district heat transmission connection to be built. In Hepomäki, the district heat transmission connection will be placed under a new road to be built in the area. A new district heat transmission connection will be built from Sorsasalo to the Haapaniemi power plant across Lake Kallavesi, with the transmission pipeline installed along the bottom of the lake.

The estimated space requirement for the SMR plant and the related buildings and structures is around 3 hectares. The SMR plant can be located either in an above-ground open pit or in a rock cavern excavated mainly underground. The amount of excavation required is estimated at up to around 130,000 m^3.

During operation, the SMR plant generates very low-, low- and intermediate-level radioactive waste (operational waste), as well as high-level spent nuclear fuel. The handling and interim storage of this waste on the plant site are included in the EIA procedure. Operational waste is sorted and processed within the power plant area and packaged into its final form for storage in the on-site interim storage facility, or transferred for interim storage outside the plant area. From the interim storage facility, the operational waste is transferred for final disposal at a repository site located outside the plant area. Interim storage of spent nuclear fuel can be implemented either on the plant site or in a centralised interim storage facility located elsewhere. After interim storage, the spent fuel will be finally disposed of at a licensed final repository site located in the Finnish bedrock. The environmental impact assessment does not include the final disposal of very low-, low- and intermediate-level radioactive waste or of spent nuclear fuel. A separate EIA procedure for these will be undertaken, if required, at a later stage.

The implementation of the project also requires the construction of new road connections, an electrical connection and water and sewer connections on the plant site.

The SMR plant examined in the project is, in principle, a light water reactor plant. The majority of the world's nuclear power plants and all the nuclear power plants in use in Finland are light water reactors. The SMR plant under examination is a pressurised water reactor, which is the most common nuclear power plant type in the world. The reactor type used at the Loviisa nuclear power plant units in operation in Finland, as well as at the Olkiluoto 3 plant, is the pressurised water reactor (PWR). In the case of a plant producing only district heat, the facility is significantly smaller and simpler than the nuclear power plants currently operating in Finland.

SMR plants that produce only heat are currently in the planning phase, which is why there is limited information available about the technology. However, the technical solutions are largely based on the technology of nuclear power plants used in power generation, for which there is extensive operational experience. Plant options intended for district heat production are commercially available within the schedule required for the Kuopion Energia project. The planned service life of the SMR plant is 60 years.

Figure 2. Kuopio's location in Finland.

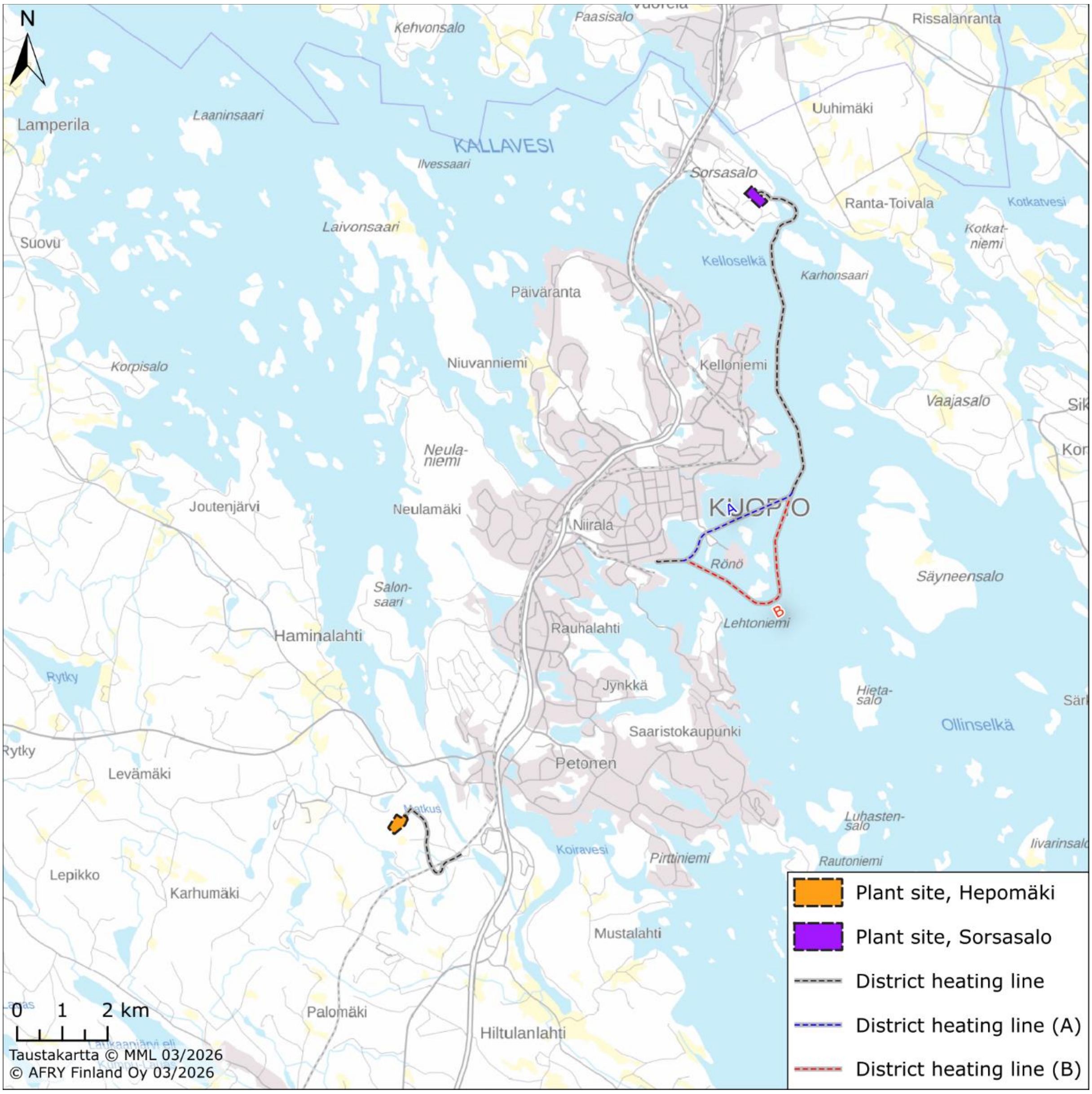

Figure 3. The location of the alternative project areas Hepomäki and Sorsasalo in Kuopio.

2.1 Options to be assessed in the EIA procedure

The EIA procedure examines two project options, VE1 and VE2. In addition, the EIA procedure includes a zero option (VE0), in which the project is not implemented, and the current state of the environment remains unchanged.

The options to be assessed in the EIA procedure are as follows:

VE0: The project will not be implemented. District heat production will continue in its current form using a combustion-based solution.

VE1: An SMR plant with a thermal output of up to around 150 MW will be built in Hepomäki, consisting of up to four reactors dedicated solely to district heat production. The district heat transmission connection from the plant to the existing district heating network will be built as an underground installation.

VE2: An SMR plant with a thermal output of up to around 150 MW will be built in Sorsasalo, consisting of up to four reactors dedicated solely to district heat production. The district heat transmission connection from the plant to the existing district heating network will be built mainly along the bottom of the lake and partly as an underground installation.

A description of the current state of the environment of the project areas is presented in the EIA programme.

3 NUCLEAR AND RADIATION SAFETY

In Finland, the use of nuclear energy must be safe under the Nuclear Energy Act and must not pose a risk to people, the environment or property. The nuclear safety requirements applicable to a nuclear facility are based on the Nuclear Energy Act (990/1987)[1] and the Nuclear Energy Decree (161/1988)[2], supplemented by the regulations[3] issued by the Radiation and Nuclear Safety Authority (STUK) and by the detailed requirements set out in the Regulatory Guides on nuclear safety (YVL Guides)[4] and Regulatory Guides on preparedness (VAL Guides)[5].

In 2024, STUK published an updated regulation on the emergency arrangements of a nuclear power plant (Y/2/2024)[6], in which the determination of the precautionary action zone and emergency planning zone was changed from fixed kilometre boundaries to a case-by-case assessment. This enables new nuclear projects to be zoned closer to the point of use in the same manner as in traditional district heat production plants.

3.1 Nuclear safety

The objective of nuclear safety is the safe operation of the nuclear facility and the protection of people and the environment from radiation. Nuclear safety consists of measures and systems that apply the principles of redundancy, separation and diversity in accordance with their safety significance.

In a nuclear power plant, the purpose of the safety functions is to prevent disturbances and accidents, to stop such situations from escalating and to mitigate the consequences of accidents. In an SMR plant, the key safety functions are passive, meaning that they do not require an external power source, such as electricity, to operate. The most important safety functions are:

- Reactivity management
- Removing decay heat
- Preventing the spread of radioactivity

Functionally, safety is ensured through the defence-in-depth safety principle, which consists of several successive and mutually reinforcing levels:

1. Prevention of operating transients and defects

[1] Nuclear Energy Act 990/1987 (https://www.finlex.fi/fi/lainsaadanto/1987/990)
[2] Nuclear Energy Decree 161/1988 (https://www.finlex.fi/fi/lainsaadanto/1988/161)
[3] Regulations issued by the Radiation and Nuclear Safety Authority (https://www.stuklex.fi/en/maarays)
[4] Regulatory Guides on nuclear safety (https://www.stuklex.fi/en/yvl-ohje)
[5] Regulatory Guides on preparedness (https://www.stuklex.fi/en/val-ohje)
[6] Regulation on the emergency arrangements of a nuclear power plant Y/2/2024 (https://www.stuklex.fi/en/maarays/stuk-y-2-2024)

2. Management of operating transients and defects
3. Management of accidents
4. Management of severe accidents and release control
5. Mitigation of the consequences of the release of radioactive substances (preparedness and rescue operations)

The defence-in-depth principle is also applied in the prevention of the spread of radioactive substances. The prevention of the release of radioactivity from nuclear fuel consists of the following successive levels:

1. Nuclear fuel including fuel pellets with ceramic cladding and fuel rods with gas-tight cladding
2. Reactor primary circuit
3. Reactor pressure vessel / reactor overpack
4. A reactor building designed to withstand an aircraft impact, located either above ground or underground.

An SMR plant and its structures and systems are designed to withstand situations related to external threats, such as extreme weather events, earthquakes, potential external events caused by other production plants, and aircraft impact.

3.2 Radiation and its monitoring

In an SMR plant, radioactive substances are generated as fission products when the atomic nuclei of the fuel split, through neutron activation in or near the reactor, and as products of the radioactive decay of the substances described above.

Systems containing radioactive substances are located within the controlled area, where specific safety instructions are followed to ensure protection against radiation. In the design of an SMR plant, the ALARA (As Low As Reasonably Achievable) principle is applied, meaning that all radiation exposures are kept as low as possible through practical measures, taking economic and societal factors into account.

Before an SMR plant is commissioned, a baseline environmental survey will be carried out within the plant area and its surroundings to determine the prevailing radiation conditions prior to the start of operation. During operation, radiation and releases of radioactive substances are monitored in accordance with the radiation monitoring programme approved by STUK.

The limit values for radiation doses to the public arising from the operation of a nuclear power plant are defined in the Nuclear Energy Decree (161/1988, section 22b). The limit on the annual dose received by an individual of the population from the normal operation of a nuclear power plant is 0.1 millisieverts, which is less than 2% of the average annual radiation dose (5.9 mSv) of Finns. The majority of the annual radiation dose to Finns is caused by indoor radon (4 mSv).

For events deviating from the normal operation of a nuclear power plant, the Nuclear Energy Decree (161/1988, section 22b) defines the limit values for radiation doses to the public as follows:

- Anticipated operational occurrences – 0.1 mSv
  - The expected occurrence of the incident is one or more times over a period of 100 years of operation.
- Class 1 anticipated accidents – 1 mSv

  - The expected occurrence of the incident is less than one time over a period of 100 years of operation, but at least one time over a period of 1,000 years of operation.
- Class 2 anticipated accidents – 5 mSv
  - The expected occurrence of the incident is less than one time over a period of 1,000 years of operation.
- Extension of an anticipated accident – 20 mSv
  - An anticipated operational occurrence or a Class 1 anticipated accident is accompanied by a common cause failure in the system required to perform the safety function, or
  - A combination of defects identified as significant based on probabilistic risk analysis, or
  - A rare external event that the plant is required to withstand without severe fuel damage.

4 EIA PROCEDURE

The need for an EIA procedure in Finland is based on the Act on the Environmental Impact Assessment Procedure (252/2017). The planned activity corresponds to item 7(b) of the project list in Annex 1 of the Environmental Impact Assessment Act: Nuclear power stations and other nuclear reactors.

This project is subject to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context.

4.1 International consultation procedure

The assessment of environmental impacts in a transboundary context is governed by the Espoo Convention (*Convention on Environmental Impact Assessment in a Transboundary Context*). Finland ratified this United Nations Economic Commission for Europe convention in 1995. The Espoo Convention entered into force in 1997. In Finland, the obligations of the Espoo Convention have been implemented through the Environmental Impact Assessment Act and the Decree on the entry into force of the Convention on Environmental Impact Assessment in a Transboundary Context (SopS 67/1997). Internationally, public participation and rights of appeal are regulated in the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (SopS 121–122/2004, the Aarhus Convention). The Aarhus Convention aims, among other objectives, to enable the public to participate in decision-making in environmental matters. The Aarhus Convention has been implemented in the EU through a number of directives, including the EIA Directive.

The parties to the Espoo Convention have the right to participate in an environmental impact assessment procedure carried out in another country if the harmful and likely significant environmental impacts of the project under assessment may affect their country ("the affected Party"). An international consultation procedure is necessary if a proposed project listed in Annex 1 to the Espoo Convention is likely to have significant adverse transboundary effects. This project list includes "nuclear power stations and other nuclear reactors". Accordingly, the transboundary environmental impact assessment procedure under the Espoo Convention may be applied to small-scale nuclear power plants.

The Point of Contact of the Party (country) of origin notifies the Points of Contact of those Parties (countries) considered likely to be affected by the project of the commencement of the EIA procedure and offers them the opportunity to participate in the procedure. If the affected Party (country) decides to participate in the assessment procedure, it will make the project documentation provided by the Party (country) of origin publicly available in the affected country for comments and opinions from its authorities and the public. The Point of Contact of the affected Party (country) compiles the comments and opinions received and then submits them to the Point of Contact of the Party (country) of origin. The Point of Contact of the Party (country) of origin submits the comments and opinions received to the competent authority for consideration in its own statement.

In the transboundary consultation procedure under the Espoo Convention, the competent authority for Finland (Party of origin) is the Finnish Environment Institute (Syke). During the EIA programme phase, a decision has been made to notify the following states pursuant to the Espoo Convention: Sweden, Norway, Denmark, Germany, Poland, Lithuania, Latvia, Estonia and Austria. The Finnish Point of Contact (Finnish Environment Institute, Syke) submits the comments and opinions received from the affected Parties to the national EIA authority (Ministry of Economic Affairs and Employment), which takes the comments and opinions/feedback into account in its own statement.

The procedure under the Espoo Convention is completed once the permits for the project have been granted and publicly announced in the countries that have participated in the transboundary consultation.

4.2 EIA procedure in Finland

The objective of the EIA Act is to promote environmental impact assessment and the uniform consideration of the assessment in planning and decision-making. The EIA procedure is an open process, and one of its objectives is to improve access to information and participation opportunities for all stakeholders.

The environmental impacts of the project must be assessed in the statutory EIA procedure at the earliest possible phase of project planning, when the alternatives are still open. The EIA procedure does not involve making decisions on the project, but it is a prerequisite for subsequent decision-making. It is therefore provided that the authorities may not grant permits for the implementation of the project, or make other comparable decisions, before the EIA procedure has been completed.

The EIA procedure is a two-step process. The EIA programme is submitted to the Ministry of Economic Affairs and Employment, which acts as the competent authority, and the Ministry announces the EIA programme by publishing a public notice on its website. The EIA programme is made available for public review for a period of 30–60 days.

During the public notice period, the authorities, local residents and other parties concerned may submit statements and opinions on the EIA programme to the competent authority. An international consultation will take place in parallel with the national consultation procedure. The competent authority compiles all the statements and opinions submitted on the EIA programme and issues its own statement on the basis of them.

In the next phase of the EIA procedure, an environmental impact assessment report (EIA report) is prepared on the basis of the EIA programme and the competent authority's statement on it. The results of the assessment are compiled in the EIA report, which is submitted to the competent authority. A public notice of the EIA report will be issued in the same manner as for the EIA programme, and during the public display period of the EIA report, an international consultation will be carried out in parallel with the national consultation with those Parties to the Espoo Convention that have announced their participation in the assessment procedure. On the basis of the EIA report and the statements and opinions submitted during both the national and international consultation procedures, the competent authority prepares its reasoned conclusion on the significant environmental impacts of the project. The permit application for the project must include the EIA report and the reasoned conclusion.

The Finnish EIA procedure ends with the reasoned conclusion issued by the competent authority. The conclusion must be attached to the project's permit applications. During the permit phase, the reasoned conclusion is checked to ensure that it is up to date. The permit decision must specify how the EIA report, the reasoned conclusion and the documents concerning the international consultation have been taken into account.

The preparation of the EIA report begins immediately after the programme phase. The EIA procedure is expected to be completed in April 2027.

5 DESCRIPTION OF THE ASSESSMENT WORK

5.1 Impacts to be assessed

Environmental impacts refer to the direct and indirect impacts of the project on the environment. In accordance with section 2 of the EIA Act, the assessment examines the environmental impacts caused by the project on:

- The population and people's health, living conditions and comfort
- Land, soil, water, air, climate, vegetation, organisms and biodiversity
- Urban structure, material assets, landscape, cityscape and cultural heritage
- Exploitation of natural resources, and
- Interactions between these factors.

The assessment considers impacts during construction and operation, as well as impacts arising after the end of operations. The impacts of the non-implementation of the project are also assessed (zero option, VE0). The assessment also highlights the uncertainties related to the assessment and the measures to prevent and mitigate adverse impacts.

The impact assessment is carried out in the form of expert assessments. The assessment work is based on existing and publicly available materials, as well as on studies and models carried out as part of the assessment work. The material to be used is described in more detail in the EIA programme.

5.2 Baseline data and project-specific studies

The environmental impact assessment is based on existing data, publicly available material and information generated during the plant's preliminary design. Various studies have been prepared for the zoning of both project areas, which are used in the EIA procedure. As part of the environmental impact assessment work related to this project, the following separate studies have been carried out during the EIA programme phase to support the existing material:

- Construction feasibility study in Sorsasalo and Hepomäki
- Vegetation and habitat survey in Sorsasalo and Hepomäki
- Aquatic vegetation survey in Lake Kallavesi
- Benthic fauna survey in Lake Kallavesi
- Natural seismicity assessment

- Underwater archaeological inventory

The results of these studies have already been used in the preparation of the EIA programme.

During the EIA report phase, the following studies will be carried out to support the environmental impact assessment work:

- Sediment sampling and contaminant analysis in Lake Kallavesi
- Siberian flying squirrel (*Pteromys volans*) survey in Sorsasalo and Hepomäki
- Supplement to vegetation and habitat surveys in Sorsasalo and Hepomäki
- Breeding bird survey in Sorsasalo and Hepomäki
- Moor frog survey in Sorsasalo
- Scarce fritillary (*Euphydryas maturna*) survey in the vicinity of the Hepomäki project area
- Noise modelling for the construction and operational phases
- Combined noise modelling (Sorsasalo)
- Illustrative images of an SMR plant
- Severe accident modelling (see section 5.3.1)

The results of the above-mentioned studies are presented in the EIA report.

5.3 Identified key environmental impacts and assessment of transboundary impacts concerning Finland

The environmental impact assessment is targeted at the likely significant environmental impacts of the project. Based on preliminary assessments, the main impact categories identified for this project are:

- Impacts on the aquatic environment during construction of the district heating transmission line (project option VE2)
- Impacts on nature during construction
- Impacts on people's living conditions, comfort and health
- Impacts on climate (positive impact)

Within the EIA procedure, the assessment covers both the impacts occurring within Finland and any potentially harmful transboundary impacts caused by the project.

Preliminary assessment indicates that the project is not likely to cause significant transboundary impacts. Only a severe reactor accident and the resulting release of radioactive substances could potentially have harmful transboundary effects. However, in this regard, the preliminary estimate is that the impacts are likely to remain within Finland's borders.

In the EIA report phase, potential transboundary impacts of Finland are assessed using dispersion modelling, in which the impacts of radioactive releases from an accident scenario are examined up to a distance of 300 kilometres. The modelling method and the basis for the scope of modelling are described in section 5.3.1.

The climate impacts of the project are assessed by calculating the carbon footprint during the project's life cycle. The positive climate impacts of the project are assessed by comparing the emission intensity of the district heat produced in the project with the emission intensity of the district heat produced in other ways. The impacts of climate change on the project are assessed by examining the risks caused by extreme weather events and the adaptation measures required by them. The climate impact assessment is described in more detail in section 18 of the EIA programme.

5.3.1 Severe accident modelling

As part of the environmental impact assessment, a hypothetical severe accident at an SMR plant is assessed. The radioactive release is scaled in accordance with section 22 b of the Nuclear Energy Decree (161/1988), using the reference release of 100 TBq of caesium-137 and the thermal power of Olkiluoto 3 (4,300 MW) to derive a release level corresponding to an SMR plant with a thermal power of 150 MW. Accordingly, the radioactive release applied in the modelling is 3.5 TBq of caesium-137. The Olkiluoto 3 nuclear power plant has been selected as the reference plant due to its modern design and advanced safety systems, which are considered representative of the accident management capabilities of new nuclear power plants. If preliminary estimates of accident release quantities are available from plant suppliers, these estimates will be compared in the EIA report with the radioactive release applied in the modelling.

The impacts of an accident are assessed up to a distance of 300 kilometres from the SMR plant. The preliminary size of the SMR plant's precautionary action zone and emergency planning zone is assessed on the basis of the requirements set out in STUK Regulation Y/2/2024[7].

The examination of a 300-kilometre impact area is based on previous environmental impact assessments for large nuclear power plants, in which the impacts of a severe accident have been assessed using a reference radioactive release of 100 TBq of caesium-137. The table (Table 1) presents the radiation doses assessed for a one-year-old over a lifetime, up to a distance of 1,000 kilometres, in the environmental impact assessment report for the service life extension of the Loviisa nuclear power plant[8] and in the environmental impact assessment report for the service life extension and thermal power uprating of the Olkiluoto 1 and Olkiluoto 2 units[9], as a consequence of a severe accident.

[7] Regulation on the emergency arrangements of a nuclear power plant Y/2/2024 (https://www.stuklex.fi/en/maarays/stuk-y-2-2024)
[8] Fortum Power and Heat Oy 2021. Loviisa nuclear power plant. Environmental impact assessment report. September 2021.

[9] Teollisuuden Voima Oyj 2024. Extending the service life of the Olkiluoto 1 and Olkiluoto 2 plant units and uprating their thermal power. Environmental impact assessment report. December 2024.

Table 1. Lifetime (70 years) radiation dose to a one-year-old at various distances in other environmental impact assessments using a 100 TBq caesium-137 release.

Distance (km)	Lifetime dose to a one-year old (mSv)	
	Loviisa 1 and 2	Olkiluoto 1 and 2
1	267	76.0
5	60.1	36.4
10	27.7	27.9
15	21.3	19.8
20	14.5	14.8
50	3.91	5.6
100	0.41	2.6
300	0.16	0.6
500	0.09	0.2
700	0.06	0.1
1,000	0.03	0.08

Based on assessments in earlier EIA procedures (Table 1), the lifetime radiation dose at 50 kilometres from a 100 TBq caesium-137 release is lower than the average annual radiation dose in Finland (5.9 mSv), and the dose decreases markedly with increasing distance. With the modelling release set at 3.5 TBq of caesium-137, the impact assessment area is conservatively limited to 300 kilometres.

The atmospheric transport of radionuclides is assessed using the Lagrangian Particle Dispersion Model (LPDM). The characteristics of the selected dispersion model are particularly well-suited to an SMR plant located in variable terrain and in the vicinity of industrial buildings.

For local-scale assessments, the AUSTAL[10] model is applied. On a regional scale, the HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory)[11] model is used. Both the AUSTAL and HYSPLIT models are widely validated and verified.

The atmospheric transport of radionuclides released in a hypothetical accident is calculated using atmospheric dispersion modelling software. Activity concentrations in air and ground deposition generated by the modelling software are used to estimate radiation doses to an

[10] German Environmental Agency 2024. AUSTAL. https://www.umweltbundesamt.de/en/topics/austal.
[11] Stein, A.F., Draxler, R.R, Rolph, G.D., Stunder, B.J.B., Cohen, M.D., Ngan, F. 2015. NOAA's HYSPLIT atmospheric transport and dispersion modelling system, Bull. Amer. Meteor. Soc., 96, 2059–2077.

unprotected population. Population dose calculations are performed using AFRY's AISM [12] software modelling tool.

The exposure pathways considered in the calculations are as follows:

- External exposure received within 48 hours from the start of exposure consists of two components.
    1. Gamma radiation resulting from a radioactive plume passing overhead.
    2. Gamma radiation caused by radionuclides deposited on the ground as a result of dry or wet deposition.
- The effective dose from inhalation accumulated within 48 hours from the start of exposure.

In the assessment of dispersion and deposition impacts up to a distance of 300 kilometres, radiation exposure to the population from the consumption of food is also taken into account. For the results, lifetime radiation doses are assessed for a one-year-old child, a ten-year-old child and an adult, in accordance with the recommendations of the International Commission on Radiological Protection (ICRP). Exposure durations of 70 years for a one-year-old child, 60 years for a ten-year-old child and 50 years for an adult are used in the calculations. In addition, the general impacts of radioactive fallout and radiation are examined.

The release height of the SMR plant's radioactive release will be examined at ground level and at around 40 metres.

Because the timing of a potential accident cannot be predicted, the modelling accounts for variations in local weather conditions throughout the year. Meteorological data from nearby weather stations is used in the modelling to identify the wind and stability conditions that would lead to plume dispersion and result in the highest radiation doses to the population. Because year-to-year variability may occur, the modelling analyses a minimum of five consecutive years of local meteorological data [13].

The modelling of a severe accident, including its methods and associated uncertainties, is described in more detail in chapter 21 of the EIA programme.

6 PERMITS, PLANS AND DECISIONS REQUIRED FOR THE PROJECT

Once the environmental impact assessment procedure has been completed, the project proceeds to the permit phases. The EIA report and the reasoned conclusion issued by the competent authority are attached to the permit applications.

[12] AFRY Intelligent Scenario Modelling (AISM) 2024. https://afry.com/en/service/intelligent-scenario-modelling-simulation-software.

[13] Environmental Protection Agency (EPA) 2020. Office of Environmental Enforcement (OEE). Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).

6.1 Decisions and licences under the Nuclear Energy Act

Finland is currently undergoing a comprehensive reform of nuclear energy legislation, and as a result, changes in licensing procedures are expected in the future, which will also be taken into account in this project. The current licensing and decision-making process related to the use of nuclear energy is briefly described below.

According to the Nuclear Energy Act, the construction of a nuclear facility requires a Government decision-in-principle that the construction of the nuclear facility is in line with the overall interest of society. The decision-in-principle requires the approval of Parliament. At the application stage for the decision-in-principle, STUK will conduct a preliminary safety assessment of the project, and will provide its views on the prerequisites for the construction of the nuclear facility in its statement. In its safety assessment, STUK states whether the prerequisites for the construction of the nuclear facility are met as required by the Nuclear Energy Act. At this stage, the technology and safety of the future nuclear facility are not yet being assessed on a detailed level.

The decision-in-principle also requires statements from the Ministry of the Environment, the municipality where the plant will be located and, as well from the neighbouring municipalities. Support from the host municipality is a prerequisite for the decision-in-principle. An environmental impact assessment (EIA) in accordance with environmental legislation must be carried out for new nuclear facility projects before applying for a decision-in-principle.

Under the Nuclear Energy Act, a construction licence for a nuclear facility is applied for by submitting a written application to the Government. STUK issues a statement on the construction licence application and carries out a safety assessment. The safety assessment includes a statement on the fulfilment of the requirements that fall within STUK's area of responsibility. The documents and information to be submitted to STUK in connection with the construction licence application are specified in Guide YVL.A1 (Regulatory oversight of safety in the use of nuclear energy) [14]. Other more specific requirements are presented in the YVL for different topics. [15]

Once the nuclear facility has been completed, an operating licence under the Nuclear Energy Act must be applied for. The operating licence is granted for a fixed period of time. An operating licence for a nuclear facility is applied for from the Government by means of a written application. YVL A.1 contains more detailed information about the documents to be submitted to STUK in connection with the operating licence application.

6.2 Other permits

The implementation of the project requires local detailed planning. The area of the Hepomäki SMR plant is located in an industrial and warehouse area (T) in accordance with the Hepomäki partial master plan, and in an area dominated by agriculture and forestry, with environmental values and outdoor recreation (MU). There are no areas within or around the Hepomäki plant site that are covered by a local detailed plan or a shoreline detailed plan. A local detailed planning process is ongoing for the Hepomäki area, during

[14] Regulatory oversight of safety in the use of nuclear energy YVL A.1 (https://www.stuklex.fi/en/ohje/YVLA-1)
[15] Regulatory Guides on nuclear safety (YVL) (https://www.stuklex.fi/en/yvl-ohje)

which the potential placement of the SMR plant will be examined. In Sorsasalo, a legally binding local detailed plan is in force, designating the area of the SMR plant as an industrial and warehouse block area where a major plant manufacturing or storing hazardous chemicals may be located (T/kem-2). A revision of the local detailed plan is ongoing for the area, and the process includes examining the potential placement of the SMR plant in the area. The zoning procedures for the project areas are proceeding in parallel with the EIA procedure, and the City of Kuopio is responsible for the zoning process. International consultations on zoning procedures are carried out as separate procedures.

In addition, the project requires, for example, a construction permit in accordance with the Construction Act (751/2023) and an environmental permit in accordance with the Environmental Protection Act (527/2014). The permits and decisions required for the project are described in more detail in chapter 4 of the EIA programme.