FINLAND

# SMART NUCLEAR FROM FINLAND

FINLAND, LEADING THE WORLD IN THE FINAL DISPOSAL OF SPENT NUCLEAR FUEL, OFFERS STRONG NUCLEAR KNOW-HOW ON THE SMARTEST FUTURE ENERGY SOLUTIONS

# CONTENTS



FINLAND

# FINLAND OFFERS AN EXCELLENT PLATFORM

Leading country in **SUSTAINABLE DEVELOPMENT** *2

The best destination for **INTERNATIONAL BUSINESS EXPANSION** in the EU *3

Number one **BUSINESS ENVIRONMENT** in the world *1

**THE HAPPIEST** country in the world *5

First-rate **INNOVATIONS** in the world *6

The most **STABLE COUNTRY** in the world *4

Top **UNIVERSITY-INDUSTRY-RESEARCH COLLABORATION** in the world *1

*1 Global Innovation Index 2016 / 2 UN Sustainable Development Report 2021 / 3 FDI attractiveness scoreboard, Copenhagen Economics 2016*
*4 The Fund for Peace, Fragile States Index 2016 / 5 UN 2018 World Happiness Report / 6 The Consumer Technology Association (CTA)™ 2018*

FINLAND

# NUCLEAR POWER IN FINLAND'S FUTURE ENERGY MIX

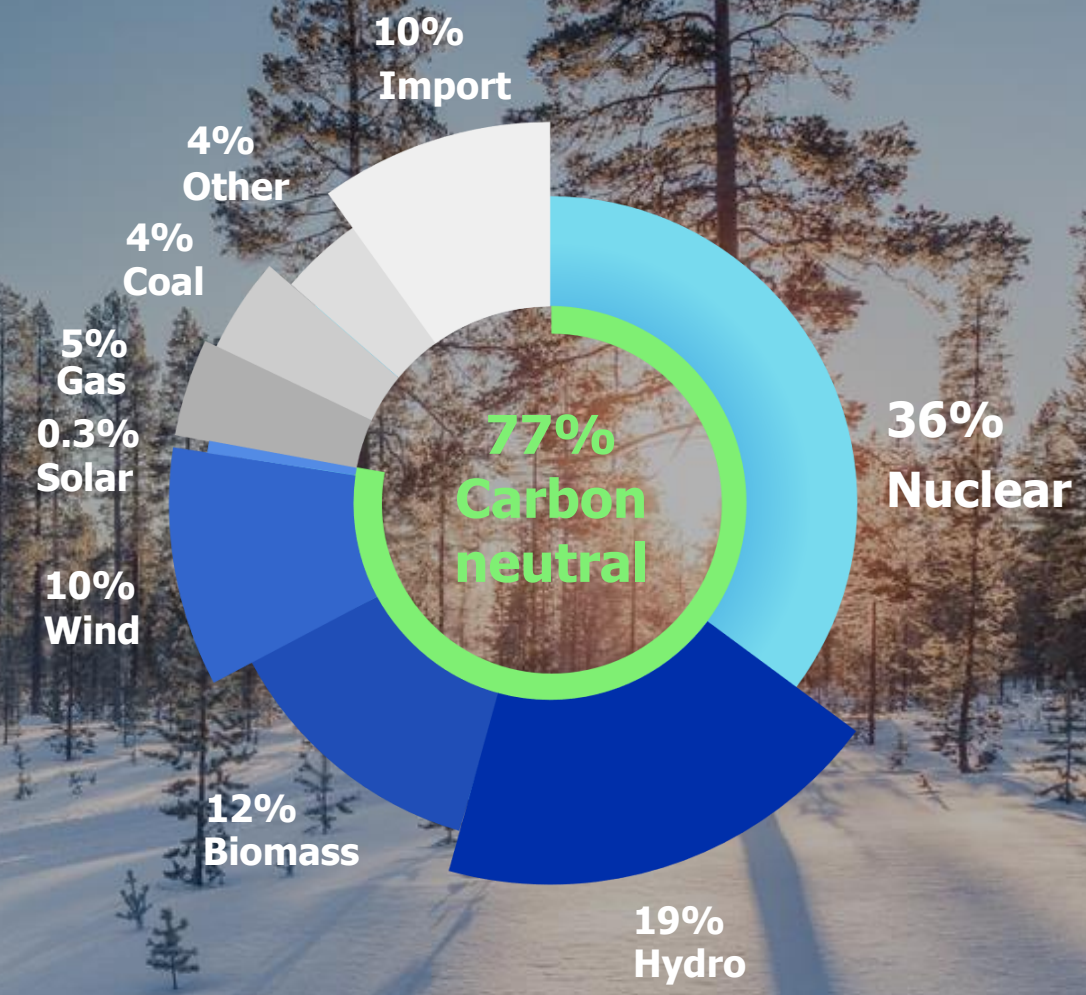
In Finland, significant proportions of electricity are generated by nuclear power, hydropower and co-generation with either district heating or industry.

One nuclear power plant unit is under commissioning and another nuclear newbuild project is ongoing. These will further increase the share of nuclear power and carbon-neutral power generation and decrease dependency on imported electricity.

Finland has ambitious goals related to climate change mitigation, and nuclear energy is seen as a key part of the fossil-free energy mix.

There is keen interest in developing small modular reactors and non-electric uses of nuclear energy for district heating as well as for the production of industrial heat, hydrogen, chemicals and synthetic fuels.

## ELECTRICITY PRODUCTION AND IMPORT ESTIMATE 2022




Source: Finnish Energy

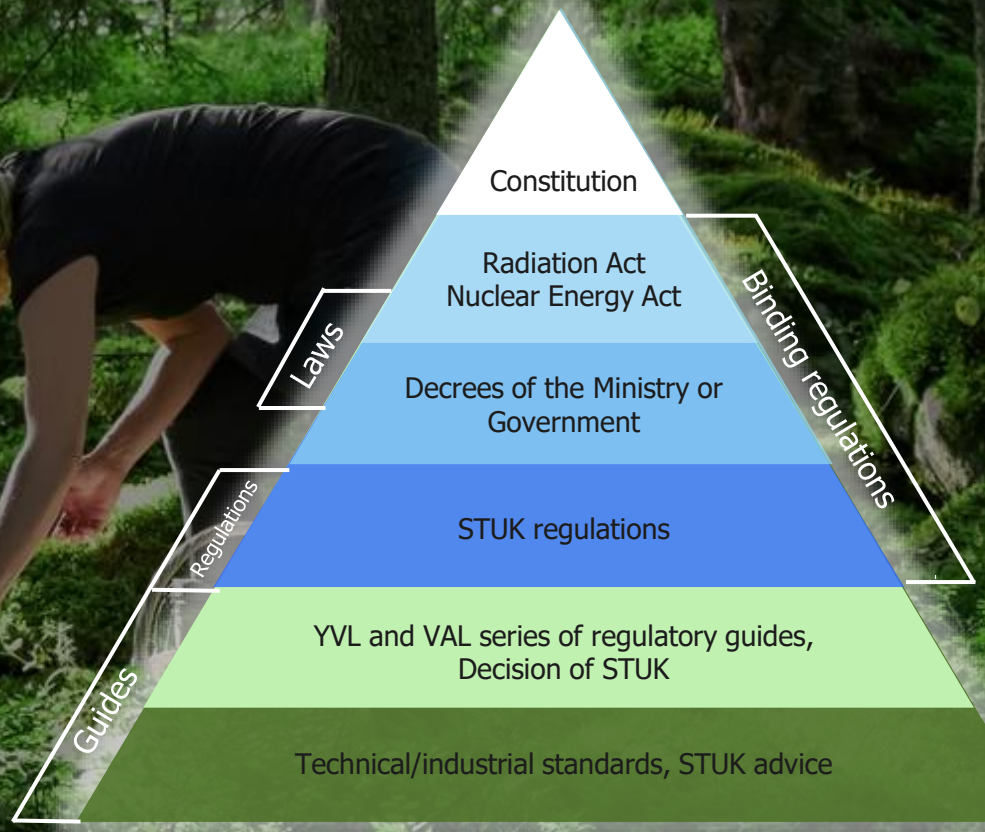
# WHY FINLAND?
# FUTURE REGULATION

The backbone of successful nuclear power production in Finland is strict regulation and inspection based on legislation.

The Ministry of Economic Affairs and Employment (MEAE) is responsible for supervising nuclear power operation and waste disposal. The National Nuclear Waste Management Fund operates in connection with the Ministry.

The country's Radiation and Nuclear Safety Authority (STUK) is responsible for regulation and inspection as well as advising on licensing. It operates under the Council of State, which licenses major nuclear facilities including uranium mines. STUK is administered by the Ministry of Social Affairs and Health and is supported by four advisory committees – nuclear safety, radiation safety, security and general.

Source: World Nuclear Association, STUK

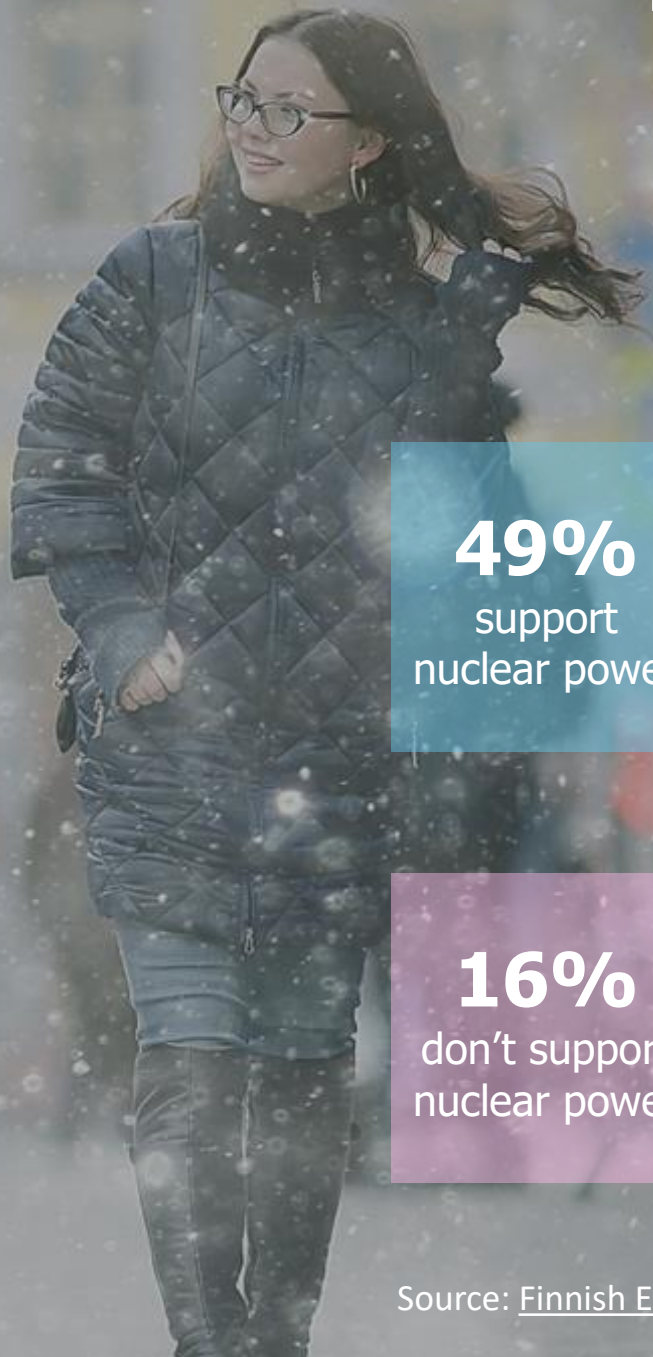


# WHY FINLAND?
# SOCIAL ACCEPTANCE

Support for nuclear power in Finland is at an almost record level, and the trend is ascending. Especially among young people, support has more than tripled in a year. This is partly a reaction to the International Climate Report in 2018, but it also shows trust in the safety and efficiency of Finnish nuclear plants that has been achieved by consistent and thorough work.

Key factors include:

- Effective nuclear plant upgrades to assure outstanding safety
- Sustainable waste management, including regulatory control
- Comprehensive regulation covering all phases from power plant planning to waste management and plant decommissioning
- Extensive inspections and regularly performed safety reassessments throughout the plant's life cycle based on strict regulations
- High-level education and research



**49%**
support
nuclear power

**16%**
don't support
nuclear power

Source: Finnish Energy

# ONKALO® FINAL DISPOSAL FACILITY FOR NUCLEAR WASTE

FINLAND

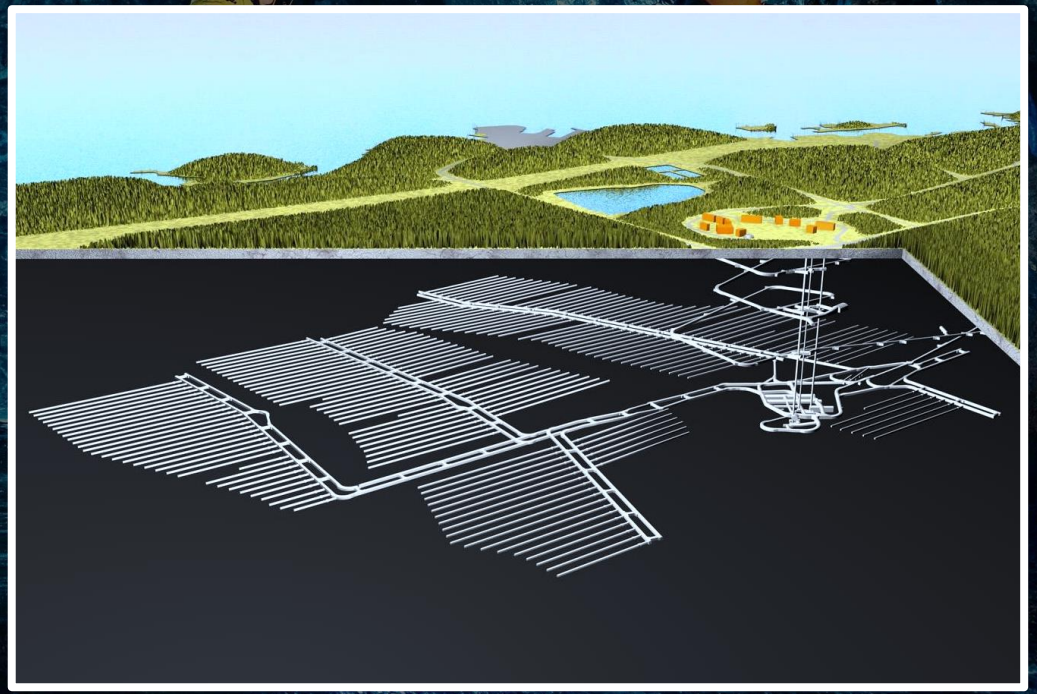
**Finland is a pioneer in the final disposal of spent fuel.** No other country has yet reached the implementation phase of final disposal. Many countries using nuclear power have final disposal facilities for low- and medium-level waste. Yet, the final disposal of high-level spent nuclear fuel has not yet been launched anywhere else beyond the planning phase.

ONKALO® consists of a spiral-shaped access tunnel, four vertical shafts, tunnels and technical rooms. The repository is constructed to a depth of 400–430 meters.

By 2020, approximately 10 km of different kinds of tunnels had been excavated in the Olkiluoto bedrock. During disposal operations, some 40 km of new tunnels will be produced.

The ONKALO facility is being developed and constructed by Posiva Ltd, a private subsidiary of the Finnish nuclear energy operators TVO and Fortum.

Read more



Picture courtesy: *Posiva*

# DECOMMISSIONING FiR1 RESEARCH REACTOR

FINLAND

FiR1 is a research nuclear reactor on the Otaniemi university campus used for training, research, isotope production and medical purposes. Preparation for dismantling is ongoing. The project is commissioned by VTT Technical Research Centre of Finland Ltd and carried out by Fortum Ltd.

**Decommissioning will progress as follows:**

- **Planning phase – 2020–2022**
  - Planning the dismantling
  - Radiation safety planning as pertains to dismantling
  - Waste treatment, characterization and disposal
- **Execution phase – 2022–2023**
  - Setting up the site
  - Operational radiation safety
  - Actual dismantling work
  - Clearance of the site
- **Waste handling phase – 2023–X**
  - Packaging and transportation
  - Final storage and disposal

**€23.5 million**
For FiR1 in Waste Management Fund (2019)

**21.4 kg**
Used uranium sent for re-use in the US

**100 $m^3$**
Low- and medium-level nuclear waste for disposal

# WORLD-CLASS EDUCATION

The safe use of nuclear energy requires in-depth knowledge that is generated through a diverse range of studies and long-term research.

**Aalto University**

Nuclear materials and engineering

Nuclear safety

Engineering physics

Geoengineering

**University of Helsinki**

Radionuclide transport and retention in rock and clay

Radiochemistry

Geology and geophysics

**University of Jyväskylä**

Nuclear and particle physics

**Lappeenranta University of Technology**

Nuclear engineering

**Tampere University**

Materials science

Environmental and energy engineering

Politics

**University of Eastern Finland**

Environmental physics, health and biology

Science and forestry

**University of Oulu**

Theoretical physics

Geosciences

**University of Turku**

Physics

Geology

# RESEARCH HIGHLIGHTS

## COMPUTATIONAL METHODS FOR PREDICTING RADIATION DAMAGE IN MATERIALS

**Aalto University** conducts research on the following topics:

- early-stage displacement damage in structural materials under neutron irradiation, through large scale atomistic simulations
- electron microscopy image simulation and modelling of radiation induced defects
- dislocation mobility in irradiated material

Read more

Aalto University

## THERMAL HYDRAULICS AND FLUID DYNAMICS

**Lappeenranta University of Technology** is working on research areas including:

- Thermal hydraulics for nuclear power plants, including experiments in thermal and fluid dynamics as well as accident situation and safety analyses
- Research related to the fourth generation of gas-cooled reactors, especially in reactor physics and thermal hydraulics modeling

Read more

LUT University

## RADIOACTIVITY AND WASTE MANAGEMENT

**Helsinki University** is researching:

- Ion exchange – applications and research on the fundamentals of separating harmful or useful chemical trace components
- Nuclear waste management – providing services from structure characterization to transport modeling
- Radioecology – almost 50 years of experience in environmental radioactivity, radioecology and atmospheric radioactivity
- Radionuclide reaction and fate – naturally occurring radioactive material (NORM) wastes, contaminated land management, nuclear accident response and environmental radiochemistry

HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

# RESEARCH HIGHLIGHTS

## EXPERT IN GEOLOGICAL RESOURCES

**GTK Geological Survey of Finland** is an internationally oriented geoscience research agency operating under the Ministry of Economic Affairs and Employment.

The nuclear power sector focuses on the geological disposal of nuclear waste, nuclear power plant site selection and researching long-term safety aspects of radioactive waste disposal.

GTK offers diverse expert and research services:

- Data sets and online services – geo.fi
- Energy and construction
- Geodata management
- Mineral economics
- Circular economy
- Water
- Environment

**Read more**

GTK

## NUCLEAR DECOMMISSIONING

**VTT Technical Research Centre of Finland** is a fully state-owned company steered by the Ministry of Economic Affairs and Employment.
VTT provides technical and business development support to companies interested in nuclear projects.

Based on experience from the FiR1 decommissioning project and by using competences within VTT and the ecosystem, VTT develops new ways to carry out decommissioning in less time and at lower costs – in a safe and sustainable manner. Digital technologies, such as virtual and augmented reality and robotics, play a big role in planning, optimization, training and implementation. These skills are being developed in VTT's dECOmm project

**Read more**

VTT

## ENGINEERING SIMULATORS AND SAFETY ANALYSIS

**VTT** and **Fortum** have jointly developed Apros®, a comprehensive, accurate and user-friendly software product for modelling and dynamic simulation of power plants, energy systems and industrial processes.

Apros is being actively used all over the world by nuclear power plant owners for safety analysis, engineering support, automation testing and operator training. It is also used by regulators for independent safety analysis, and by universities for research and education.

Apros is a registered trademark of VTT and Fortum.

**Read more**

Apros fortum VTT

# SMALL MODULAR REACTORS (SMRS)

**Small modular reactors are an emerging market for both existing players in the nuclear industry and companies offering or needing low-carbon solutions. Small reactors have the potential to provide an alternative to the use of fossil fuels in district heating and industrial applications. Urban and industrial heat use has significant $CO_2$ reduction potential.**

As producers of technology and services, Finnish companies have a place in the supply chains of new thermal solutions and the integration of SMR solutions. The first SMR technology experts can become involved in international deployment projects through consulting work and supply chain experience.

Licensing and placement of small reactors are the first issues on the market. **Finnish actors have the know-how that can be applied to SMR projects.**

VTT Technical Research Centre of Finland is the coordinator of the ELSMOR project for European SMR licensing practices. VTT coordinates Finland's SMR ecosystem, networking and co-innovating with various stakeholders. VTT is developing LDR, low-temperature district heating and desalination reactor technology.

LUT University Nuclear Engineering laboratory in Lappeenranta, Finland, has been the custodian of Finnish nuclear safety competence since 1975. Its most recent development is an innovative concept for an inherently safe small district heating reactor – the LUT HEating Reactor, LUTHER.

Source: SMR ecosystem Finland

FINLAND

# NUCLEAR ECOSYSTEM IN FINLAND

Finnish advanced nuclear programs have been achieved through the joint activities of licensees and their ecosystem, which includes suppliers, contractors and research institutes. Finnish subcontractors are organized under the FinNuclear Association. It promotes Finnish companies' general preconditions, cooperation, competences and international profiles in manufacturing, construction and service activities in the nuclear energy field.

FINNUCLEAR®

## LICENSEES

- fortum – For a cleaner world
- Posiva
- TVO

## SITE ACTIVITIES

- BUREAU VERITAS
- DEKRA
- E. HELAAKOSKI OY
- MAASTORAKENTAJAT
- INSTA
- RTK palvelu
- kiwa
- PROHOC
- RAMIRENT
- SGS
- SPARAL
- SRV
- TELATEK
- TELINEKATAJA

## DESIGN AND ENGINEERING

- CULMENTOR
- VTT
- ENMAC
- SWECO
- INS Works.
- ROCKPLAN
- Metecno – Mechatronical Solutions
- adiabatix
- PLATOM
- AFRY
- ARME
- A-INSINÖÖRIT

## MANUFACTURING

- peikko
- MEKA
- KONECRANES
- Miilukangas
- REFINEC
- SSAB
- GE Power

## CONSULTING

- Audit, Consulting and Inspection Services Ari Greus Ltd.
- Rajalimes Oy
- CLENERCON – CLEAN ENERGY CONSULTING
- QUALIFINN
- X-CONCEPTS
- SYSE Oy
- INS Works.
- JTS
- MEURO-TECH

## OTHERS

- barona
- eezy
- framatome
- enersense
- Teknologiateollisuus
- econia
- OULU BusinessOulu
- FENNOVOIMA
- ROSATOM
- RAAHE REGION DEVELOPMENT
- RAOS PROJECT ROSATOM
- RT Confederation of Finnish Construction Industries
- Patria
- FINNUCLEAR®
- Thomas Thor associates
- QSi CONSULTANCY GROUP
- KPMG
- Prizztech
- Rental Service MARRA RAAHE

# WORLD-LEADING FINNISH NUCLEAR EXPERTISE

Responsibility for the entire life cycle of nuclear power goes hand in hand with long-term commitment – beyond the end of nuclear power plant operation to plant decommissioning. A high record of safety and a cost-effective operating history enable life extensions of the units. Nuclear power plants in Loviisa and Olkiluoto, for instance, have been operating safely for over 40 years. Waste management is an integral part of the life cycle, and a plan to handle it is already required in the application phase of a construction license.

## LIFE-CYCLE MANAGEMENT

Continuous improvements and modernization have made Finnish power plants among the most efficient in the world. Independent internal and external monitoring ensures safe operations. This is enabled by a high level of education, strategically focused research, continuous development and robust competence management among power companies and a strong network of suppliers and contractors.

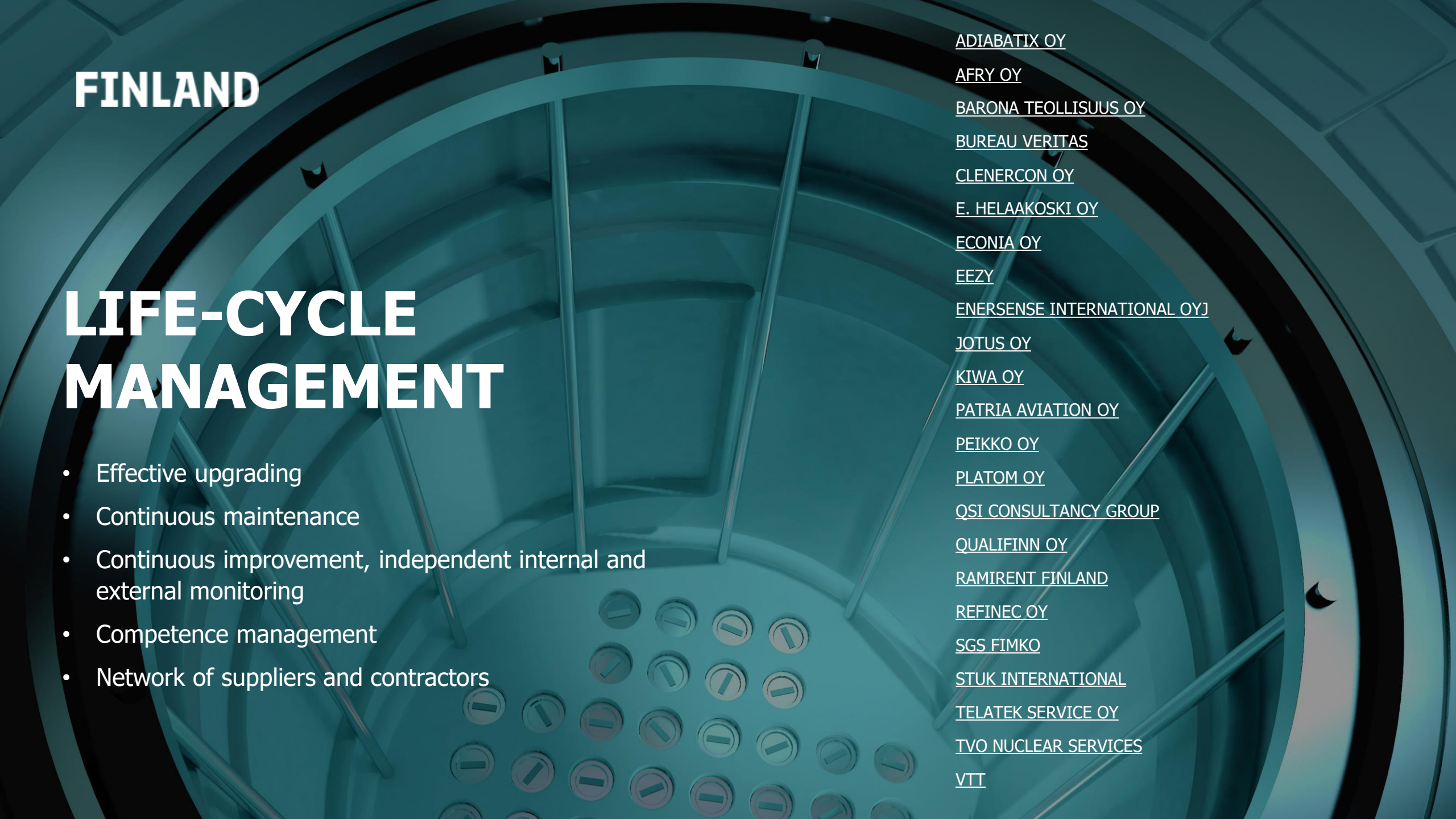
## DECOMMISSIONING

Nuclear power plants in Finland are not yet in the decommissioning phase but plans for procedures, techniques and costs already exist. These plans have been updated systematically over the decades.

Valuable experience for planning and implementing decommissioning will be gained from the ongoing closure of the Otaniemi research reactor.

## RADIOACTIVE WASTE MANAGEMENT

At the moment, Finland is one of the world's leading countries in the final disposal of spent nuclear fuel. This is due to extensive research, development and design over the decades by Posiva and its network of suppliers, contractors and research institutions. Posiva has constructed ONKALO®, the underground research facility. Currently under construction, it will be part of the final repository for spent nuclear fuel.



FINLAND

# LIFE-CYCLE MANAGEMENT

- Effective upgrading
- Continuous maintenance
- Continuous improvement, independent internal and external monitoring
- Competence management
- Network of suppliers and contractors

ADIABATIX OY

AFRY OY

BARONA TEOLLISUUS OY

BUREAU VERITAS

CLENERCON OY

E. HELAAKOSKI OY

ECONIA OY

EEZY

ENERSENSE INTERNATIONAL OYJ

JOTUS OY

KIWA OY

PATRIA AVIATION OY

PEIKKO OY

PLATOM OY

QSI CONSULTANCY GROUP

QUALIFINN OY

RAMIRENT FINLAND

REFINEC OY

SGS FIMKO

STUK INTERNATIONAL

TELATEK SERVICE OY

TVO NUCLEAR SERVICES

VTT

# ADVANCED INSULATIONS

FINLAND

## OUR SOLUTION

Since 2000, Adiabatix has designed, manufactured and installed reflective metallic insulations (RMI) for primary components in nuclear power plants (NPPs). In addition to its excellent insulation properties, Adiabatix's patented technology helps you achieve significant savings in life-cycle costs and notable improvements in occupational safety at the same time. Adiabatix's technology is ideally suited for sound, thermal and refractory insulation in sectors that face insulation challenges and that must meet strict nuclear requirements.

## COMPETITIVE ADVANTAGE

Thanks to its modular structure, the Adiabatix product is easy to install, dismantle and reinstall during servicing operations. No special tools are needed to open the module, as the lock can be opened with a normal hex key. The modular components are light and easy to handle, even by one person alone.

Quick installation and dismantling save a considerable amount of time and simultaneously reduce maintenance personnel's exposure to radiation.

Thanks to the product's structure, maintenance work can be performed twice as fast as with traditional solutions.

## COMPANY

We supply products for nuclear power generation, shipbuilding, power plants and the oil and gas industry. Our customers include Scandinavian nuclear power plants and many of the world's best-known engine manufacturers. Our insulation for engine exhaust manifolds serves hundreds of cruise ships.

Adiabatix Oy is part of the largest energy hub in the Nordic countries.

## REFERENCES

- Forsmark NPP, Adi-NGr (reflective metal insulation)
- Forsmark NPP, main steam isolation valve (MSIV), Adi-NG (cassette insulation)
- CCI AG Test laboratory, Adi-NG
- Fortum, Loviisa Power Plant, safety valve insulation modules

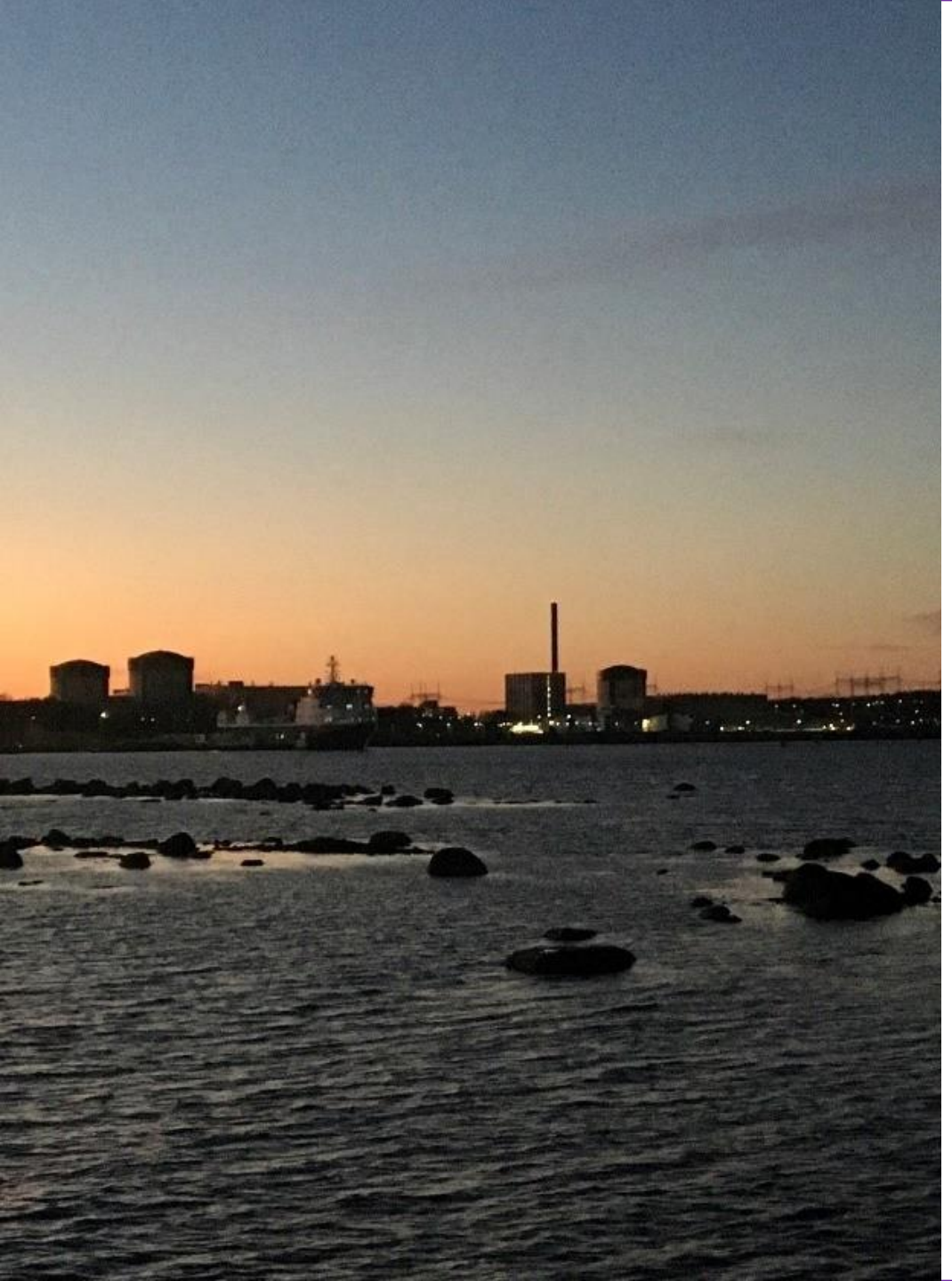
**Jerker Kullberg, CEO**

jerker.kullberg@adiabatix.fi

+358 400 600 380

www.adiabatix.fi

adiabatix
advanced insulations



FINLAND

# SUPPORTING CONTINUED OPERATION WITH OPTIMUM SAFETY AND PERFORMANCE

**OUR SOLUTION**

AFRY supports the long-term operation of existing nuclear power plants, power upgrades and the optimization of plant maintenance and operational management. Our techniques include probabilistic safety assessments, developing risk management tools and various state-of-the-art digital solutions. AFRY reliability, availability, maintainability and safety (RAMS) tools support our clients' operational excellence and increase safety.

AFRY also offers nuclear players support in strategy and scenario development, evaluation of commercial models, energy market analysis and forecasting, and operating model implementation and improvement.

Moreover, AFRY has strong expertise in environmental issues. We have carried out nearly all the nuclear environmental impact assessments (EIAs) in Finland.

**COMPETITIVE ADVANTAGE**

AFRY has developed many long-term relationships to support the continued operation of nuclear assets by providing innovative solutions for difficult problems. With our global reach and experience with different types of projects in a variety of countries, we offer our clients solutions based on experience gained from real projects. We have roughly 1,000 nuclear experts with a variety of skill sets.

They have both excellence in all technical disciplines as well as extensive engineering and project management capabilities. This enables us to deliver turnkey solutions, projects or high-level expert support in specific areas.

**COMPANY**

AFRY is a European leader in engineering, design and advisory services. We have 16,000 experts devoted to infrastructure, industry, energy and digitalization.

We have been working in the nuclear industry since its infancy, successfully carrying out projects that deal with everything from full-service undertakings to highly specialized details. At any stage of your project life cycle, we support all relevant aspects related to nuclear assets. Our services span safety to technical solutions to their economics, fulfilling a wide range of complex client needs from strategic advice to design and licensing to construction, operation, decommissioning and waste management. We cover the whole plant life cycle.

**REFERENCES**

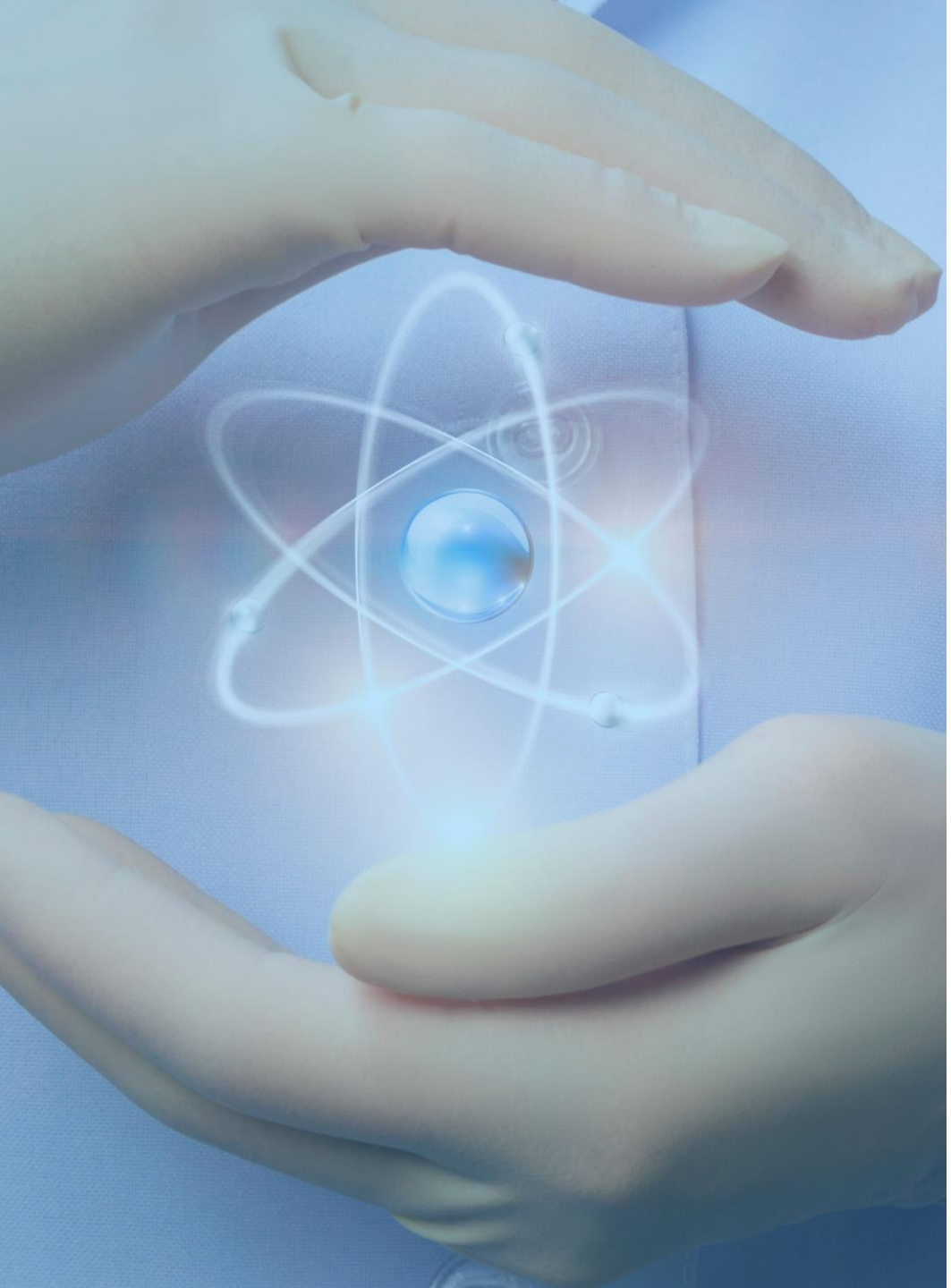
We have extensive experience in life-cycle management from a number of nuclear clients. In addition to providing services for all Finnish nuclear companies, AFRY has supported all Swedish nuclear power plants in areas related to safety reviews, aging management, digitalization such as digital twins and virtual reality, plant upgrades and O&M.

**Jari Kuikka, Director, Nuclear Energy**

jari.kuikka@afry.com

www.afry.com

AFRY
ÅF PÖYRY



FINLAND

# HIGH-QUALITY SOLUTIONS FOR LIFE-CYCLE MANAGEMENT

## OUR SOLUTION

Barona specializes in human resources management for roles at all levels. We find competent workers as well as top international talent, both in Finland and abroad, to work for your business. With years of experience, we offer site management services ranging from access control to licensing, regulatory affairs as well as labor and competence resource management.

## COMPETITIVE ADVANTAGE

We have 15 years of experience in diverse resourcing projects and maintenance with top organizations in the nuclear power industry in Finland and abroad.

We operate with broad international expertise in 11 countries and are familiar with the actors in the nuclear power and energy production sector in Finland and globally. Our experts are widely experienced professionals in the energy production industry. We always customize our services to meet the changing needs of our clients.

## COMPANY

We are the leading industry recruitment and temporary staffing service provider in Finland. We challenge traditional ways of working and always seek opportunities in places where others haven't yet looked. We offer reliable, professional workers for all situations and needs in nuclear power production.

**Minna Vanhala-Harmanen, CEO**

minna.vanhala-harmanen@barona.fi

+358 400 511 786

www.barona.fi/en/services

barona

FINLAND

# SAFETY, QUALITY AND PERFORMANCE THROUGHOUT THE LIFE CYCLE

## OUR SOLUTION

Bureau Veritas offers innovative solutions for conformity assessment to comply with standards and regulations, reduce risk, improve performance and promote sustainable development.

Our services verify compliance, ensure safety and fully respect regulations. We help you assess and mitigate risks, deliver to specifications and optimize maintenance costs.

## COMPETITIVE ADVANTAGE

Established in 1828, Bureau Veritas is a global leader in testing, inspection and certification. Bureau Veritas is recognized and accredited by the largest national and international organizations.

Thanks to its presence around the world with 1,400 offices in 140 countries, Bureau Veritas covers the needs of the supply chain in Europe, Russia, Asia and the United States.

**Petteri Maininki, Sales Director Industry Finland**

petteri.maininki@bureauveritas.com

group.bureauveritas.com

BUREAU VERITAS

FINLAND

# FOR A SUSTAINABLE FUTURE

## OUR SOLUTION

Clenercon has more than 40 years of comprehensive experience in all areas of life-cycle management – the basis for our tailored service portfolio. We provide advice for the industrial supply chain and decision-making in life-cycle management, and our comprehensive mentoring, tutoring and strategic leadership help build, create and manage innovative European networks and legal entities. Our technical competence lies in finding solutions related to material engineering, design and manufacturing of mechanical components, long-term operations, aging management, safety and reliability of nuclear energy production as well as root cause analysis of safety-critical components.

## COMPETITIVE ADVANTAGE

Clenercon provides tailored reports and presentations in the areas of our core competence to meet the needs of clients. We give general advice and prepare analysis reports on different topics in life-cycle management programs, especially component-specific evaluation for aging and reliability essential to safety. We advise on nuclear regulations and conformity assessment of systems, structures and components in meeting safety requirements. Using new communication technologies and a customer-oriented approach, we provide lectures and web-based education courses and marketing and communication plans.

## REFERENCES

- Preliminary feasibility studies of small modular reactors (SMR) in the energy system, surveys of development needs for regulatory control and the creation of licensing models in Finland
- Background document and implementation plan for the Finnish initiative (EU Strategic Energy Technology Plan)
- Advice to the Management Board of the Kepco International Nuclear Graduate School (KINGS)

**Rauno Rintamaa, CEO**

rauno.rintamaa@clenercon.fi

+358 40 501 5184

www.clenercon.fi

CLENERCON
CLEAN ENERGY CONSULTING


FINLAND

# HEAVY LIFTING SOLUTIONS THROUGHOUT THE PROJECT

**OUR SOLUTION**

E. Helaakoski Oy is one of the largest heavy lifting service providers in Finland. We serve our industrial customers in the areas of heavy-duty lifting and overall lifting project management.

With us, your heavy lifting needs are met by a highly experienced team. We use 3D and CAD modeling software to plan projects for operational safety. From planning to implementation, lifting and transporting, we offer you comprehensive services. Our fleet of modern lifting machinery includes high-capacity mobile cranes, crawler cranes, trucks and a wide range of access platforms and telehandlers.

**COMPETITIVE ADVANTAGE**

Safety, quality and expertise are the cornerstones of our operations. Our ISO 9001:2015 certified quality management system sets the guidelines for outstanding quality, professional service and reliable operations our customers expect from us.

E. Helaakoski Oy provides standardized planning using unified methods so the movements of all cranes operating in an area are planned and presented.

**Raimo Tervapuro, Transport Manager**

raimo.tervapuro@helaakoski.com

**Daniel Estabrook, Quality Manager**

daniel.estabrook@helaakoski.com

www.helaakoski.com

E. Helaakoski Oy's consistent methods and standards improve reliability, efficiency – and above all – safety at the construction site.

**COMPANY**

E. Helaakoski Oy offers a wide range of heavy lifting and transport solutions to professionals in various industries across Finland and Northern Europe. With decades of experience in the fields of lifting and hoisting, we have consolidated our position among the leading heavy lifting companies in Finland. We offer clients versatile lifting and transport machinery with special equipment and devices. Our partners are professionals in diverse industries, such as construction, steel, mining, energy, gas and oil as well as wood. Our main depots are located in Raahe, Pyhäjoki, Oulu, Kokkola, Porvoo, Kouvola and Lappeenranta.

**REFERENCES**

- National and international companies in the fields of petroleum, energy production, construction, infrastructure and heavy industry
- Lifting and installation of concrete elements for Olkiluoto 3 Nuclear Power Plant
- Hanhikivi 1 Nuclear Power Plant

E. HELAAKOSKI OY

# YOUR BUSINESS PARTNER IN FINLAND

FINLAND

**OUR SOLUTION**

Econia has offered extensive business services and employment expertise for more than 20 years. We are the financial administration partner for foreign companies entering Finnish markets, industrial projects and sites.

As a full-house business service company, we provide international companies with various services under the same roof. Business setup consultation, financial administration, local representation, staffing and recruitment and advisory services are our main services. Our rock-solid experience in international projects and knowledge of local legislation aid you in fulfilling all your obligations under Finnish law.

**COMPETITIVE ADVANTAGE**

Our anti-grey economy services are aimed at large industrial projects, such as construction sites. Our proactive approach to preventing the grey economy has been honed by practical work during the past 15 years. The model is based on our own expertise and excellent stakeholder relationships.

Econia's holistic model prevents the grey economy and assists with the contractor's obligations and liability act and licensing office, stakeholder cooperation and the supervision and training of subcontracting chains. The main focus of our operating model is on proactive risk management.

**COMPANY**

Econia is your partner for investing in or entering the Finnish market. We offer international business services, such as financial administration, HR and local representation.

We are an experienced and reliable partner for foreign subcontractors. We offer financial administration, such as payroll, accounting, company setups, local representation for foreign workers, tax counseling, including VAT and permanent establishment taxation, interpretation of the Finnish contractor's liability act and collective agreement documents, temporary staffing and recruitment services along with employment outsourcing services.

**REFERENCES**

We have extensive experience with industrial projects in Finland and have served hundreds of foreign companies. We have been involved in operations at the Olkiluoto 3 Nuclear Power Plant since 1996, and have participated at various construction sites and shipyards.

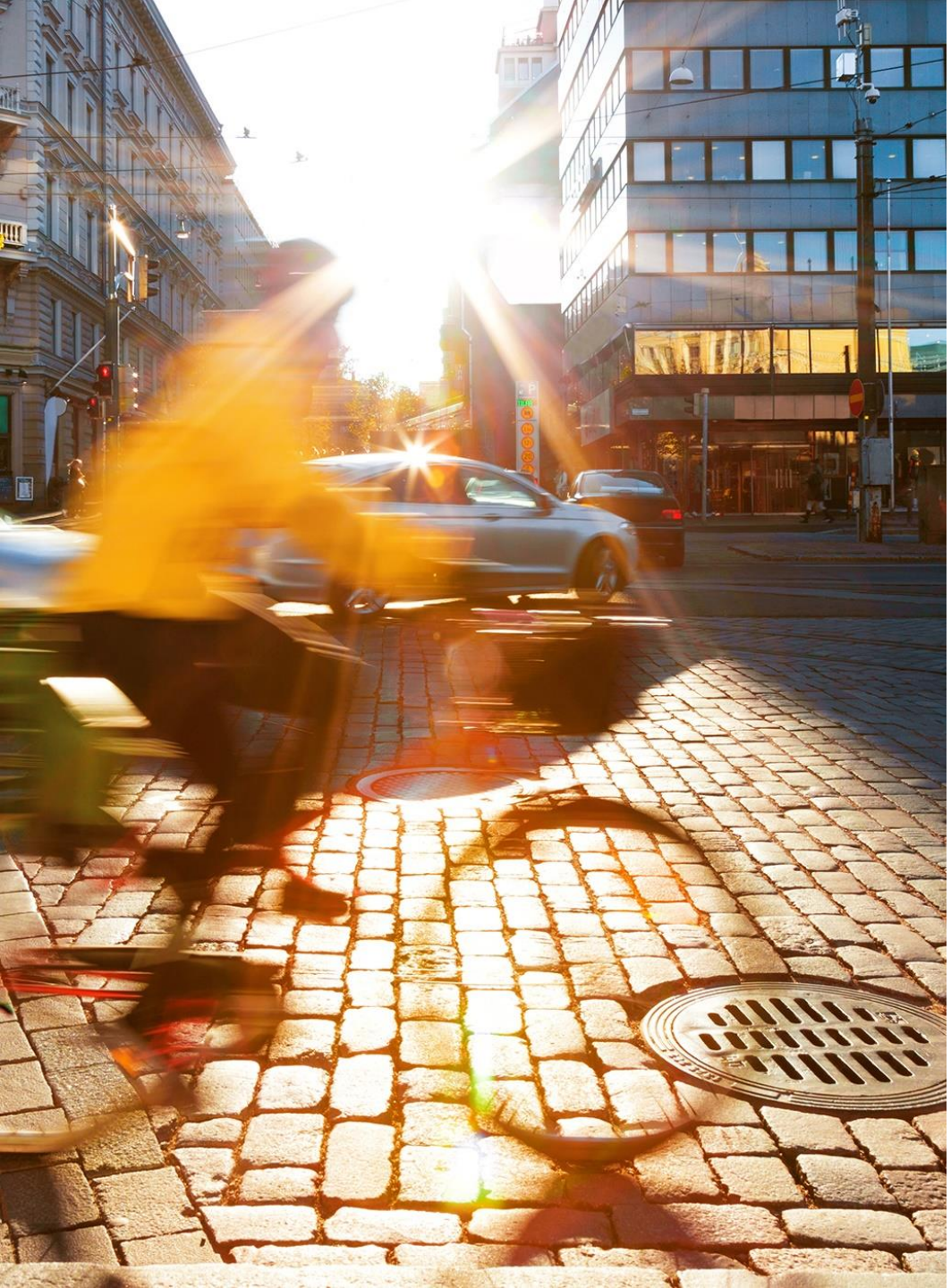
**Heimo Alatalo, Director,**
**International & HR Services**

heimo.alatalo@econia.com

+358 50 527 9444

www.econia.com

econia



FINLAND

# DELIVER THE RIGHT PEOPLE AT THE RIGHT TIME

## OUR SOLUTION

Eezy is the most versatile staffing services company in Finland. We know how to deliver the right people at the right time.

## COMPETITIVE ADVANTAGE

We offer a huge pool of candidates for companies and provide staffing services, local and international recruiting, personnel assessment, executive search and organizational development.

## COMPANY

Eezy knows Finnish working life from Hanko to Utsjoki and employs around 30,000 people each year.

In 2018, our combined turnover was around EUR 300 million – and our growth continues. Our goal is market leadership in Finland by 2022.

Our services range from short-term personnel rental to high-profile managerial recruiting and organizational development. We make sure to satisfy any and all HR needs our customers may have.

## REFERENCES

Our references include AREVA NP, Bilfinger GmbH, Christof Industries GmbH, Actemium, Suunto and others.

**Jani Andreasen, Sales Manager**

jani.andreasen@eezy.fi

www.eezy.fi

# CREATOR OF ZERO-EMISSION ENERGY SOLUTIONS

FINLAND

## OUR SOLUTION

Enersense has expertise in maintenance advancement, revision management, occupational safety development, high voltage distribution systems and quality control and documentation. Our core knowledge includes project know-how, automation installation, electrifying of processes, steel and piping installation, surface treatment, HVAC installation, mechanical installation and professional personnel services. Our expertise is further strengthened by our wide supplier network. Our nuclear power services are used, for example, in the currently operating TVO and Fortum plants.

## COMPETITIVE ADVANTAGE

Enersense has excellent and flexible capabilities to provide both Finnish and international resources while complying with public authority requirements and collective agreements, for our own projects or directly for client projects.

Enersense is a reliable partner for engineering businesses and industry plants and projects, thanks to our exceptionally versatile service and project know-how.

## COMPANY

Enersense is strongly involved in creating a zero-emission society. Our versatile services help bring success to Nordic and international companies in the industrial, energy, telecommunications and construction sectors. Our goal is to be our customers' primary and versatile partner during the energy revolution.

Enersense has 2,400 employees in 40 different countries who are working toward a cleaner and more sustainable future.

## REFERENCES

Our references include Areva, Siemens, Samsung, Wärtsilä, Outotec, Hitachi, Mitsubishi, First Quantum Minerals, Fortum, TVO, Valmet and RMC.

**Jaakko Leivo, Executive Vice President, Smart Industry**

jaakko.leivo@enersense.com

www.enersense.com/en

enersense

FINLAND

# SAFE ENERGY WITH CLEAR DOCUMENTATION

**OUR SOLUTION**

Jotus adds value to customer projects with documentation and project lead services. We are a documentation professional in the instrumentation and control (I&C) field. This means we understand the big picture, have versatile technical knowledge and a wide knowledge of Finnish nuclear requirements (YVL). We produce overall quality and technical documents, from designing to commissioning, including factory acceptance test (FAT) and site acceptance test (SAT) documentation.

Our process is straightforward. We find out the customer's needs and requirements. Then we gather background information for the project and make a preliminary draft with schedules, coordination and implementation carefully defined. We review the draft with our customer and make iterations if needed. The outcome for our customer is a report, documentation or a project.

**COMPETITIVE ADVANTAGE**

Clear documentation is key for successful nuclear projects. Nuclear documentation is guided by requirements and standards and must focus on the essentials. Well-structured documentation ensures that all requirements are met and each stakeholder understands the project requirements correctly.

Field engineers have the best knowledge of systems and products. With our versatile technical project management and nuclear knowledge, we can assist our customers in transferring their field experience into clear and effective documentation.

**COMPANY**

Jotus is a Finnish company providing expert services for nuclear I&C documentation. We use our know-how to secure safe and green energy. We combine the knowledge of engineers, specialists and field practices into documentation. That is why our services are useful when building new plants or making modifications.

Our interdisciplinary knowledge secures clear, high-quality documentation of the energy production stages for our clients and supervising authorities.

**REFERENCES**

We have participated in the Loviisa Nuclear Power Plant emergency diesel generator (EDG) I&C modification by creating and verifying quality, FAT, SAT and installation documentation. We also have experience in I&C research documentation for the main grid reserve power plants.

Our main partners are Prohoc Oy and ABB Oy.

**Joonas-Matti Aleksi Tuominen, CEO**

joonas.tuominen@jotus.fi

www.jotus.fi

JTS
JOTUS OY

FINLAND

# TESTING, INSPECTING, CERTIFYING AND CONSULTING

**OUR SOLUTION**

Kiwa provides advisory services and expertise for different project phases like planning and purchasing, engineering and design, manufacturing and installation and operation for lifetime management.

Our technical competencies include pressure equipment, steel structures, concrete and other structures, electrical installations, fire safety, safety-related automation systems, cranes and machines, lifts, material technology, welding and ventilation.

**COMPETITIVE ADVANTAGE**

We have over 40 years of experience in the nuclear industry and are responsible for approvals during the construction of nuclear reactors in Sweden and Finland.

**COMPANY**

We are Kiwa. With our certification, inspection, testing, training and consultancy services, we create trust in our customers' products, services, processes, management systems and employees.

We have clients in manufacturing and process industries, business services, public and private utilities, governments and international institutions.

**Jukka Verho**

jukka.verho@kiwa.com

www.kiwa.com

Our wide variety of training services includes traditional classroom training and modern digital online and virtual reality training. With our digital services, you can control and improve your safety culture. All digital tools can be tailored to your needs.

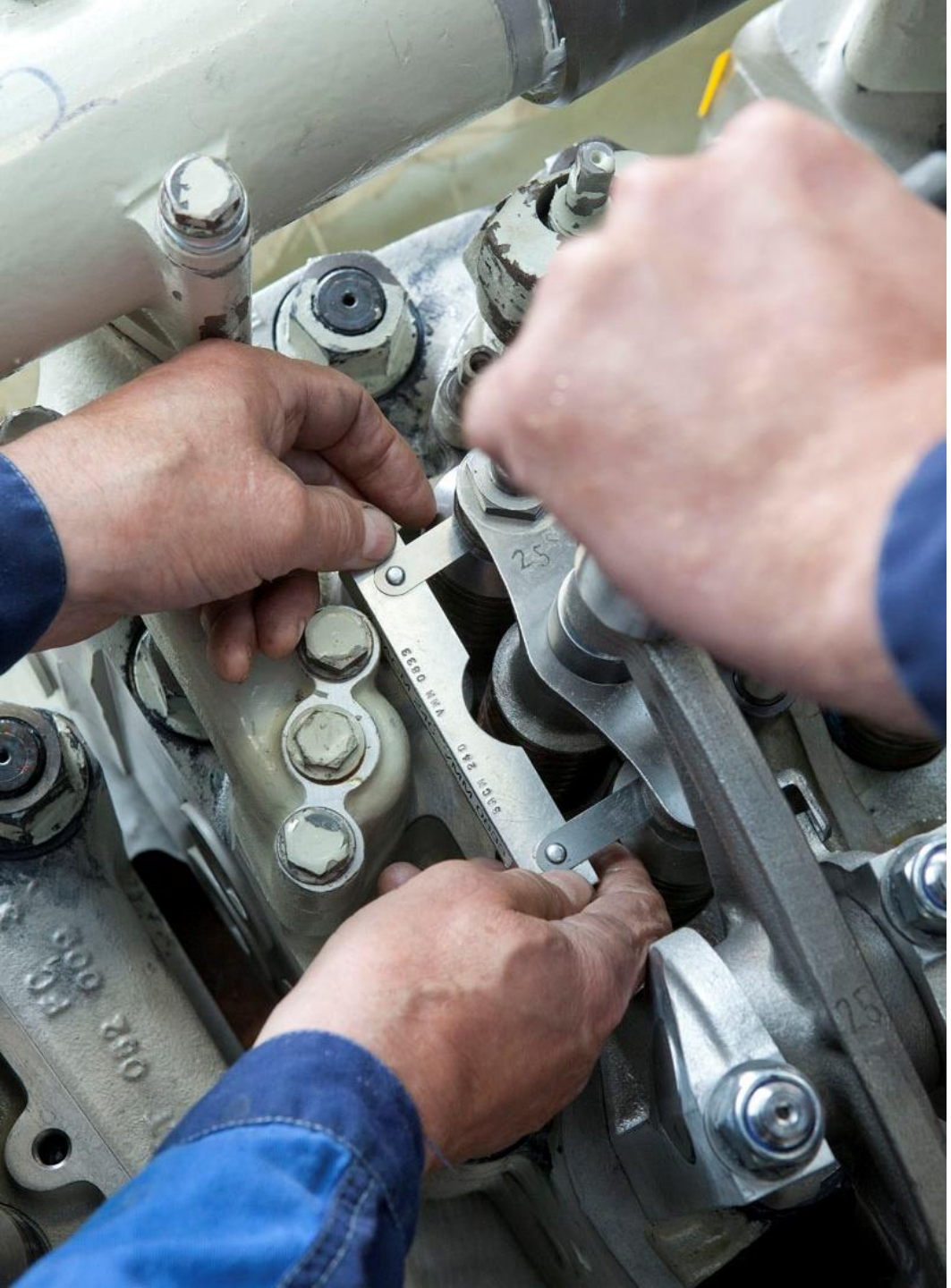
Kiwa employs over 5,500 people in over 35 countries.

**REFERENCES**

Kiwa contributed many areas of expertise to the Finnish Olkiluoto 3 newbuild nuclear power project, including:

- Mechanical construction
- Pressure vessels
- Piping
- Pumps and valves
- Electrical installations
- Lifting equipment
- Fire safety

kiwa



FINLAND

# MAINTENANCE, REPAIR AND OVERHAUL SERVICES FOR DIESEL ENGINES AND RELATED EQUIPMENT

## OUR SOLUTION

Patria Aviation Oy has offered services to nuclear power plants since the early 1990s. Since 1964, diesel engines, their accessories and equipment have formed an important part of our range of services.

## COMPETITIVE ADVANTAGE

We provide our customers with individually tailored service, partnering with them to keep the life-cycle costs of their equipment to a minimum and improve their fleet availability. To meet this challenge, our personnel is committed to high quality and service excellence.

## COMPANY

Patria is an international provider of defense, security and aviation life-cycle support services, pilot training and technology solutions.

Patria's mission is to give its customers confidence in all conditions. Our vision is to be the #1 partner for critical operations on land, sea and air.

dieselservice@patriagroup.com

www.patriagroup.com

Patria


FINLAND

# PROVEN TRACK RECORD AND EXPERTISE IN DEMANDING PROJECTS

## OUR SOLUTION

Peikko provides high-quality, embedded-steel components for demanding nuclear power plant (NPP) projects. We have 55 years of experience in the production of leading, concrete-connection technology for the global market and have a strong focus on research and development.

## COMPETITIVE ADVANTAGE

Over the last 15 years, we have been successful in applying our innovative connection technologies to highly demanding nuclear projects. We offer you peace of mind with our fully certified and traceable components. At Peikko, we understand just how critical nuclear safety is, and we work in conjunction with the Nuclear Safety Policy.

With full transparency of all our process phases, and with all work being organized according to international nuclear standards, every single product is completely traceable. We always provide you with all the documentation required for your project.

## COMPANY

Peikko Group Corporation is a leading global supplier of slim floor structures, wind energy applications and connection technology for precast and cast-in-situ construction.

Peikko has sales offices in over 30 countries in Asia Pacific, Europe, Africa, the Middle East and North America, with manufacturing operations in 12 countries. Peikko generated a turnover of EUR 239 million in 2020 and employs about 1,900 professionals.

**Raimo Lehtinen, Business Director, Power Plants**

raimo.lehtinen@peikko.com

www.peikko.com

peikko®

FINLAND

# YOUR CORE TEAM OF NUCLEAR EXPERTS

**OUR SOLUTION**

Platom provides nuclear licensing and qualification.

**COMPETITIVE ADVANTAGE**

Platom has successfully carried out projects at all stages of a nuclear power plant's life cycle, from design and license applications to operations and license extension as well as decommissioning and dismantling.

We offer multidisciplinary and experienced in-house nuclear engineering and licensing expertise. We have proven project and requirement management processes, along with the ability to provide complete solutions including system deliveries.

We have an agile company culture and a problem-solving mindset.

**COMPANY**

Platom is the leading expert in nuclear licensing and qualification in Finland. We are a team of independent, agile and experienced specialists who aspire to master the most demanding aspects of the nuclear industry. Our objective is to improve the sustainability of nuclear energy and guarantee the welfare of our customers for a sustainable future.

**REFERENCES**

We have 20+ years of experience and have delivered 550+ projects for the nuclear industry.

**Miika Puukko, CEO**

m.puukko@platom.fi

www.platom.fi/en

PLATOM

FINLAND

# QUALITY, PROFESSIONALISM AND INTEGRITY

## OUR SOLUTION

We facilitate project objectives by identifying and minimizing both commercial and schedule risks through project controls and other means. In the event of disputes, we provide professional claims preparation and defense services with the ultimate objective of dispute resolution.

## COMPETITIVE ADVANTAGE

QSI's dedicated consultants are client-focused and apply high professional and ethical standards to all assignments while working toward optimal commercial solutions and risk management.

## COMPANY

QSi Consultancy Group is a specialist international consultancy established in 2007.

**Brian Allan**

brian.allan@qsint.com

www.qsint.com

We provide professional services, including project controls, contractual advice, commercial management, claims handling, delay analysis, dispute resolution and other expert services to the nuclear industry and related sectors.

QSi Consultancy Group has offices in the UK, the EU and the Middle East, enabling it to respond rapidly to client requirements in multiple regions.

## REFERENCES

- Olkiluoto 3 – Finland
- Hanhikivi 1 – Finland
- Barakah – UAE
- Hinkley Point – UK

QSi CONSULTANCY GROUP

FINLAND

# ENSURING NUCLEAR PERFORMANCE

**OUR SOLUTION**

Qualifinn Ltd is an independent expert organization providing advisory services and expert resources for quality and project management. Our competence covers the ISO 19443 standard, IAEA safety standards and Finnish YVL requirements. We also offer support, consultancy and implementation for all project management activities, such as planning, scheduling, control and reporting.

**COMPETITIVE ADVANTAGE**

Our years of experience in the nuclear industry give Qualifinn a thorough understanding of different quality management requirements and guidelines applicable to the nuclear sector. Profound knowledge of ISO quality and project management standards and the experience we've gained in nuclear energy projects enable us to meet specific nuclear industry requirements.

Qualifinn has the competence to train and counsel organizations supplying products and services critical to nuclear safety on how to include the specific ISO 19443 standard requirements in their quality management system.

**COMPANY**

Qualifinn Ltd is a private independent consulting company serving the nuclear sector in quality management and project management. We operate according to internationally recognized and approved principles, techniques and standards with companies and authorities of all sizes – both in Finland and internationally.

**REFERENCES:**

References available upon request.

**Markku Juhani Pitko, CEO**

markku.pitko@qualifinn.com

+358 400 722 567

www.qualifinn.com

QUALIFINN

FINLAND

# EQUIPMENT RENTAL AT YOUR SERVICE

## OUR SOLUTION

Ramirent fulfills customer equipment rental and service needs conveniently and cost efficiently with one of Europe's largest equipment fleets. Our product portfolio consists of a wide variety of access equipment, heavy machinery, site modules and equipment and light equipment, including safety equipment, electrical and heating systems. We also offer related services ranging from worksite planning to condition monitoring, on-site support, logistics and fuel services, safety planning and training.

## COMPETITIVE ADVANTAGE

Our core offering consists of equipment rental and services. We also offer total solutions that simplify our customers' business. We deliver value throughout the project life cycle by helping customers move from several suppliers to one organization, reducing costs and lead times while improving safety and efficiency. Our vision is to offer an unbeatable service experience in equipment rental which in the long run makes owning unnecessary for our customers.

## COMPANY

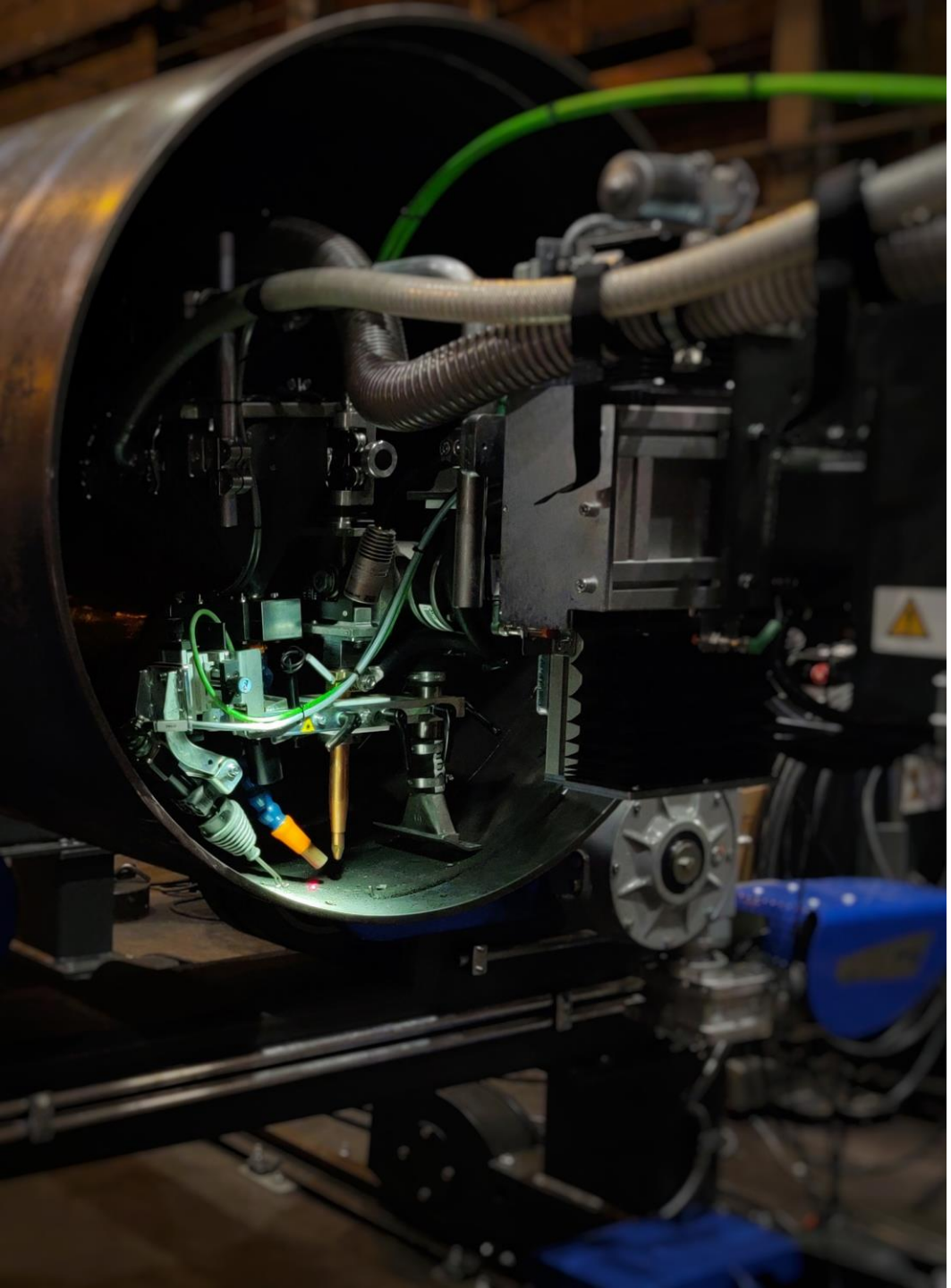
Ramirent is a leading company offering equipment rental for construction services, the public sector, industry and households. We have around 3,000 co-workers and 300 customer centers across nine countries in Northern and Eastern Europe – Finland, Sweden, Norway, Estonia, Latvia, Lithuania, the Czech Republic, Slovakia and Poland. In Russia, we operate through the 50%-owned joint-venture company Fortrent. Ramirent belongs to the Loxam Group, the third largest equipment rental company in the world.

**Mika Eskola, Director, Strategic Alliances**

mika.eskola@ramirent.fi

www.ramirent.fi

RAMIRENT



FINLAND

# FROM PRESSURE EQUIPMENT TO SMALL MODULAR REACTORS

## OUR SOLUTION

As interest in small modular reactors (SMRs) has started to increase, more testing using physical prototype reactors is needed. Refinec develops and manufactures prototype reactors for research institute and company SMR studies. Refinec also researches manufacturability and manufacturing technologies, such as the weldability of different reactor materials and structure types. By taking part in the research phase of new SMR technology, we simultaneously contribute to studies about the needed design and manufacturing regulations of SMRs. In this way, we influence how conventional pressure equipment directives may be applied to SMRs with additional testing and management systems.

## COMPETITIVE ADVANTAGE

Refinec is known for excellence in project management and documentation. We use state-of-the-art automated welding equipment and professional operators to ensure top quality. Our in-house rating, designing and R&D departments and in-house manufacturing ensure smooth cooperation and confidentiality.


**Hannu Tapio Perälä, CEO**

hannu.perala@refinec.fi

+358 44 974 9403

www.refinec.fi


With one SMR prototype under our belt, Refinec is well equipped to continue manufacturing new SMR prototypes. Any customer who plans to build research prototypes or more advanced functional phase equipment will benefit from our expertise and know-how.

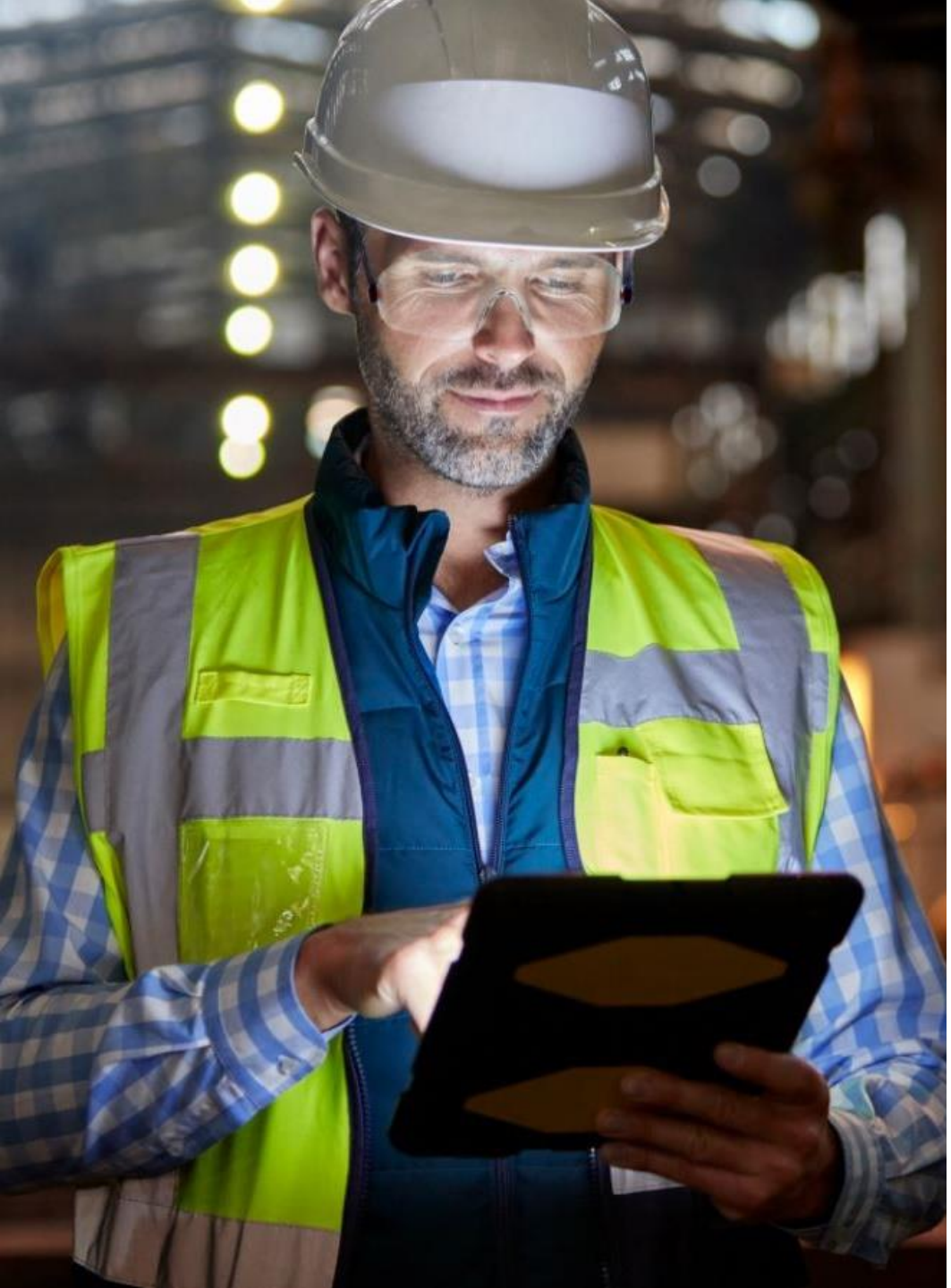
## COMPANY

Refinec Oy is a growing engineering workshop whose main products are heat exchangers and pressure vessels from a wide range of different materials. We offer full delivery including design, rating, manufacturing and project execution.

## REFERENCES

Refinec has manufactured a prototype SMR for LUT University. Our scope included not only the manufacturing of the equipment, but strength calculations and the design of structural details related to manufacturing as well. For the same test system, Refinec delivered a vessel and piping system parts along with the SMR prototype.

REFINEC



FINLAND

# WHEN YOU NEED TO BE SURE

## OUR SOLUTION

The services of SGS as a STUK-authorized inspection organization (AIO) include assessments relating to the conformity of pressure and other mechanical equipment and structures, and certain electrical and I&C equipment. We provide product conformity services from accredited testing and certification to notified body activities and environmental analysis.

Additionally, we offer services for supply chain management, including witnessing the manufacturing process along with factory acceptance testing (FAT), auditing the supply chains and performing pre-shipment inspections.

We provide management systems certifications, such as ISO 9001, ISO 3834-2, ISO 19443, ISO 14001, ISO 45001 and ISO 27001. We also offer functional safety services to ensure the suitability and compliance of safety functions, systems, processes and components.

## COMPETITIVE ADVANTAGE

We are a truly global company with local service. With more than 89,000 employees, we operate a network of more than 2,600 offices and laboratories around the world. Wherever you conduct your business, we are there.

Our expertise is widely recognized. SGS Fimko Oy is approved as an authorized inspection organization by STUK. We have certifications like PED, CPR and MD from several notified bodies and have been accredited by FINAS for calibration, certification, inspection and testing services.

## COMPANY

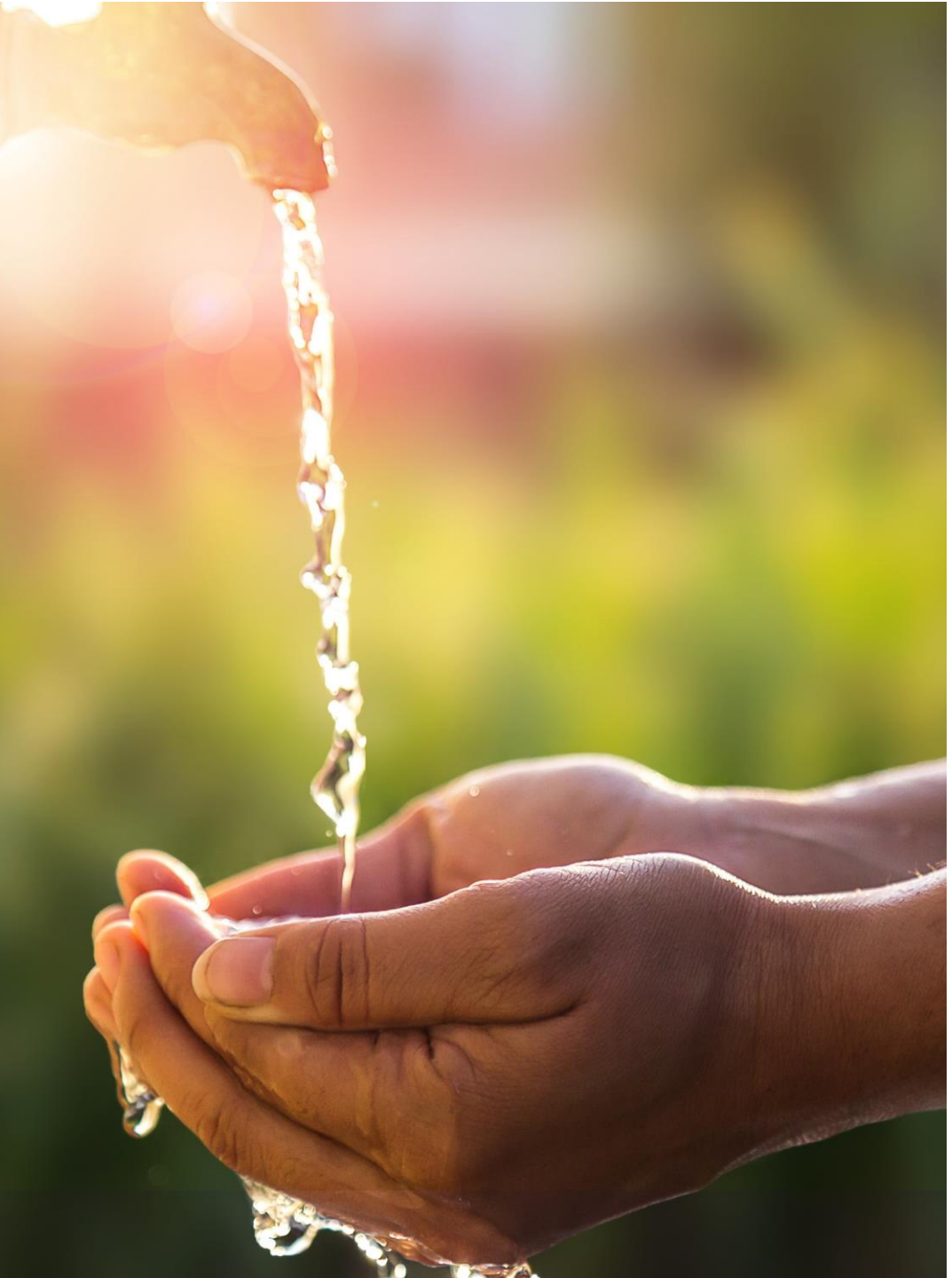
SGS Fimko Ltd is the world's leading inspection, verification, testing and certification company. We are recognized as setting the global benchmark for quality and integrity. We have been operating in Finland since 1924. Today, we provide diverse inspection, testing, verification and certification services for a wide range of industries.

**Tuomas Hänninen**

tuomas.hanninen@sgs.com

www.sgs.fi

SGS



# A SAFER WORLD WITH BETTER UNDERSTANDING, POLICY AND PRACTICE

FINLAND

## OUR SOLUTION

STUK International Ltd. offers radiation and nuclear safety regulatory expert services to authorities and service providers outside Finland.

Our expertise areas cover the regulation of safety, security and safeguards.

**Nuclear safety**: Nuclear safety oversight in nuclear newbuilds, operation and maintenance of nuclear facilities, backend activities of decommissioning and nuclear waste management.

**Radiation safety**: X-ray or MRI diagnostics, accelerators, measurements, nondestructive testing (NDT) and research.

**Safeguards by design**: Supporting efficient and effective safeguard implementation by the facility, the national authority and international organizations (IAEA, EC).

**Environmental radiation monitoring**: Radiation levels in outdoor environments including air, soil and water.

**Emergency preparedness and response**: Organization, procedures, support tools and crisis communication.

**Non-ionizing radiation**: UV, electromagnetic fields, lasers and more.

**Supporting the development of the regulatory framework**: Identification, development and implementation of core regulations and regulatory guides, licensing schemes, regulatory inspection programs, safeguards and other topics identifying comprehensive and sustainable regulatory environment throughout the life cycle.

**Supporting the development of the regulator organization**: Support for developing the regulator organization, including the planning of organizational structure, identification of roles and responsibilities, establishing a management system and other topics that enable building a trustworthy, independent, and efficient national regulator.

**Supporting the development of competence**: Hands-on technical training to develop the competence of the regulatory authority staff in all areas required for the practical work of the regulatory organization.

## COMPETITIVE ADVANTAGE

All our services are tailor-made for each client separately. We have a wide range of experts who provide both technical and management advice on areas within the scope of our services. We also provide modular qualification trainings, where the client can easily choose relevant ones.

## COMPANY

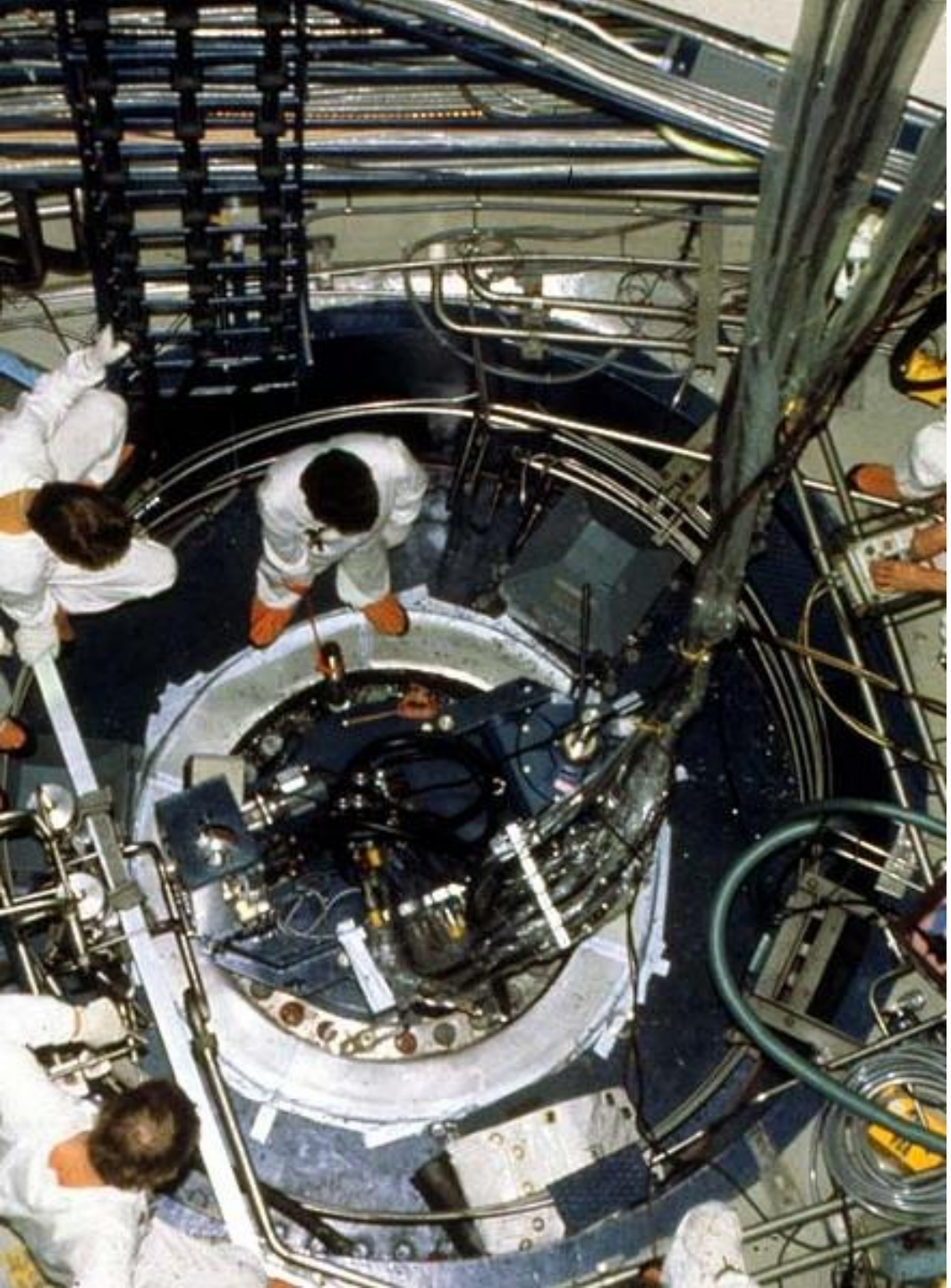
STUK International Ltd. develops and improves radiation and nuclear safety worldwide. We are an independent, self-governing and trustworthy provider owned by the Finnish state. We work in close cooperation with STUK, the Finnish Radiation and Nuclear Safety Authority.

**Leena Jylhä**

leena.jylha@stukinternational.fi

www.stukinternational.fi

STUK INTERNATIONAL



FINLAND

# LIFE-CYCLE CARE IN RELIABLE HANDS

## OUR SOLUTION

Telatek Service Oy is a trusted partner and specialist in energy industry maintenance. We are a forerunner of on-site machining and thermal coating technologies. Our work for the nuclear industry started over 40 years ago. Telatek Service's special products are thermally sprayed and welded coatings against erosion, corrosion and wear as well as on-site machining, repair welding, machine installation, nondestructive testing (NDT) methods and measuring services. We typically work on steam turbines, pumps, valves, shafts, rotors, generators, white metal bearings, sealing areas, vessels and other aspects of energy industry machinery.

## COMPETITIVE ADVANTAGE

Telatek Service's offering includes cover mechanical maintenance services with proven solutions for power plants. As most of the repair work can be done on site, extensive dismantling is not required. We machine surfaces using different types of special mobile equipment.

A typical renovation process consists of pre-inspection, pre-machining, thermal or weld coating, final machining and measurements. We also carry out dismantling and installation work. Telatek Service Oy employs 100 professionals who are experienced in on-site work.

## COMPANY

Telatek Group is a leading supplier of field and workshop services. Telatek Service Oy offers cover maintenance, repair and installation of machinery and equipment, for example, when customers have problems with erosion, corrosion and wear. Our strength is versatile implementation of mobile technologies, thermal spraying, welding and machining.

Telatek Service also has extensive experience in nondestructive inspections. Our NDT operations are FINAS accredited and approved also by STUK. Telatek Works Oy Workshop Services has the special skills needed for heavyweight manufacturing and machining of heavy and complex products.

## REFERENCE

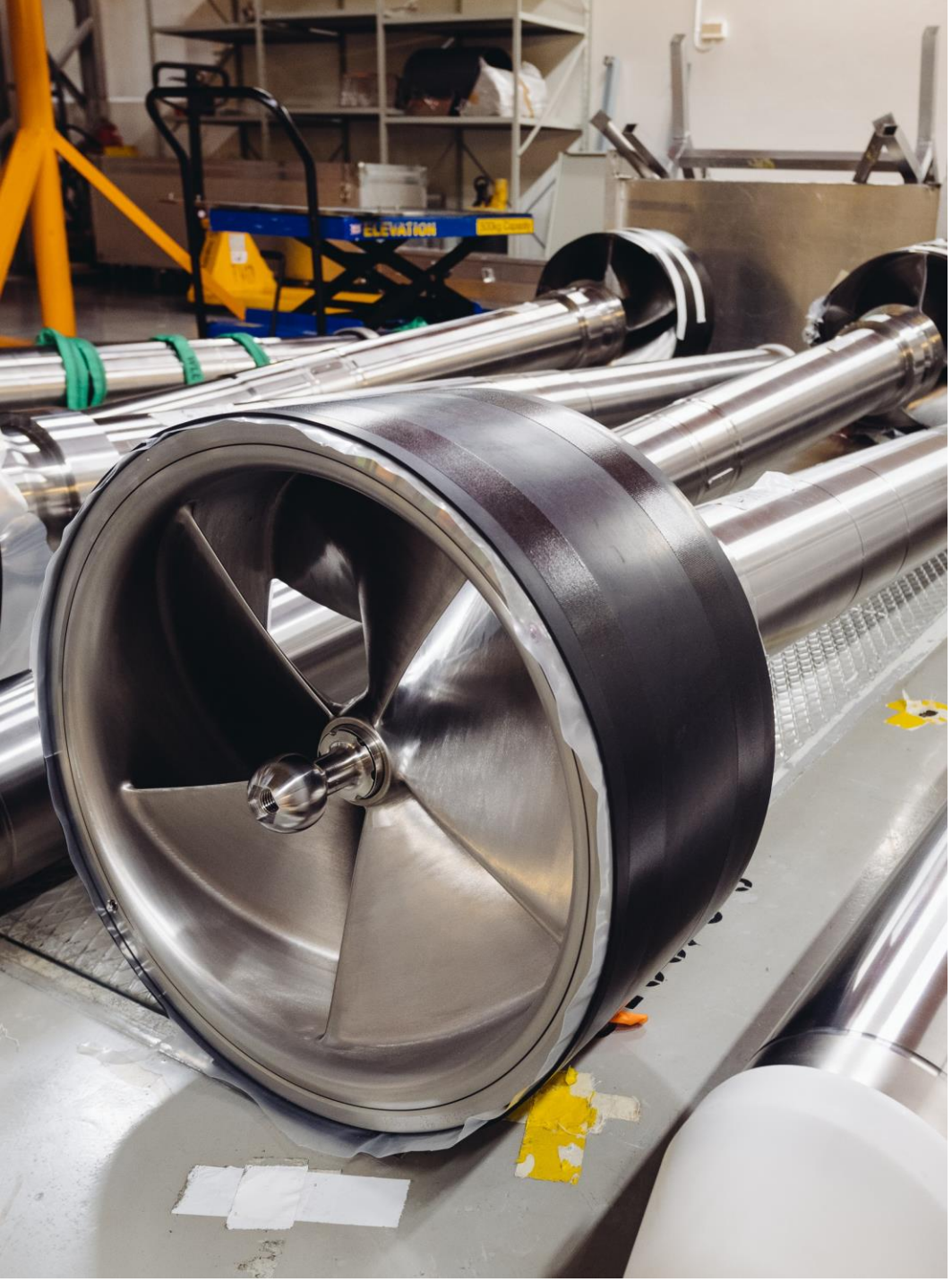
- Loviisa Nuclear Power Plant – Finland
- Olkiluoto Nuclear Power Plant – Finland
- Paks Nuclear Power Plant – Hungary
- Leningrad Nuclear Power Plant – Russia
- Kola Nuclear Power Plant – Russia
- Cernavoda Nuclear Power Plant – Romania

**Juha Rintala, Technology Manager**

juha.rintala@telatek.fi

www.telatek.fi

TELATEK SERVICE




FINLAND

# WE HAVE THE EXPERIENCE

## OUR SOLUTION

TVO Nuclear Services Oy (TVONS) offers a wide range of life-cycle management (LCM) consulting services. These include LCM strategy, outage planning and lifetime extension to improve your operating performance and competitiveness. With our help, it is possible to optimize operation, maintenance and service life, while maintaining safety and performance. Our LCM, integration management and economic planning help improve the return on investments over the service life of the plant.

## COMPETITIVE ADVANTAGE

Over the years, we have made continuous improvements to the Olkiluoto power plant units to guarantee excellent operating performance and safety. We have the unique experience of being a license holder and operator of these nuclear power units for over 40 years. Our proven procedures can be utilized for our customers.

## COMPANY

TVONS is a subsidiary of Teollisuuden Voima Oyj (TVO), an independent and non-listed public Finnish nuclear power plant operator.

We have access to TVO's experts and partners for consultation and development services. TVONS has provided consulting services based on TVO's experience in the nuclear power business since 1969. We have experience operating boiling water reactors (BWRs) since 1978 and in the construction and usage of a low- and intermediate-level waste repository since 1992. With Olkiluoto 3 in Finland, we have recent experience in tendering, sourcing, constructing and commissioning a modern nuclear power plant.

tvons@tvo.fi

www.tvo.fi

tvons

FINLAND

# SUPPORTING PLANT LIFE MANAGEMENT

## OUR SOLUTION

VTT Centre for Nuclear Safety offers a wide range of services involving experimental studies, computational analysis and data analytics to support plant operation and plant life management. We assess the safety, integrity and performance of systems, structures and components by experimental studies and analysis. We provide mechanical testing of reactor pressure vessel (RPV) surveillance specimens and other irradiated materials. Additionally, we can carry out fatigue testing under realistic conditions with microstructural characterization.

We also offer safety analysis, including accident and transient analysis, severe accident analysis and probabilistic risk assessment. In the area of digitalization, we provide data analytics, artificial intelligence applications, cybersecurity evaluation and development.

VTT has three software products, and we offer licenses and related services:

- Apros for analysis and dynamic simulation, owned by VTT and Fortum,
- Serpent for reactor physics,
- FinPSA for Probabilistic Risk Assessment

## COMPETITIVE ADVANTAGE

VTT offers a unique set of sophisticated experimental facilities, and analysis and modeling software. Our professional staff has multi-technological backgrounds and state-of-the-art knowledge from research projects and collaboration with industry.

## COMPANY

VTT is one of Europe's leading multi-technology research institutions. We are owned by the Finnish state. Our task is to advance the utilization and commercialization of research and technology in commerce and society. VTT is a key partner in R&D&I and technical support for Finland's successful nuclear sector. In collaboration with our partners, we offer our services for the successful use of nuclear energy around the world.

## REFERENCES

VTT provides support in plant life management to all nuclear power plants in Finland. We also work as a technical support organization for STUK.

**Matti Paljakka, Solution Sales Lead**

matti.paljakka@vtt.fi

www.vttresearch.com/nuclear

VTT

# FINLAND

# DECOMMISSIONING

- Experience in closing and decommissioning the Otaniemi research reactor
- Employment of methods and resources used in the construction, operation, modernization and waste management of plants
- Effective implementation of digitalization and developing new technologies
- Systematic update of procedures, techniques and costs during the operating phase

AFRY OY

BARONA TEOLLISUUS OY

BUREAU VERITAS

EEZY

FORTUM

MEURO-TECH OY

PEIKKO OY

PLATOM OY

TVO NUCLEAR SERVICES

VTT

Picture courtesy: TVO

FINLAND

# EXPERTISE COVERING EVERY ASPECT OF DECOMMISSIONING

## OUR SOLUTION

AFRY has a comprehensive understanding of the complex issues within the decommissioning of nuclear facilities. We offer our clients support in all decommissioning tasks – from post-operational conditions to greenfield sites.
We cover every aspect of decommissioning, including planning and strategy development, evaluation of commercial models, organizational development, project management, logistics, environmental studies and permits, safety and licensing support, 3D tools, calculations and radiological safety assessments and safety cases.

## COMPETITIVE ADVANTAGE

When decommissioning, AFRY offers a wide range of professional consulting services, from large projects to highly specialized expertise in specific areas. Our global reach and international experience and network allow us to support our clients worldwide with top expertise in a variety of areas. Besides implementing projects and providing professional consulting services, AFRY also provides software for simulation modeling and risk assessment, such as Ecolego, NORMALYSA and Clearance Tool.

**Jari Kuikka, Director, Nuclear Energy**

jari.kuikka@afry.com

www.afry.com

## COMPANY

AFRY is a European leader in engineering, design and advisory services. We have 16,000 experts devoted to infrastructure, industry, energy and digitalization.

At any stage of your project life cycle, we support all relevant aspects related to nuclear assets. Our services span safety to technical solutions to their economics, fulfilling a wide range of complex client needs from strategic advice to design and licensing to construction, operation, decommissioning and waste management. We cover the whole plant life cycle.

## REFERENCES

AFRY has a proven track record of working in all areas of the nuclear arena, including decommissioning. Most of our work is in the Nordics, but we also work globally. We are currently supporting all nuclear power plants in Sweden that are undergoing decommissioning and dismantling. In addition, AFRY has performed the first decommissioning-related environmental impact assessment (EIA) in Finland.

AFRY
ÅF PÖYRY

FINLAND

# SUCCESSFUL SOLUTIONS FOR DECOMMISSIONING

## OUR SOLUTION

Barona specializes in human resources management for roles at all levels. We find competent workers as well as top international talent in Finland and abroad to work for your business. With years of experience, we offer site management services ranging from access control to licensing, regulatory affairs as well as labor and competence resource management.

## COMPETITIVE ADVANTAGE

We have 15 years of experience in diverse resourcing projects and maintenance with top organizations in the nuclear power industry, both in Finland and abroad.

## COMPANY

We are the leading industry recruitment and temporary staffing service provider in Finland. We challenge traditional ways of working and always seek opportunities in places where others haven't yet looked. We offer reliable, professional workers for all situations and needs in nuclear power production.

**Juho-Pekka Nojonen, Vice President, Barona Industry**

juho.nojonen@barona.fi

www.barona.fi/en/services

barona

FINLAND

# OPTIMIZE LATE-LIFE MANAGEMENT

## OUR SOLUTION

Bureau Veritas offers a wide range of services, including due diligence, environmental impact assessment, on-site quality assurance and quality control, on-site health, safety and environment (HSE), radiation protection, logistics support and oversight, waste classification and waste management surveillance.

## COMPETITIVE ADVANTAGE

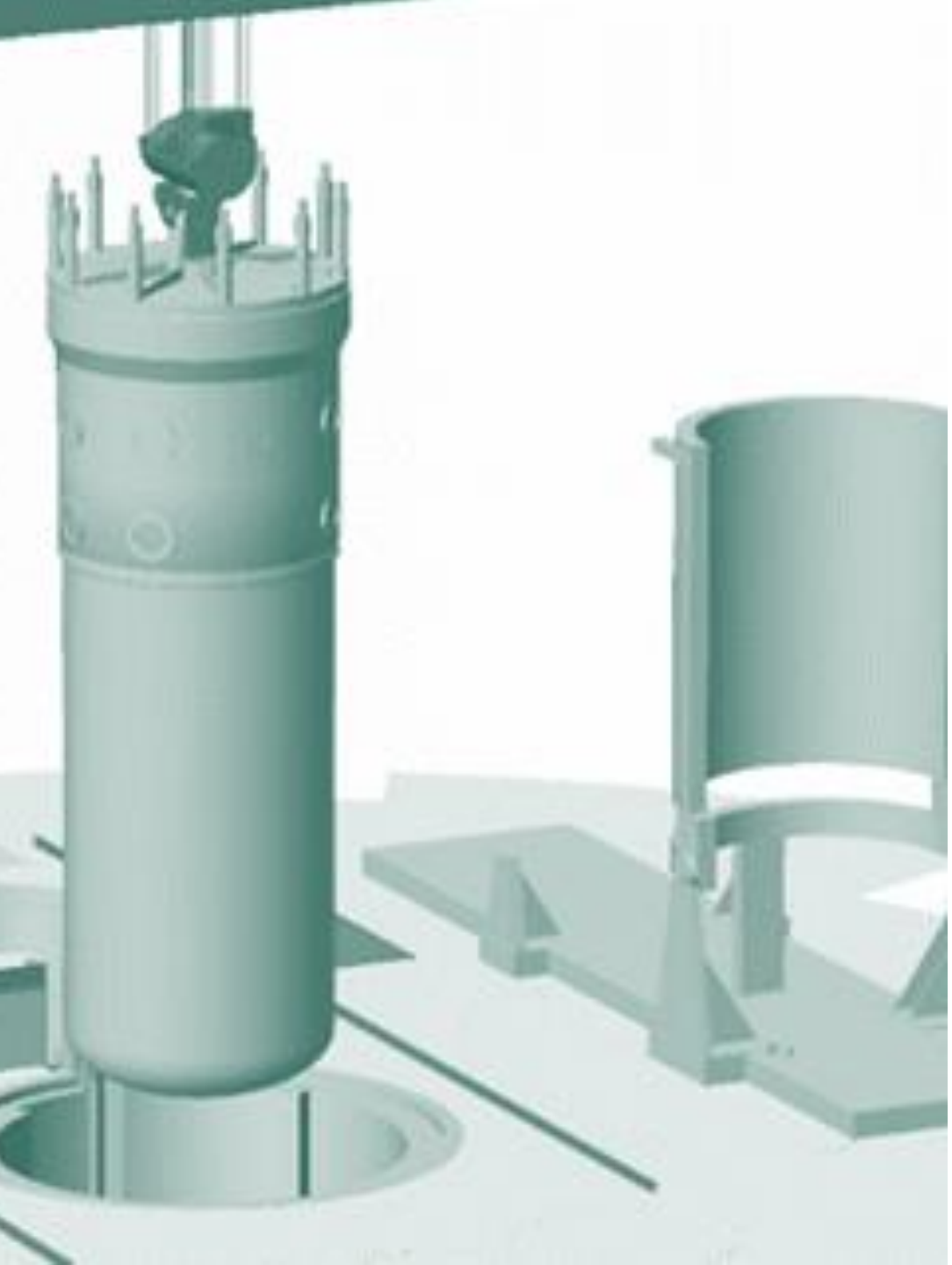
Bureau Veritas' role is to provide services related to the analysis of the condition of installations, using studies and diagnostics, in strict compliance with the regulatory framework.

**Petteri Maininki, Sales Director Industry Finland**

petteri.maininki@bureauveritas.com

group.bureauveritas.com

BUREAU VERITAS



FINLAND

# NUCLEAR DECOMMISSIONING AND DISMANTLING

## OUR SOLUTION

Fortum provides services in all the areas of nuclear decommissioning – from decommissioning strategical and program planning with cost estimates of the actual dismantling work and component segmentation. We support our customers in pre-decommissioning and facility shutdown activities, such as characterization planning and service operation optimization. We help with dismantling activities, such as special component dismantling like a reactor pressure vessel, and the coordination of dismantling logistics. We support decommission waste management, such as waste handling and treatment at the site. We even provide project management, engineering and steering, such as for site and health, safety and environment (HSE) management as well as radiation safety engineering.

## COMPETITIVE ADVANTAGE

As a nuclear operator, we have decades of experience in decommissioning planning. In addition to the decommissioning and waste management planning of our own units, we have supported the decommissioning planning of all Finnish nuclear reactors. We are currently executing the decommissioning program of Sweden's Oskarshamn units 1 & 2 and Barsebäck units 1 & 2 in cooperation with Uniper.

Through this significant four-unit decommissioning program, we are gaining up-to-date experience in cost-efficient decommissioning. Our customers will benefit from our further growing competencies.

## COMPANY

Fortum is a power company with deep roots in the field of nuclear power as an owner, operator and service provider. As a nuclear power plant (NPP) operator, Fortum has two NPP units of its own, and the Fortum Group has an ownership stake in several other units in Finland and Sweden. Fortum also provides other services for nuclear power plants and facilities, including extensive services for decommissioning nuclear power plants and radioactive waste management.

## REFERENCES

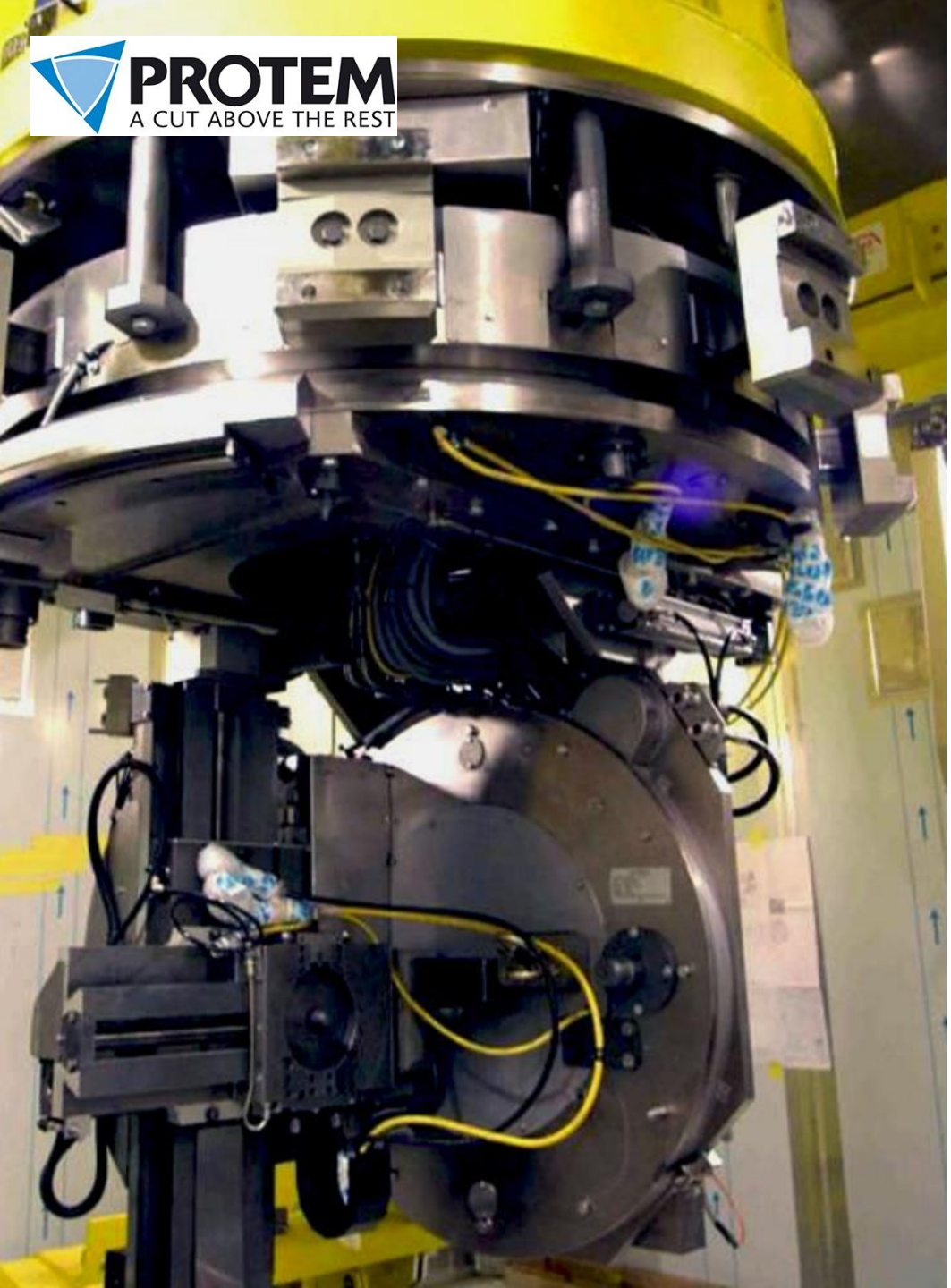
- Decommissioning planning for Loviisa NPP and Olkiluoto NPP – Finland
- Decommissioning the ongoing FiR1 research reactor – Finland
- Dismantling of moisture separator reheaters (MSRs) and feedwater piping in the Oskarshamn units 1 & 2 and Barsebäck units 1 & 2 – Sweden
- Dismantling asbestos insulations and control rod housings and piping in the reactor pressure vessel (RPV) segmentation project at the Barsebäck unit – Sweden

**Antti Ketolainen, Senior Manager, Decommissioning and Waste**

antti.ketolainen@fortum.com

www.fortum.com/products-and-services/power-plant-services/nuclear-services/decommissioning-and-waste-treatment

fortum
For a cleaner world




FINLAND

# DECOMMISSIONING & DISMANTLING

## OUR SOLUTION

Meuro-TECH represents the special machine manufacturer PROTEM, which has developed suitable mechanized equipment for dismantling several reactors around the world.

## COMPETITIVE ADVANTAGE

PROTEM supplies equipment to nuclear facilities all over the world. The company's technical expertise and experience have made PROTEM a world leader in the design and manufacture of equipment for the nuclear industry.

## COMPANY

Meuro-TECH is specialized in modern welding, cutting and laser cleaning technologies for customers in highly demanding fields.

Partnering with high-tech equipment manufacturers, Meuro-TECH imports the most suitable equipment for its customers, assists them in training and production startup, supports post-operations and maintenance along with providing consumables and spare parts service.

## REFERENCES

Meuro-TECH's references include electron beam welding (EBW) in heavy material thickness, especially copper. We have more than 30 years of experience in EBW. Our main customer is the Posiva company in Finland.

Another one of our references is the use of cleanLASER's equipment for surface laser cleaning where we mainly focus on critical structures and decommissioning applications.

**Ismo Meuronen, CEO**

ismo.meuronen@meuro-tech.fi

www.meuro-tech.fi

MEURO-TECH


FINLAND

# PROVEN TRACK RECORD AND EXPERTISE IN DEMANDING PROJECTS

## OUR SOLUTION

Peikko provides high-quality, embedded-steel components for demanding nuclear power plant (NPP) projects. We have 55 years of experience in the production of leading, concrete-connection technology for the global market and have a strong focus on research and development.

## COMPETITIVE ADVANTAGE

Over the last 15 years, we have been successful in applying our innovative connection technologies to highly demanding nuclear projects. We offer you peace of mind with our fully certified and traceable components. At Peikko, we understand just how critical nuclear safety is, and we work in conjunction with the Nuclear Safety Policy.

With full transparency of all our process phases, and with all work being organized according to international nuclear standards, every single product is completely traceable. We always provide you with all the documentation required for your project.

## COMPANY

Peikko Group Corporation is a leading global supplier of slim floor structures, wind energy applications and connection technology for precast and cast-in-situ construction.

Peikko has sales offices in over 30 countries in Asia Pacific, Europe, Africa, the Middle East and North America, with manufacturing operations in 12 countries. Peikko generated a turnover of EUR 239 million in 2020 and employs about 1,900 professionals.

**Raimo Lehtinen, Business Director, Power Plants**

raimo.lehtinen@peikko.com

www.peikko.com

peikko®

FINLAND

# YOUR TEAM OF NUCLEAR EXPERTS

**OUR SOLUTION**

Platom has expertise in the technical aspects of radioactive waste management, understands authority requirements and requirement management, and has experience working with supply chains. This allows us to effectively plan and manage large-scale radwaste flows from decommissioning and dismantling projects.

We can also help with defining the decommissioning waste inventory. We have specialized technical expertise for waste flows and logistics, measurement technologies and radiation safety.

**COMPETITIVE ADVANTAGE**

Platom has successfully carried out projects at all stages of a nuclear power plant's life cycle, from design and license applications to operation and license extension as well as decommissioning and dismantling.

We offer multidisciplinary and experienced in-house nuclear engineering and licensing expertise.

We have proven project and requirement management processes, along with the ability to provide complete solutions including system deliveries.

We have an agile company culture and a problem-solving mindset.

**COMPANY**

Platom is the leading expert in nuclear licensing and qualification in Finland. We are a team of independent, agile and experienced specialists whose aspiration lies in mastering the most demanding aspects of the nuclear industry. Our objective is to improve the sustainability of nuclear energy and guarantee the welfare of our customers for a sustainable future.

**REFERENCES**

We have 20+ years of experience and have delivered 550+ projects for the nuclear industry.

**Joel Maunula, Business Unit Director**

joel.maunula@platom.fi

www.platom.fi/en

PLATOM

# RESPONSIBLE CONSULTATION FOR DECOMMISSIONING

FINLAND

## OUR SOLUTION

TVO Nuclear Services Oy (TVONS) offers consultation services for waste characterization, handling, packaging and final disposal. Our services can decrease decommissioning costs by optimizing waste categorization and final disposal procedures.

## COMPETITIVE ADVANTAGE

Our experience, lessons learned and technical expertise help ensure the success of decommissioning projects. We have decades of practical experience in dismantling systems, structures and components (SSCs) from nuclear power plant modification projects. Dismantled waste is characterized, handled, packaged and disposed of into a low- and intermediate-level waste (LILW) repository. Our proven procedures guarantee safe and efficient solutions for decommissioning.

We are continuously developing waste management procedures. In addition, we have experience from an on-ground disposal facility for very low-level waste (VLLW).

## COMPANY

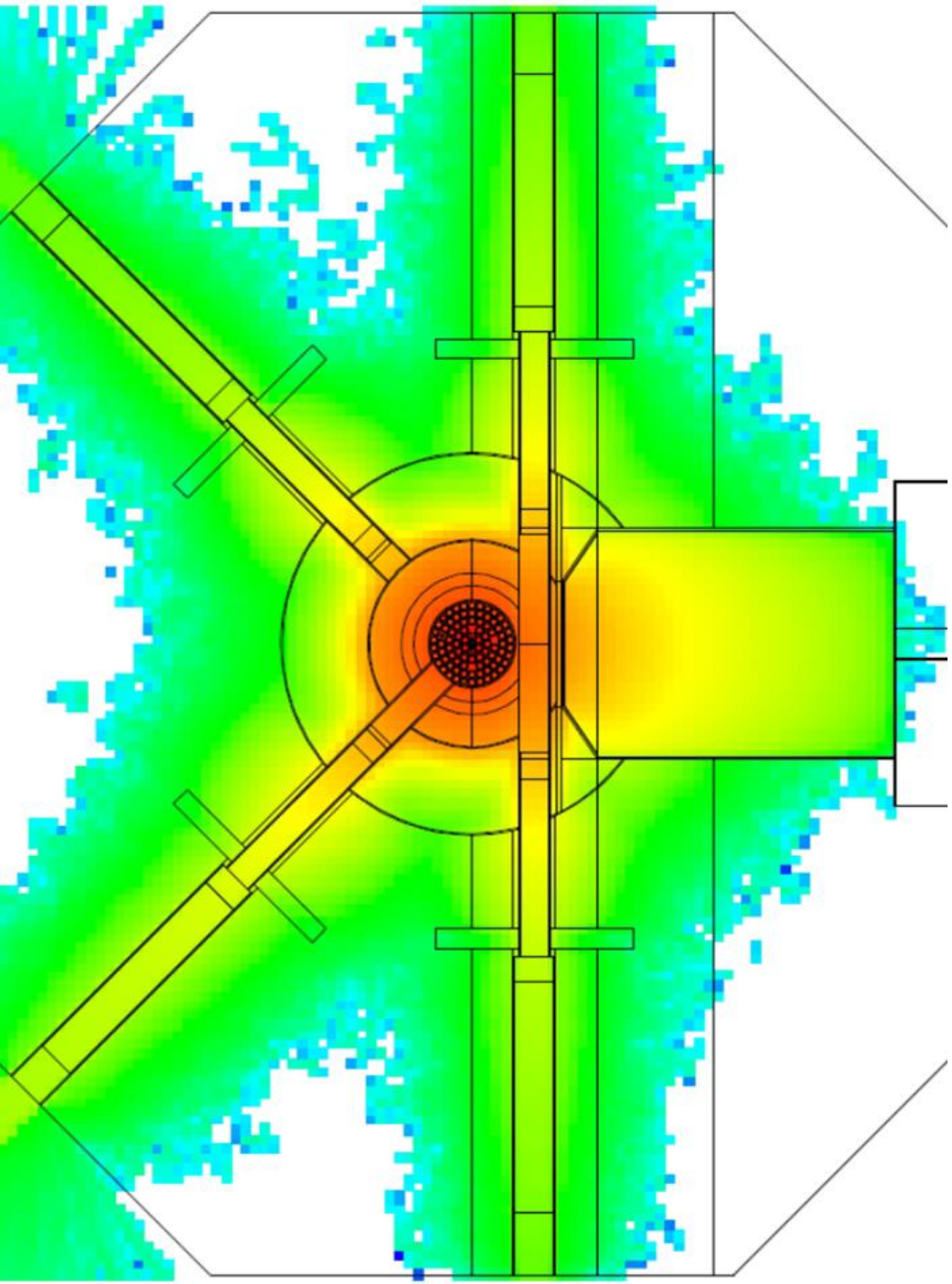
TVONS is a subsidiary of Teollisuuden Voima Oyj (TVO), an independent and non-listed public Finnish nuclear power plant operator.

We have access to TVO's experts and partners for consultation and development services. TVONS has provided consulting services based on TVO's experience in the nuclear power business since 1969. We have experience operating boiling water reactors (BWRs) since 1978 and in the construction and usage of a low- and intermediate-level waste repository since 1992. With Olkiluoto 3 in Finland, we have recent experience in tendering, sourcing, constructing and commissioning a modern nuclear power plant.

tvons@tvo.fi

www.tvons.fi

tvons



FINLAND

# EXPERT SERVICES FOR NUCLEAR DECOMMISSIONING

## OUR SOLUTION

VTT offers support services related to human capacity development, project planning and management, technology selection and more in collaboration with other Finnish partners.

VTT has computational tools for the modeling of inventory and contamination, as well as a radiochemistry laboratory for elemental and isotopic analysis. We also handle difficult-to-measure isotopes. Our expertise in non-nuclear technologies available for R&D&I includes data analytics, artificial intelligence applications, cybersecurity, robotics, optical instrumentation, machine vision and other technologies.

## COMPETITIVE ADVANTAGE

VTT has a research reactor (FiR1) currently under decommissioning. The project provides us with practical knowledge of the management of licensing and tendering decommissioning projects. We have knowledge of a comprehensive set of technologies that can be combined for nuclear projects within the same organization. The FiR1 decommissioning project works as a platform for developing new methods and technologies in collaboration with companies.

## COMPANY

VTT is one of Europe's leading multi-technology research institutions. We are owned by the Finnish state. Our task is to advance the utilization and commercialization of research and technology in commerce and society. VTT is a key partner in R&D&I and technical support for Finland's successful nuclear sector. In collaboration with our partners, we offer our services for the successful use of nuclear energy around the world.

## REFERENCES

VTT's references include the decommissioning of the FiR1 research reactor and the decommissioning of VTT's old hotlab, a laboratory for irradiated material studies.

**Erika Holt, Customer Account Lead**

erika.holt@vtt.fi

www.vttresearch.com/nuclear

VTT

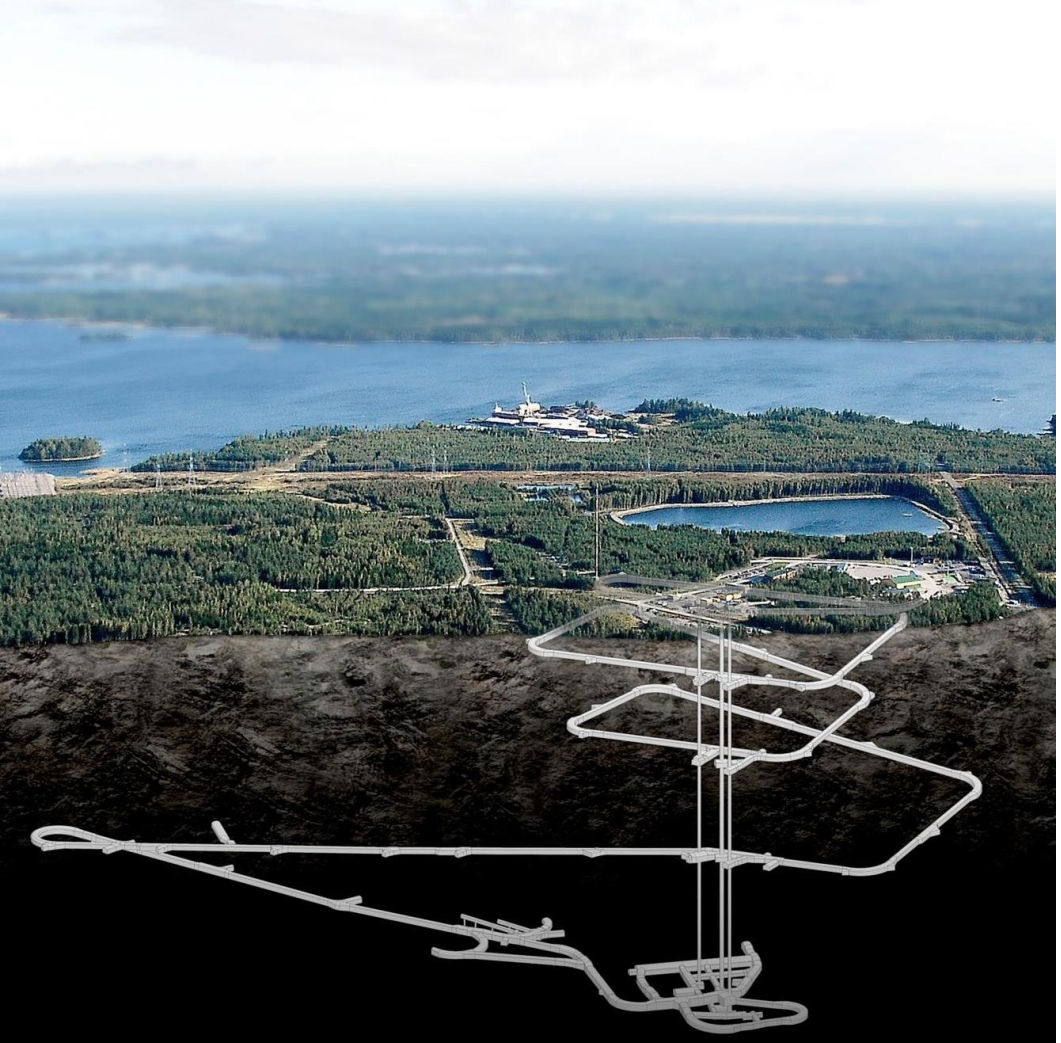
FINLAND

# RADIOACTIVE WASTE MANAGEMENT

- Commitment to responsibly take care of all waste over a plant's life cycle
- ONKALO® – underground rock facility – final repository for spent nuclear fuel constructed by Posiva
- Low- and intermediate-level waste handling and disposal at plants

AFRY OY
AINS GROUP
BARONA TEOLLISUUS OY
BUREAU VERITAS
EEZY
FORTUM
GEOLOGICAL SURVEY OF FINLAND
METECNO OY
MEURO-TECH OY
PEIKKO OY
PLATOM OY
POSIVA
ROCKPLAN
TVO NUCLEAR SERVICES
VTT

Picture courtesy: TVO



Picture: Posiva

# LEADING SOLUTIONS FOR RADIOACTIVE WASTE MANAGEMENT

FINLAND

## OUR SOLUTION

At AFRY, we have the expertise to support you with the best possible solutions for radioactive waste management. We have extensive experience with the management and handling of operational waste, waste from decommissioning and spent nuclear fuel. AFRY has highly qualified experts with experience in developing international standards in this area for the International Atomic Energy Agency (IAEA) and implementing them internationally.

AFRY has wide experience in nuclear waste management from site selection to in-service monitoring, including hydrogeology, geophysics, geochemistry, seismology, petrophysics and environmental issues like environmental impact assessments (EIAs). AFRY also has comprehensive experience in rock and tunnel engineering, including repository space design competence.

## COMPETITIVE ADVANTAGE

AFRY covers all aspects of radioactive waste and deep geological disposal from strategy development and case studies to public relations. We have supported national organizations worldwide with the management of radioactive waste in matters concerning deep geological disposal since the 1980s, conducting small case studies and analyses. These have included failure tolerance analysis for the safety classified systems of the whole encapsulation plant and the final disposal process.

Besides implementing projects and providing professional consulting services, AFRY also provides software for simulation modeling and risk assessment, such as AFRY RAMS, Ecolego, Safety Assessment Database, ERICA and SAFRAN.

## COMPANY

AFRY is a European leader in engineering, design and advisory services. We have 16,000 experts devoted to infrastructure, industry, energy and digitalization.

We have been working in the nuclear industry since its infancy, successfully carrying out projects that deal with everything from full-service undertakings to highly specialized details. At any stage of your project life cycle, we support all relevant aspects related to nuclear assets. Our services span safety to technical solutions to their economics, fulfilling a wide range of complex client needs from strategic advice to design and licensing to construction, operation, decommissioning and waste management. We cover the whole plant life cycle.

## REFERENCES

AFRY is a long-term partner in pioneering Nordic deep geological repositories. We have been supporting Posiva, the company responsible for the final disposal of spent fuel from Fortum and TVO. From the early research phase through the design and construction phases, we have provided Posiva with highly specialized services in a number of areas.

**Jari Kuikka, Director, Nuclear Energy**

jari.kuikka@afry.com

www.afry.com

AFRY
ÅF PÖYRY

FINLAND

# A FUNCTIONAL AND SAFE REPOSITORY IN CLEAR SIGHT

**OUR SOLUTION**

AINS Nuclear Waste Management is a team of consulting engineers and scientists with over 30 years of experience in the Finnish nuclear waste programs. We have expertise in low-level waste repositories, as well as with the globally pioneering spent fuel repository program. We have helped more than 25 nuclear waste management programs internationally, including both low-level and high-level waste. This makes us a leading expert globally in nuclear waste management.

Our specialist expertise lies in repository siting, repository design, long-term safety and engineered clay barriers.

**COMPETITIVE ADVANTAGE**

Our advantage comes from our deep experience in Finland and wide experience internationally. Our clients value our needs-focused ethos and our ability to work with a wide network of experts.

With our experience in repository siting, design and cost estimation, we help clients achieve a clear line of sight to a functional and safe repository. Our safety case experts have a proven track record effectively managing scientific knowledge for long-term development of a safety case. Our engineered clay barriers team effectively covers all matters to do with bentonite, from material selection and testing to predictive modeling.

**REFERENCES**

AINS has led an international consortium that helped the Norwegian nuclear waste management program get off to a good start. Our services cover repository design with optioneering, siting and safety analysis, as well as helping with program management to provide foresight to our clients.

**Teemu Laurila, Unit Director,**
**Nuclear Waste Management**

teemu.laurila@ains.fi

www.ains.fi

AINS GROUP


FINLAND

# RELIABLE RADIOACTIVE WASTE MANAGEMENT SOLUTIONS

## OUR SOLUTION

Barona specializes in human resources management for roles at all levels. We find competent workers as well as top international talent in Finland and abroad to work for your business. With years of experience, we offer site management services ranging from access control to licensing, regulatory affairs as well as labor and competence resource management.

## COMPETITIVE ADVANTAGE

We have 15 years of experience in diverse resourcing projects and maintenance with top organizations in the nuclear power industry in Finland and abroad. We operate with broad international expertise in 11 countries and are familiar with the actors in the nuclear power and energy production sector in Finland and globally.

Our experts are widely experienced professionals in the energy production industry. We always customize our services to meet the changing needs of our clients.

## COMPANY

We are the leading industry recruitment and temporary staffing service provider in Finland. We challenge traditional ways of working and always seek opportunities in places where others haven’t yet looked. We offer reliable, professional workers for all situations and needs in nuclear power production.

**Juho-Pekka Nojonen, Vice President, Barona Industry**

juho.nojonen@barona.fi

www.barona.fi/en/services

barona

FINLAND

# SUPPORT SERVICES FOR WASTE MANAGEMENT

## OUR SOLUTION

Established in 1828, Bureau Veritas is a global leader in testing, inspection and certification.

Our services related to controlling environmental impact include certification of waste collection and packaging processes, managing "classic" waste, type monitoring and classification.

We also provide support for setting up a sector with evaluation of quantities, natures and more. We carry out asbestos diagnostics before deconstruction through creation or updating 3D models.

Other services include nuclear waste and TFA (very low activity), waste monitoring and certification, material balance and container integrity as well as control of packaging and transport (approval for new class 7).

## COMPETITIVE ADVANTAGE

Bureau Veritas offers innovative solutions for conformity assessments compliant with standards and regulations to reduce risk, improve performance and promote sustainable development. Bureau Veritas is recognized and accredited by the largest national and international organizations.

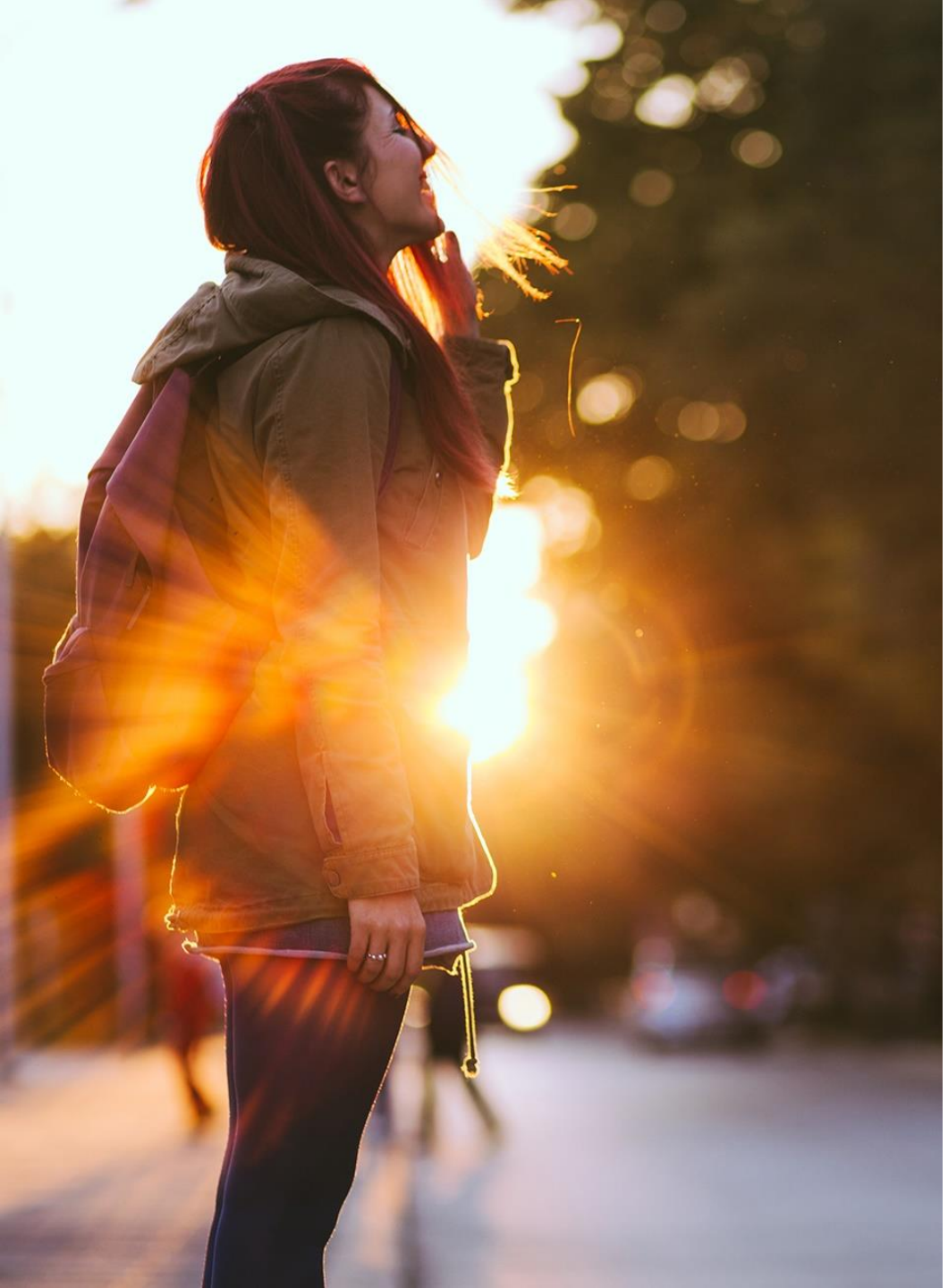
Thanks to its presence around the world with 1,400 offices in 140 countries, Bureau Veritas covers the needs of the supply chain in Europe, Russia, Asia and the United States.

**Petteri Maininki, Sales Director Industry Finland**

petteri.maininki@bureauveritas.com

group.bureauveritas.com

BUREAU VERITAS



FINLAND

# DELIVER THE RIGHT PEOPLE AT THE RIGHT TIME

## OUR SOLUTION

Eezy is the most versatile staffing services company in Finland. We know how to deliver the right people at the right time.

## COMPETITIVE ADVANTAGE

We offer a huge pool of candidates for companies and provide staffing services, international recruiting, personnel assessment, executive search and organizational development. We also offer consultation on Finnish employment law.

## COMPANY

Eezy knows Finnish working life from Hanko to Utsjoki and employs around 30,000 people each year. In 2018, our combined turnover was around EUR 300 million – and our growth continues.

Our goal is market leadership in Finland by 2022.

Our services range from short-term personnel rental to high-profile managerial recruiting and organizational development. We make sure to satisfy any and all HR needs our customers may have.

## REFERENCES

Our references include AREVA NP, Bilfinger GmbH, Christof Industries GmbH, Actemium, Suunto and others.

**Jani Andreasen, Sales Manager**

jani.andreasen@eezy.fi

www.eezy.fi

FINLAND

# NUCLEAR WASTE MANAGEMENT

## OUR SOLUTION

Fortum supports its customers in several areas of nuclear waste management – from waste strategy planning to consultancy services in the final disposal. Fortum's offering in waste management covers strategical waste management planning, including treatment optimization and waste routing for both operational and decommissioning waste.

We also offer waste characterization planning, radioactive liquid waste treatment with NURES® products and waste solidification with the LOCKIT® cement-based solidification concept.

Other services from Fortum include the conceptual planning of low- and intermediate-level waste (LILW) final repositories and intermediate storage as well as safety assessments (safety case) for the final disposal of LILW.

## COMPETITIVE ADVANTAGE

As a nuclear operator, we have decades of waste management competencies that play a key role at Fortum. We have decades of experience in nuclear waste treatment and have developed our own solution for radioactive liquid waste purification.

Our NURES® technology purifies liquid radioactive waste to a fraction of the original waste volume. This technology is based on patented, 100% inorganic, highly selective ion exchange materials.

We also operate our own low- and intermediate-level nuclear waste final underground repository at our Loviisa Nuclear Power Plant site in Finland. Practicalities of operation and safety aspects of final disposal are at the core of our waste management competence.

## COMPANY

Fortum is a power company with deep roots in the field of nuclear power as an owner, operator and service provider. As a nuclear power plant (NPP) operator, Fortum has two NPP units of its own, and the Fortum Group has an ownership stake in several other units in Finland and Sweden. Fortum also provides other services for nuclear power plants and facilities throughout the entire life cycle of a nuclear power plant.

## REFERENCES

- Waste strategy planning and implementation for Loviisa NPP
- Waste strategy planning and implementation for the ongoing FiR1 research reactor decommissioning project
- Installation of a NURES® radioactive liquid waste treatment system for decommissioning an NPP in Germany
- Delivery of NURES® CsTreat® and SrTreat® IX materials for an advanced liquid processing system (ALPS) at Fukushima Dai-ichi since 2012

**Antti Ketolainen, Senior Manager, Decommissioning and Waste**

antti.ketolainen@fortum.com

www.fortum.com/products-and-services/power-plant-services/nuclear-services/decommissioning-and-waste-treatment

fortum
For a cleaner world

FINLAND

# FOR EARTH AND FOR US

## OUR SOLUTION

As maximum safety is the cornerstone of the nuclear energy industry, Geological Survey of Finland (GTK) helps you take the first step to ensure appropriate site selection. Our extensive geological site selection services assist you in choosing the criteria and best possible final disposal site for nuclear waste and deciding the location for a nuclear power plant. We help prepare you to operate a nuclear facility. Our site investigations are tailored for all stages of the process, from screenings to site selection. We provide innovative solutions for assessing long-term safety and implementing natural analogue investigation projects.

## COMPETITIVE ADVANTAGE

For more than 40 years, GTK has worked closely with the nuclear energy sector. As a trusted independent research agency, we produce a wide variety of impartial geological and geophysical data.

We also provide professional services for energy companies, the waste management sector and governmental agencies to support decision-making and safe implementation of nuclear energy. We use our extensive experience in multiple nuclear power plants and disposal projects at home and abroad.

## COMPANY

GTK is an internationally oriented geoscience research agency operating under the Ministry of Economic Affairs and Employment in Finland. We provide impartial pioneer research and high-class geological expertise in creating solutions for more sustainable growth. Our over 400 professionals offer diverse expertise in research, digital solutions and a broad range of laboratory services. In the nuclear power sector, our focus is on geological disposal of nuclear waste, site selection for power plants and safety aspects of nuclear power plant siting as well as long-term safety of radioactive waste disposal.

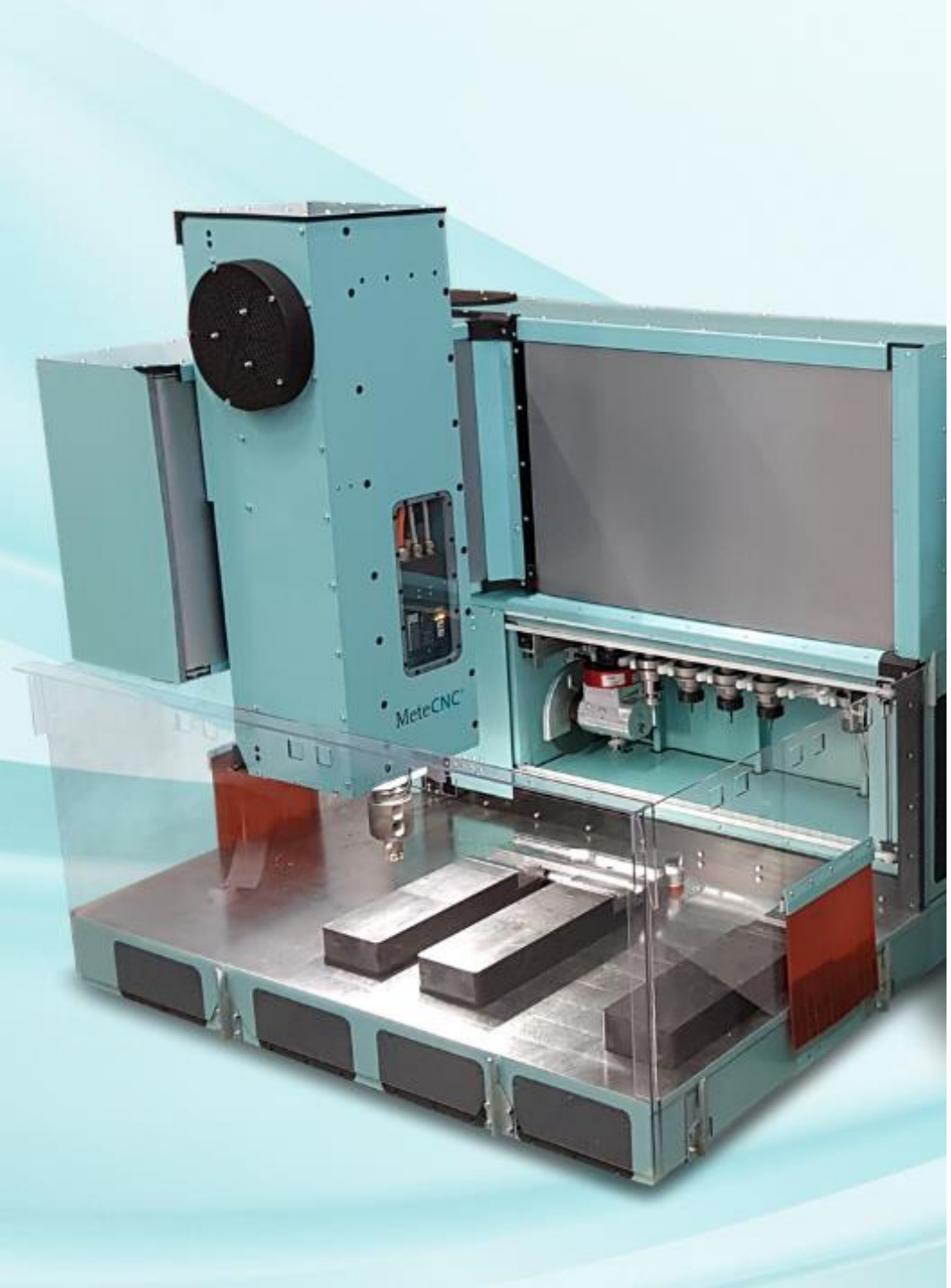
GTK – For Earth and for us.

**Ismo Aaltonen, Senior Specialist**

ismo.aaltonen@gtk.fi

www.gtk.fi

GTK




FINLAND

# RADIATION-RESISTANT SPECIAL PURPOSE CNC MACHINES

## OUR SOLUTION

At Metecno Oy, we aim to work on projects to produce high-quality CNC-controlled, special purpose machines that resist radiation and function fully in a radioactive environment.

## COMPETITIVE ADVANTAGE

From start to finish, we design and build demanding CNC-controlled machine and automation solutions that have been unattainable for companies before.

We are one of only a few companies to provide customized and comprehensive CNC solutions on a turnkey basis tailored to individual client needs.

## COMPANY

Metecno Oy is a Finnish family-owned company. Since 2008, we've been an innovative special purpose machine manufacturer, an expert in automation design, mechanical engineering and robotics integrations – and a reliable partner.

Our vision is to be the best-known special purpose machine manufacturer in Finland. We commit ourselves to help any company in any industry in any country solve their problem with an unprecedented machine solution.

## REFERENCES

We have previously delivered a CNC-controlled, radiation-resistant milling machine to VTT, the Technical Research Centre of Finland, for their hot cell. This machine is an ultra-compact, modular, easy-to-disassemble MeteCNC® special purpose machine for handling radioactive material.

Currently, we are working on a project to deliver a MeteCNC® robotic machining station to Posiva Oy, a pioneer in nuclear waste management, for its nuclear fuel encapsulation plant. The station's task is to ensure the dimensions and surface quality of the fuel capsules to be disposed of in ONKALO®.

**Matti Metsähonkala, CEO**

info@metecno.fi

+358 20 741 5500

www.metecnc.com

Metecno

Mechatronical Solutions


# LASER DECONTAMINATION

FINLAND

## OUR SOLUTION

Meuro-TECH specializes in laser cleaning technologies and modern welding and cutting applications for customers in highly demanding fields.

Cleaning surfaces via laser ablation is a modern, dry, media-free, non-abrasive and environmentally friendly process. Laser cleaning reduces secondary waste.

## COMPETITIVE ADVANTAGE

Laser ablation is an alternative technology to current decontamination technologies like mechanical abrasion and chemical etching. It presents a contact-free procedure for the decontamination of metal surfaces from radioactive substances.

Laser cleaning is an effective process for decontaminated applications. Decontamination factors (DFs) of 1,000 can be reached.

cleanLASER has 20 years of know-how from mid- and high-power applications for power plants and the petrochemical, defense, military, aerospace and tire industries.

## COMPANY

Partnering with high-tech equipment manufacturers, Meuro-TECH imports the most suitable equipment for customers, assists them in training and production startup, supports post-operations and maintenance along with providing consumables and spare parts service.

## REFERENCES

Meuro-TECH's references include surface laser cleaning using cleanLASER's equipment. Our main activity focuses on critical structures and decommissioning applications.

Another one of our references is electron beam welding (EBW) in heavy material thickness, especially copper. We have more than 30 years of experience in EBW. Our main customer is the Posiva company in Finland.

**Ismo Meuronen, CEO**

ismo.meuronen@meuro-tech.fi

www.meuro-tech.fi

MEURO-TECH


FINLAND

# PROVEN TRACK RECORD AND EXPERTISE IN DEMANDING PROJECTS

## OUR SOLUTION

Peikko provides high-quality, embedded-steel components for demanding nuclear power plant (NPP) projects. We have 55 years of experience in the production of leading, concrete-connection technology for the global market and have a strong focus on research and development.

## COMPETITIVE ADVANTAGE

Over the last 15 years, we have been successful in applying our innovative connection technologies to highly demanding nuclear projects. We offer you peace of mind with our fully certified and traceable components. At Peikko, we understand just how critical nuclear safety is, and we work in conjunction with the Nuclear Safety Policy.

With full transparency of all our process phases, and with all work being organized according to international nuclear standards, every single product is completely traceable. We always provide you with all the documentation required for your project.

## COMPANY

Peikko Group Corporation is a leading global supplier of slim floor structures, wind energy applications and connection technology for precast and cast-in-situ construction.

Peikko has sales offices in over 30 countries in Asia Pacific, Europe, Africa, the Middle East and North America, with manufacturing operations in 12 countries. Peikko generated a turnover of EUR 239 million in 2020 and employs about 1,900 professionals.

**Raimo Lehtinen, Business Director, Power Plants**

raimo.lehtinen@peikko.com

www.peikko.com

peikko®

FINLAND

# YOUR TEAM OF NUCLEAR EXPERTS

## OUR SOLUTION

Platom's extensive experience in radwaste management allows us to provide services in many different areas and throughout the entire life cycle of a nuclear facility.

Our expertise includes the final disposal of low- and intermediate-level waste (LILW), liquid waste solidification, gaseous waste treatment, decontamination and final disposal of spent nuclear fuel.

Additionally, we are involved in solving issues related to large-scale radwaste flows from nuclear power plant dismantling. We also carry out preliminary problem solving and feasibility studies to help identify the best options for our customers.

## COMPETITIVE ADVANTAGE

We have good knowledge of the existing and upcoming technological solutions for different radwaste management situations. We combine our understanding of Finnish regulations and requirement management know-how to create accurate specifications for each scenario.

We are also able to design and provide customized equipment and system deliveries for our customers if no suitable solution is available on the market. We have a good track record of delivering tailored radwaste management systems to our customers on time and on budget.

## COMPANY

Platom is the leading expert in nuclear licensing and qualification in Finland. We are a team of independent, agile and experienced specialists whose aspiration lies in mastering the most demanding aspects of the nuclear industry. Our objective is to improve the sustainability of nuclear energy and guarantee the welfare of our customers for a sustainable future.

## REFERENCES

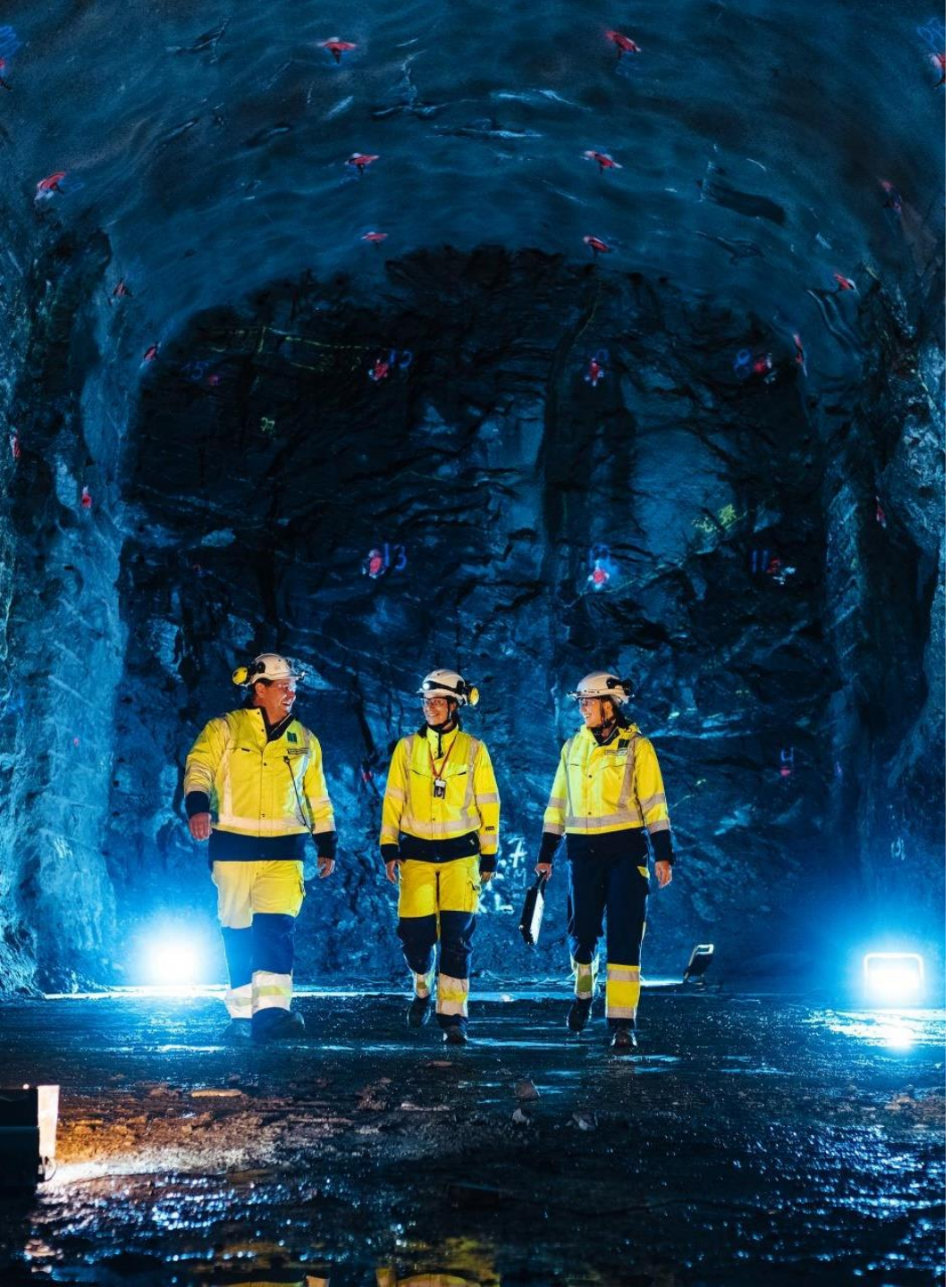
We have 20+ years of experience and have delivered 550+ projects for the nuclear industry.

**Joel Maunula, Business Unit Director**

joel.maunula@platom.fi

www.platom.fi/en

PLATOM



FINLAND

# DECADES OF R&D KNOWLEDGE IN SPENT NUCLEAR FUEL SYSTEM DESIGN

## OUR SOLUTION

Posiva Solutions' mission is to add value to our clients' nuclear waste management programs by saving time and reducing costs. Our expertise is based on our decades-long experience in the design, research and development of the deep geological repository ONKALO®, a registered trademark of Posiva Oy.

## COMPETITIVE ADVANTAGE

Posiva Solutions Oy delivers expert knowledge gained by decades of research and development in spent nuclear fuel system design. Together with an extensive cooperation network, we provide tailored services and solutions for nuclear waste management.

## COMPANY

Posiva Solutions Oy, established in 2016, is the subsidiary of Posiva Oy, the leading expert in the final disposal of spent nuclear fuel.

## REFERENCES

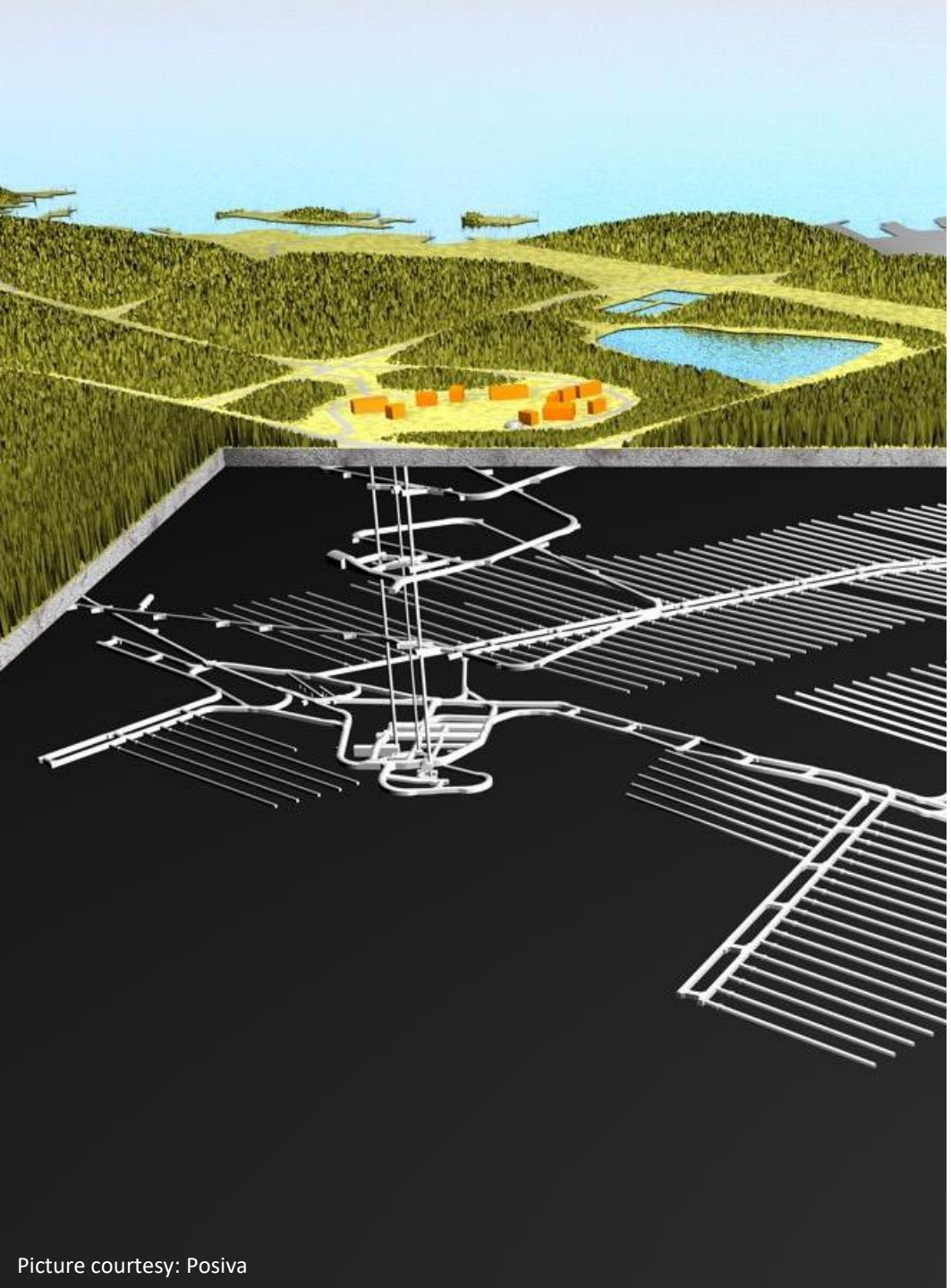
Our references include Svensk Kärnbränslehantering AB (SKB), Norwegian Nuclear Decommissioning (NND), National Cooperative for the Disposal of Radioactive Waste (Nagra), Czech Radioactive Waste Repository Authority (SÚRAO), Radioactive Waste Management (RWM), Nuclear Waste Management Organization (NWMO), Beijing Research Institute of Uranium Geology (BRIUG) and Radioactive Waste Management Funding and Research Center (RWMC) in Japan.

**Jari Makkonen**

jari.makkonen@posiva.fi

www.posivasolutions.com

Posiva Solutions



Picture courtesy: Posiva

FINLAND

# SAFE FUTURE SOLUTIONS

## OUR SOLUTION

The safe final disposal of spent nuclear fuel is an important mission for Rockplan in establishing a healthy environment for generations to come. Rockplan is a growing international infrastructure design and consulting company that develops functional and safe solutions for projects that require special expertise, from urban development to nuclear waste.

Rockplan provides combined expertise that covers principal and architectural design, structural design, rock mechanics and tunneling design, geological and environmental design, project management and project development tasks, as well as planning and consulting related to nuclear waste disposal.

## COMPETITIVE ADVANTAGE

Rockplan's scientists, designers and engineers have made it possible to construct ONKALO®, the world's first deep geological final repository for spent nuclear fuel in hard crystalline bedrock, owned and managed by Posiva Oy in Finland. We are pleased to share our expertise in similar projects worldwide.

In addition to the design of repositories for spent nuclear fuel and other radioactive waste, our services include carbon-free energy production based on small modular reactor (SMR) technology to provide a clean environment for future generations to enjoy. Part of realizing this mission has been the development of an underground SMR design.

## COMPANY

Founded in 1986, Rockplan is an international and growing customer-oriented design agency specializing in underground construction. We are now nearly 50 professionals. Rockplan is part of Solwers Oyj Group, with over 250 engineering specialists.

## REFERENCES

Our references include rock mechanics and tunneling design, implementation planning and work time planning for Posiva Oy's underground ONKALO® research facility, which extends to a depth of 450 meters.

**Jorma Autio, Head of Nuclear Services**

jorma.autio@rockplan.fi

www.rockplan.fi

ROCKPLAN


FINLAND

# EXPERIENCE-BASED RADIOACTIVE WASTE MANAGEMENT SOLUTIONS

## OUR SOLUTION

TVO Nuclear Services Oy (TVONS) provides consultation services for low- and intermediate-level waste (LILW) management. Our proven solution minimizes waste and costs. Our wide range of consultation services includes characterization, handling, packaging and final disposal of radioactive waste. In addition, we offer planning, support and training related to waste management.

## COMPETITIVE ADVANTAGE

TVONS helps its clients achieve safe and cost-efficient waste management practices based on our decades of practical experience in LILW management.

## COMPANY

TVONS is a subsidiary of Teollisuuden Voima Oyj (TVO), an independent and non-listed public Finnish nuclear power plant operator.

We have access to TVO's experts and partners for consultation and development services. TVONS provides consulting services based on TVO's experience in the nuclear power business since 1969. We have experience operating boiling water reactors (BWRs) since 1978 and in the construction and usage of a low- and intermediate-level waste repository since 1992. With Olkiluoto 3 in Finland, we have recent experience in tendering, sourcing, constructing and commissioning a modern nuclear power plant.

tvons@tvo.fi

www.tvons.fi

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# SCIENCE-BASED SUPPORT FOR RADIOACTIVE WASTE MANAGEMENT

## OUR SOLUTION

VTT offers expertise and experimental and computational analyses for a wide range of needs related to radwaste management. These include geological site and hydrogeochemical characterization, development of encapsulation and disposal technologies, including fuel characterization, canister design and safety, and robotics.

We also develop, assess and construct engineered barrier systems, monitor and model material behavior and safety. VTT provides operational and post-closure safety assessment, including risk assessment and licensing documentation and reviews.

## COMPETITIVE ADVANTAGE

VTT is a key research, development and innovation partner in Finland's world-leading radwaste program. VTT has knowledge of a comprehensive set of technologies that can be incorporated into radwaste management projects within the same organization, including microbial effects, thermal treatment of waste or artificial intelligence.

## COMPANY

VTT is one of Europe's leading multi-technology research institutions. We are owned by the Finnish state. Our task is to advance the utilization and commercialization of research and technology in commerce and society. VTT is a key partner in R&D&I and technical support for Finland's successful nuclear sector.

## REFERENCES

VTT has played an active role in developing practical Finnish and Swedish waste management solutions for high-level nuclear waste (Posiva and SKB), solutions for other waste forms (TVO, Fortum and Fennovoima), as well as solutions for governmental and regulatory authorities (TEM/MEE, STUK and SSM).

**Erika Holt, Customer Account Lead**

erika.holt@vtt.fi

www.vttresearch.com/nuclear

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# CONTACT INFORMATION

BUSINESS
**FINLAND**

**Business Finland**
Risto Huhta-Koivisto, Senior Advisor
+358 40 343 3347
risto.huhta-koivisto@businessfinland.fi
**www.businessfinland.com**

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**FinNuclear Association**
Jekaterina Lavonen, Executive Director
+358 44 710 2062
Jekaterina.lavonen@finnuclear.fi
**www.finnuclear.fi**