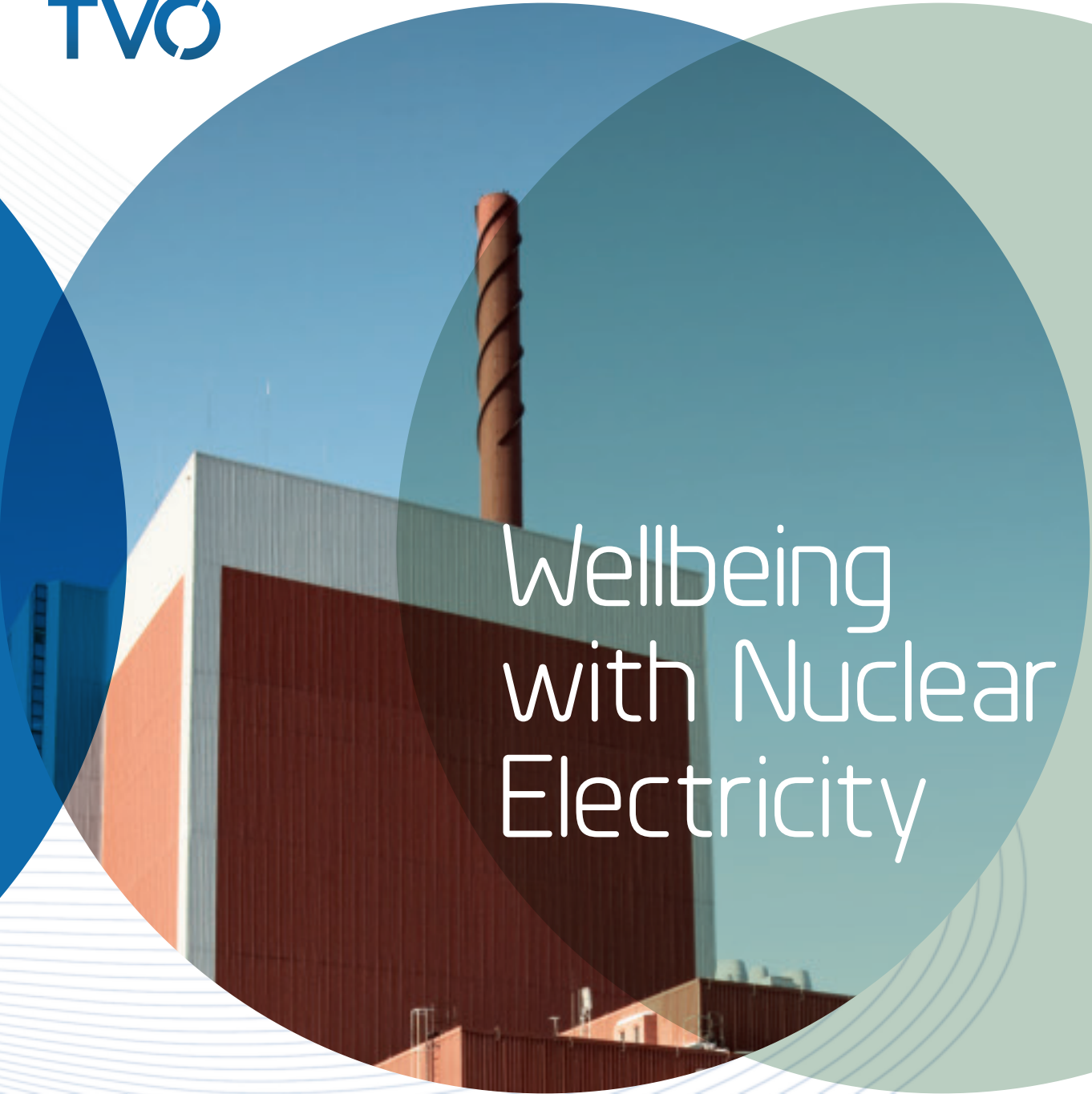
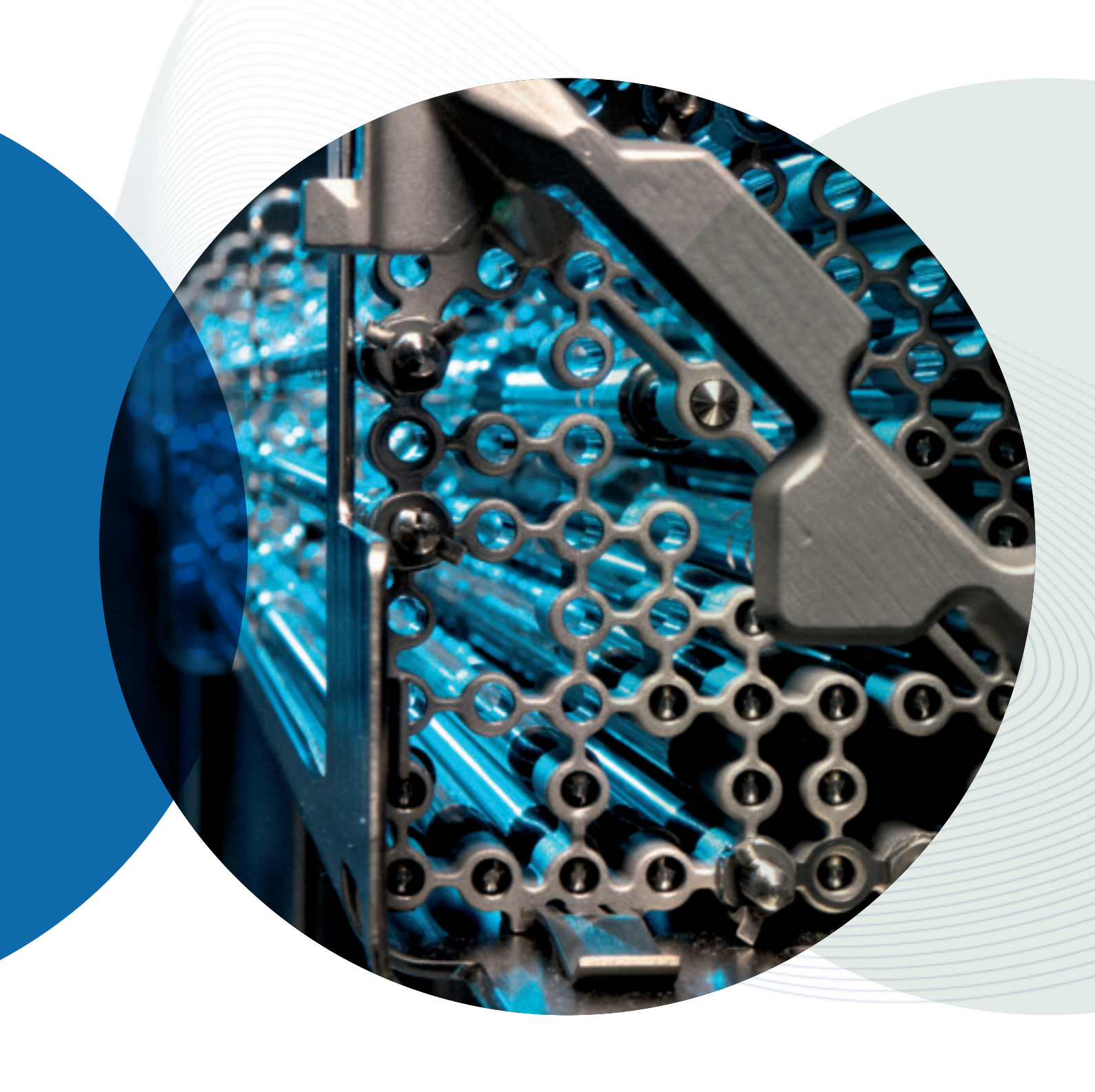


TVO

A photograph of a nuclear power plant with a tall, rusted metal smokestack rising from a large, modern building with a mix of grey and reddish-brown panels. The image is framed by large, overlapping circles in shades of blue and green, with a series of thin, white, curved lines at the bottom.

# Wellbeing with Nuclear Electricity



# LIGHTING THE WAY

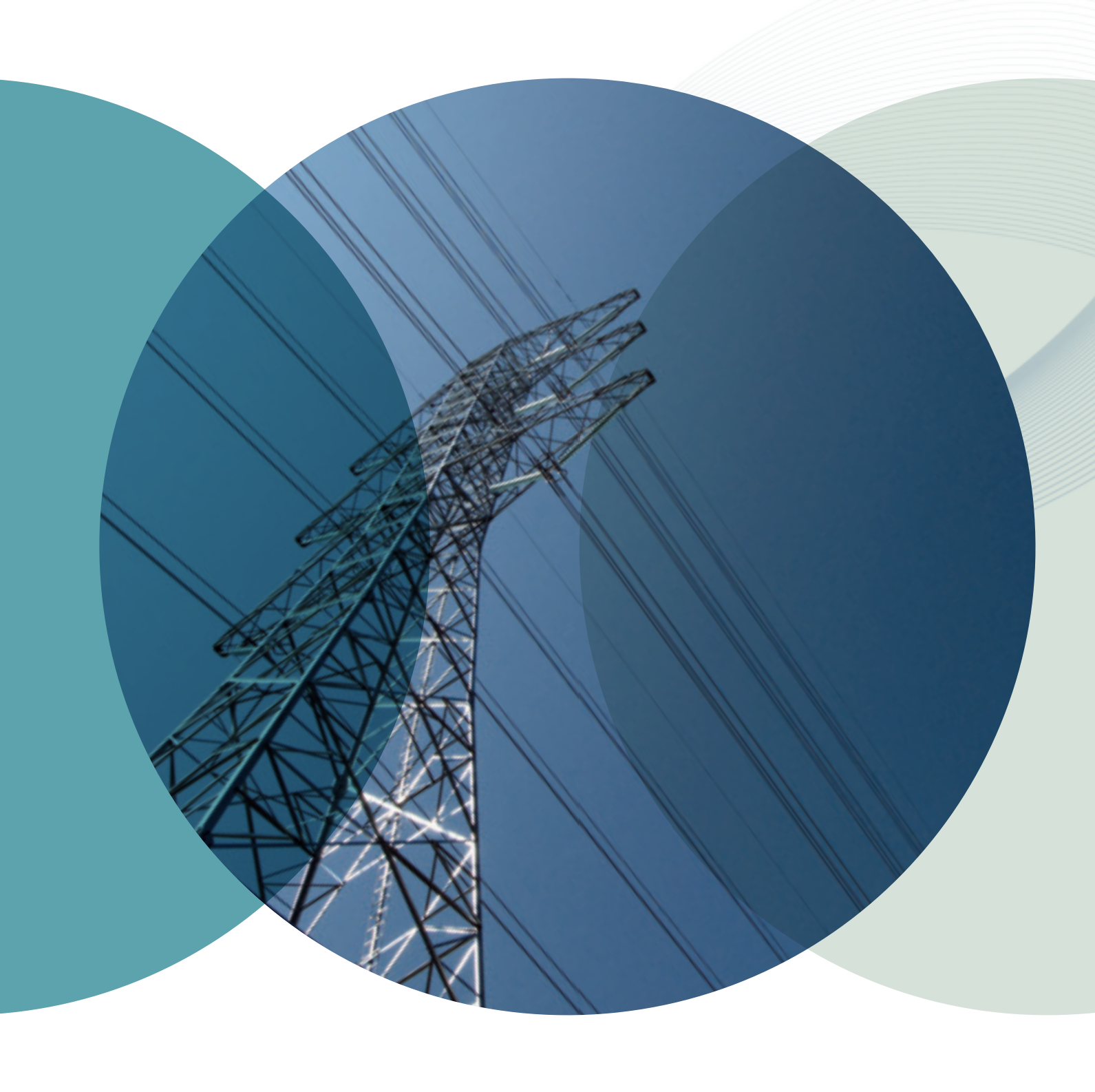
Teollisuuden Voima Oyj (TVO) has been supplying electricity from the island of Olkiluoto for more than 30 years – safely and reliably. We have received the Key Flag, a symbol for Finnish work, know-how and ownership, for the electricity we are producing. We produce about one-sixth of the total electricity consumed in Finland. Electricity produced in Finland brings wellbeing and preconditions for growth and will continue to do so in the future.

Nuclear electricity production is stable and its costs predictable. Therefore, nuclear power suits superbly to fulfill the basic demand for electricity in Finland. We are in fact part of the backbone of Finnish society: TVO is owned by a group of Finnish industrial and energy companies, to which we deliver electricity at cost price.

Half of the electricity we produce is used to keep the wheels of industry rolling while the other half flows to households, services and agriculture through energy companies.

Olkiluoto is undergoing a period of major projects. We are modernizing the existing plant units, building and planning two new nuclear power plant units and excavating a repository for spent nuclear fuel. The projects are a feat of strength establishing the position of Finnish nuclear expertise at the top and strengthening our role as the forerunner in the energy sector.







# STEADY SUPPLY

Electricity is one of the basic necessities in modern society. It is important to households and a key production prerequisite to the business sector. Electricity consumption is now on the rise after the economic recession. Fighting against climate change increases the use of electricity in traffic and heating, for example, in order to replace fossil fuels.

Nuclear power is an excellent form of electricity production, as it allows secure supply, competitive production costs and limitation of carbon dioxide emissions. It is also a very effective way of producing electricity: less than one matchbox-sized amount of uranium fuel is enough to produce electricity for one year for a family of four living in a detached house with electric heating.

The existing nuclear power plants are based on fission technology. Uranium nuclei are split with neutrons in the nuclear reactor, which releases energy and new neutrons. The release of neutrons results in a chain reaction that keeps the nuclear reactor going. Energy is released mostly as the kinetic energy of the fission products. The kinetic energy first transforms into thermal energy and is then transformed into electricity. In practise, a nuclear power plant boils water using the heat released by the splitting of uranium nuclei. The resulting steam rotates the turbine that in turn rotates the generator. This transforms kinetic energy into electricity.



# IRONCLAD SAFETY

The cornerstone of our operation is to keep the existing plant units Olkiluoto 1 and 2 (OL1, OL2) safe and always up-to-date through systematic, long-term, careful operation and continuous modernization. Thanks to determined development work, the reliability of our plant is first rate.

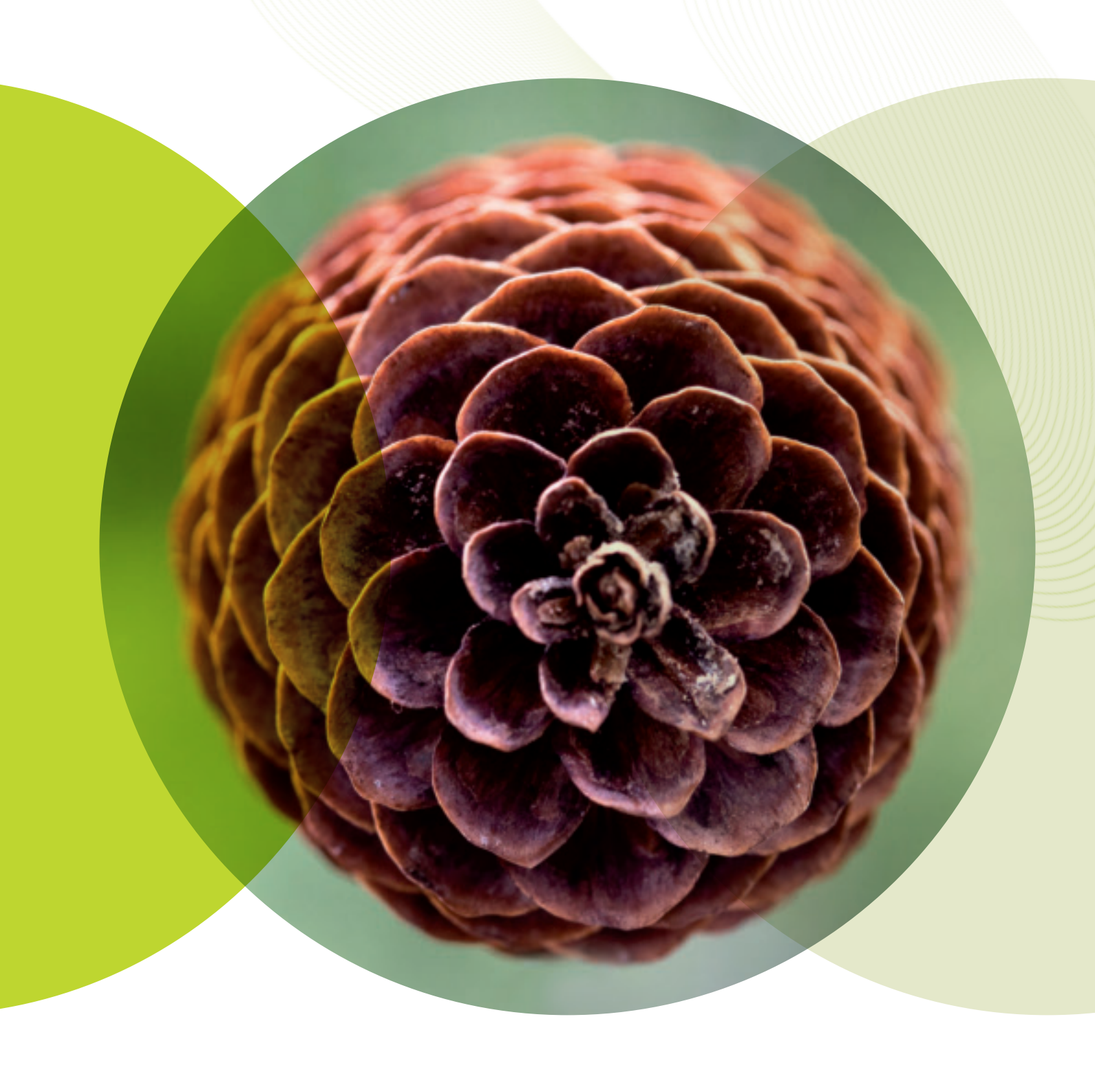
Based on our principle of continuous improvement, plant safety features have been improved in a variety of ways over the years. The worst possible threats that Olkiluoto could face have been taken into consideration in planning and the development as well as construction of safety systems. Threats include storms, floods, freezing, fire and earthquakes.

Olkiluoto 3 (OL3), which is currently under construction, represents the latest developments in reactor technology. New technical features have been added

with caution in order to improve safety, production capacity and reliability. OL3 includes advanced safety solutions. In addition to multiple, separate safety systems that use different principles and are employed in traditional units, OL3 also has new safety features. Among other things, the plant unit has a double-layer containment building and a core melt spreading area with, i.e. a core catcher.

A fourth unit, Olkiluoto 4 (OL4), will also be constructed in Olkiluoto in the future. We will make use of the expertise and experience gained from the OL3 project, and the complete infrastructure available on the island of Olkiluoto, in the planning, designing and building of the OL4 unit.









# INSPIRED RENEWAL

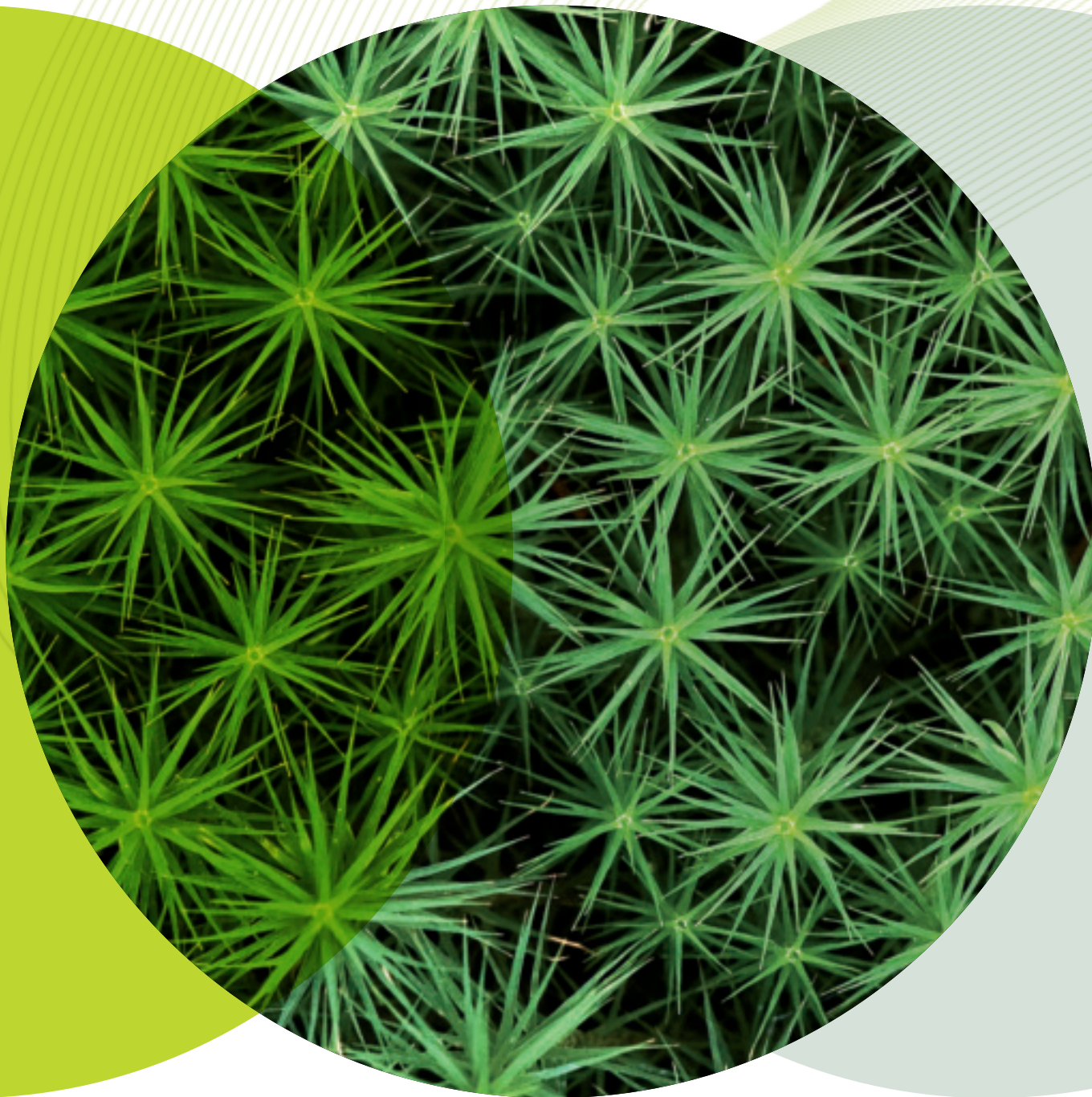
The energy sector plays an important role in building and maintaining wellbeing. We are looking for answers to the question of how growing energy needs can be satisfied effectively but without impacting the environment. TVO has some 800 employees operating and building the most sophisticated nuclear technology in the world – at the same time building a cleaner future.

The existing nuclear power plant units are being developed and modernized, new production capacity is being constructed and a repository solution for spent nuclear fuel is being developed and planned in Olkiluoto.

We are engaged in this unique, pioneering work together with international scientific communities and leading experts.

Our mission is to produce electricity safely, economically and in an environmentally friendly manner. Our values are responsibility, continuous improvement, proactiveness and transparency. The core of our corporate culture is safety culture, which directs everything we do.

We create jobs and wellbeing in the neighbouring areas of Olkiluoto as well as the whole of Finland. We are a responsible, renewal-oriented company whose employees remain in its service for even decades. We are constantly looking for new nuclear power experts, to whom we offer opportunities for maintaining their know-how and for constant learning and development as part of an international nuclear power community.





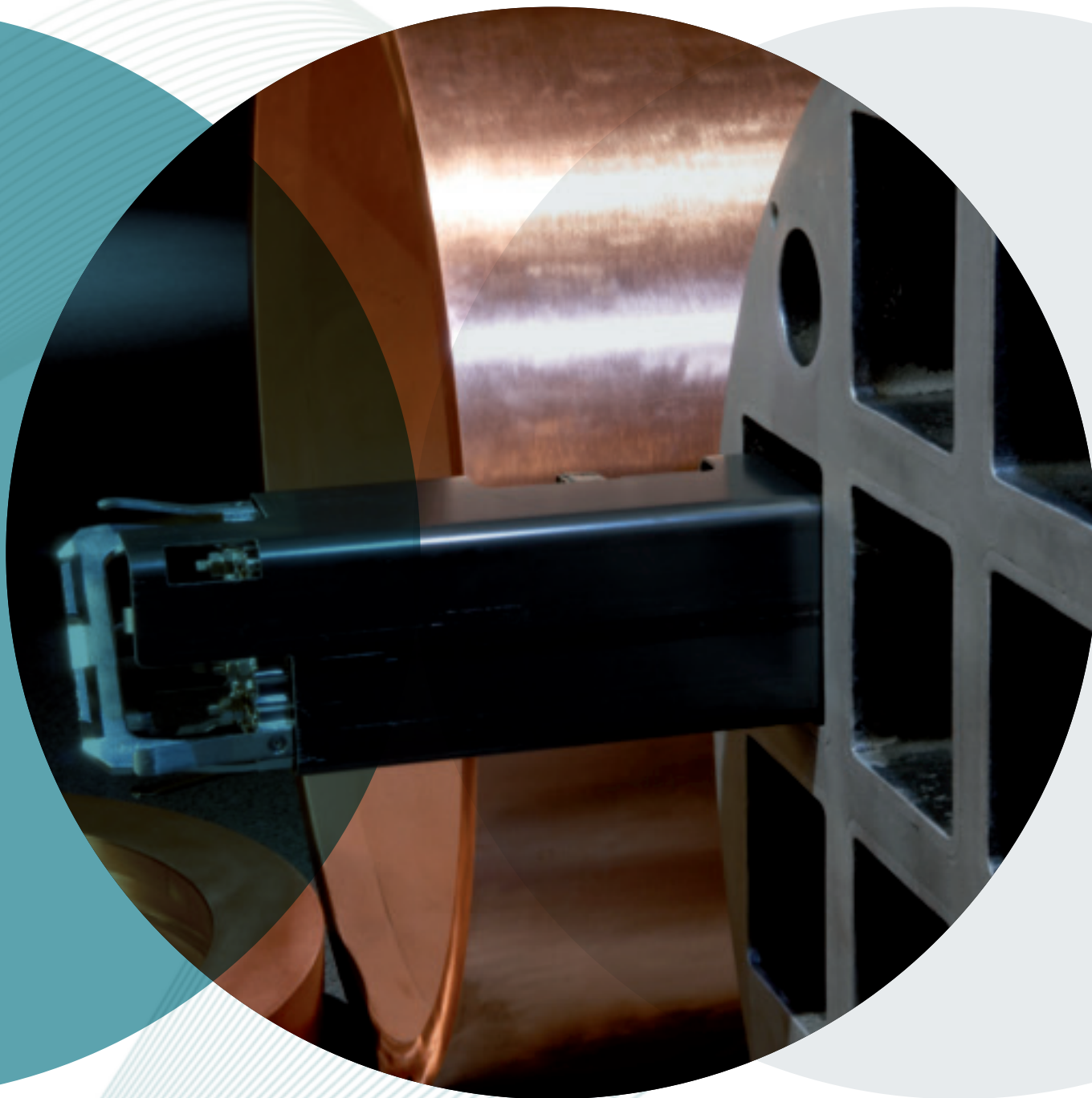
# GENERATING GREEN

The electricity we produce helps fighting against climate change, as nuclear power is a very environmentally friendly electricity production form throughout its lifecycle. During their operating life, our units have already reduced the carbon dioxide emissions of Finnish electricity production by approximately one third compared to a situation where the corresponding amount of electricity had been produced with coal. The amount of CO<sub>2</sub> emissions saved through our production is the same as that produced by traffic in Finland.

The state of the environment around the nuclear power plant in Olkiluoto is monitored regularly, and our operation is supervised by the Finnish Radiation and Nuclear Safety Authority STUK. The power plant's permissible emission limit values are set in the technical specifications and the environmental permit.

Our nuclear electricity production causes hardly any emissions, and nuclear power plants do not cause greenhouse gases or emissions that increase acidification. The most extensive environmental impact from the nuclear power plant in Olkiluoto is an increase in water temperature in the nearby sea area by a few degrees. Radioactive emissions from our plant are small – only a fraction of the limits set by authorities.

All waste at the power plant is sorted and treated in accordance with our environmental management system. Most of the waste is recycled and reused. Radioactive waste is treated separately and placed in a repository in order to isolate it from the organic environment.







# ROCK TO ROCK

The fuel of our nuclear power plant is uranium, most of which we purchase from Canada and Australia under long-term agreements. Spent nuclear fuel will be placed in a tunnel system to be excavated in bedrock in Olkiluoto where it will remain isolated from organic nature.

Spent nuclear fuel is cooled before it is deposited hundreds of metres below the ground. After removal from the reactor, fuel assemblies are moved to the fuel pools in the reactor hall, where they will remain for some years. They will then be stored in water-filled spent fuel pools in an interim storage for about 40 years. During this time, the radioactivity of the spent fuel will fall considerably and only amount to one-thousandth of the initial level upon final disposal.

When disposed of, the nuclear assemblies will be sealed in final disposal canisters made of copper and cast iron. The canisters will be placed down to a depth of over 400 metres in holes drilled in the final disposal tunnels. The tunnel system is then filled and sealed.

Spent nuclear fuel is secured deep in bedrock, and approximately one metre of rock will stop the radiation emitted from the canister when placed in the repository. There are several independent systems to ensure that final disposal will not cause any long-term emissions into the environment either. The bedrock in Olkiluoto is 1,800 million years old, offering predictable and stable conditions for the canisters.

# DID YOU



# KNOW THAT

TVO has six direct owners, backed up by 10 industrial companies, nearly 50 energy companies and

140

municipalities.

25%

(approx. 22 TWh) of all electricity consumed in Finland is produced using nuclear power; imported electricity accounts for well over 10% of our total electricity consumption.

14 TWh

Olkiluoto produces more than of electricity per year, slightly over 1 GWh of this using wind power.

40

TVO invests some million euros in research and development each year, most of it in nuclear safety and waste management.

smallest

Nuclear, wind and hydro power cause the carbon dioxide emissions during the entire lifecycle. Biomass is considered to be carbon-neutral because the carbon dioxide released in its combustion is sequestered back to nature by growing plants.

## We are responsible for

our nuclear waste management and collect the necessary funds beforehand into a fund maintained by the state. Posiva Oy, a company founded by TVO and Fortum, takes care of the final disposal of spent nuclear fuel generated by its founder companies in Finland.



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