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A Guide to

FINNISH RENEWABLES

2024

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With its ambitious climate goals, abundance of renewable energy sources and forward-thinking innovation, Finland offers a compelling opportunity for renewable energy developers and investors. Having traditionally been an energy importer, Finland is on the verge of becoming a significant exporter of clean power, hydrogen and synthetic fuels.

This guide delves into the market dynamics and regulatory framework of renewable energy projects in Finland. Explore the latest sector trends, market opportunities and practical aspects of project development and operation.

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The Finnish Context

Political Targets

Finland's policy framework places a strong emphasis on renewable energies with the goal of becoming a "superpower in the green economy". The country has positioned itself as a trailblazer in the global transition towards sustainability by setting itself the ambitious goal of achieving **carbon neutrality by 2035**.

The government program prioritises promoting an affordable, emissions-free, and secure energy system, while also contributing to global climate goals through the export of sustainable energy solutions. In allocating public funds, the focus lies on gaining a competitive edge through research and development, smooth permitting processes, and robust energy infrastructure.

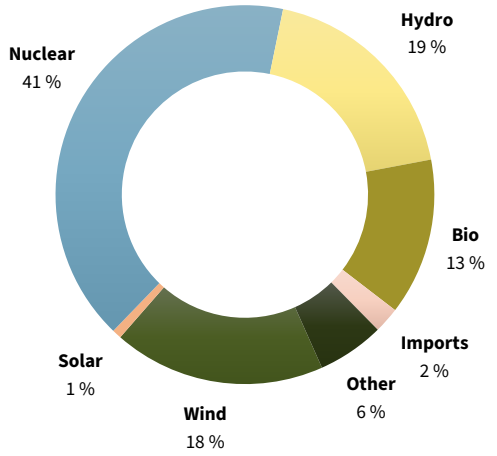
Finland is striving to become a key European player in clean hydrogen and aims at producing at least **10% of the EU's clean hydrogen demand** by 2030.

Energy Markets

Finland has one of the highest per-capita electricity consumptions in the EU. The energy mix is distinctly low-carbon, with the primary sources being hydro, wind, nuclear and biomass. Nuclear power is expected to remain significant in the foreseeable future, with a growing emphasis on small modular reactors (SMRs). Thanks to the increase in renewables, the country is well on its way from being a traditional energy importer to becoming a significant exporter.

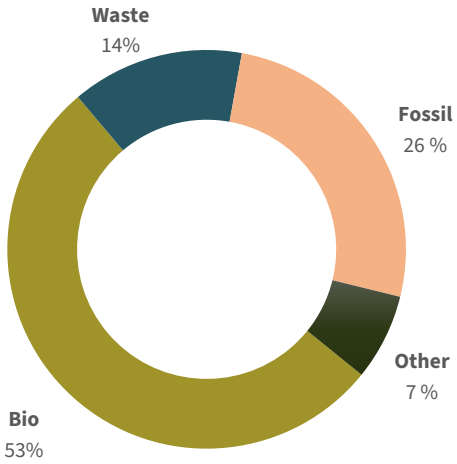
While fossil sources have been almost phased out in electricity generation, the heating sector is still catching up. However, with increasing electrification and further expansion of the already robust district heating network, this is only a matter of time.

Finland has a high share of energy intensive industries, including pulp and paper, steel and metal manufacturing, chemicals, mining and wood-based industries.



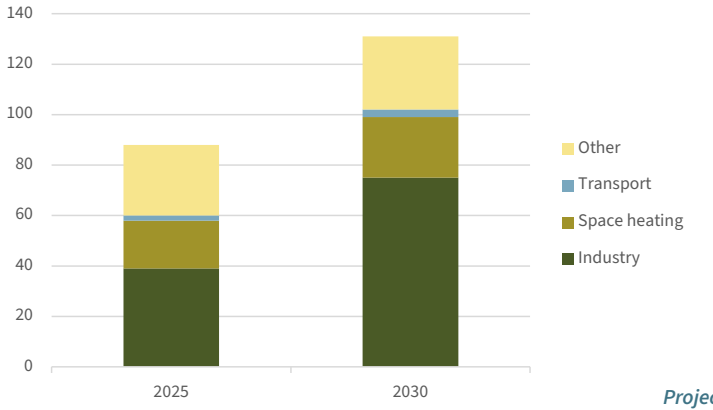
Electricity consumption by energy source (2023)

Source: Statistics Finland [1]



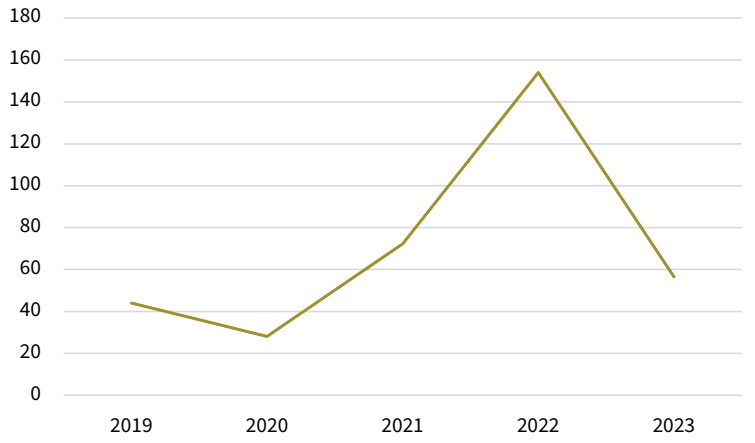
Produced district heat by energy source (2023)

Source: Finnish Energy [2]



Projected electricity consumption (TWh)

Source: Fingrid [3]



Annual average electricity prices 2019-2023 (EUR/MWh)

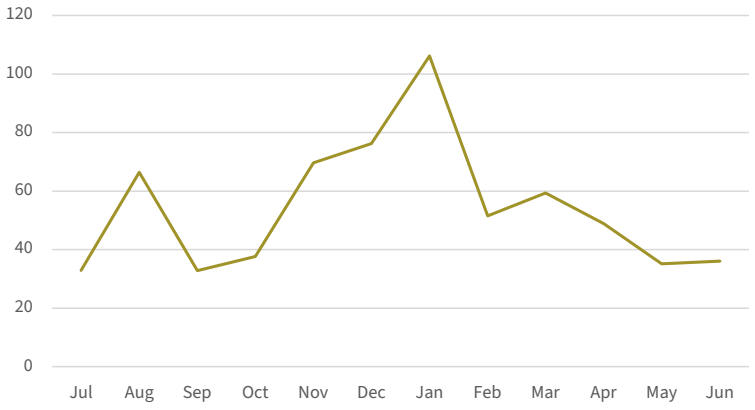
Source: Nord Pool [4]

Other large consumers of electricity are the heating and transport sectors. With the rising trend of electrification and the emergence of new offtaker markets such as data centres and Power-to-X, the electricity demand is projected to significantly increase in the coming decade.

Finland's energy markets are closely integrated within Europe. Finland is part of the Nord Pool power exchange, which operates in 16 European countries, including the Nordics, Baltics, Germany and the UK. High-voltage interconnectors link the national grid to Estonia, Sweden and Norway. To manage this coupling, the national TSOs have allocated reserve quotas they procure from national or joint reserve markets.

Finland has one single price zone, and the Finnish electricity prices are among the lowest in Europe. Except for a peak during the 2022 energy crisis, the annual average has in recent years fluctuated around the 50 EUR/MWh mark, however with considerable seasonal and daily variations.

For gas, energy and capacity are traded wholesale in an entry-exit system that opened to competition in 2020. LNG terminals and the Balticconnector pipeline enable gas flows between Finland and other markets around the Baltic Sea and



Monthly average electricity prices 2023-2024 (EUR/MWh)

Source: Nord Pool [5]

beyond, and investments to complement these with hydrogen pipelines are underway.

Geography

Finland's vast area and low population density means there is ample space for renewable projects without significant conflicts over land use. The long distances between cities and regions necessitate efficient energy transmission, making it essential to invest in robust power grids and interconnections.

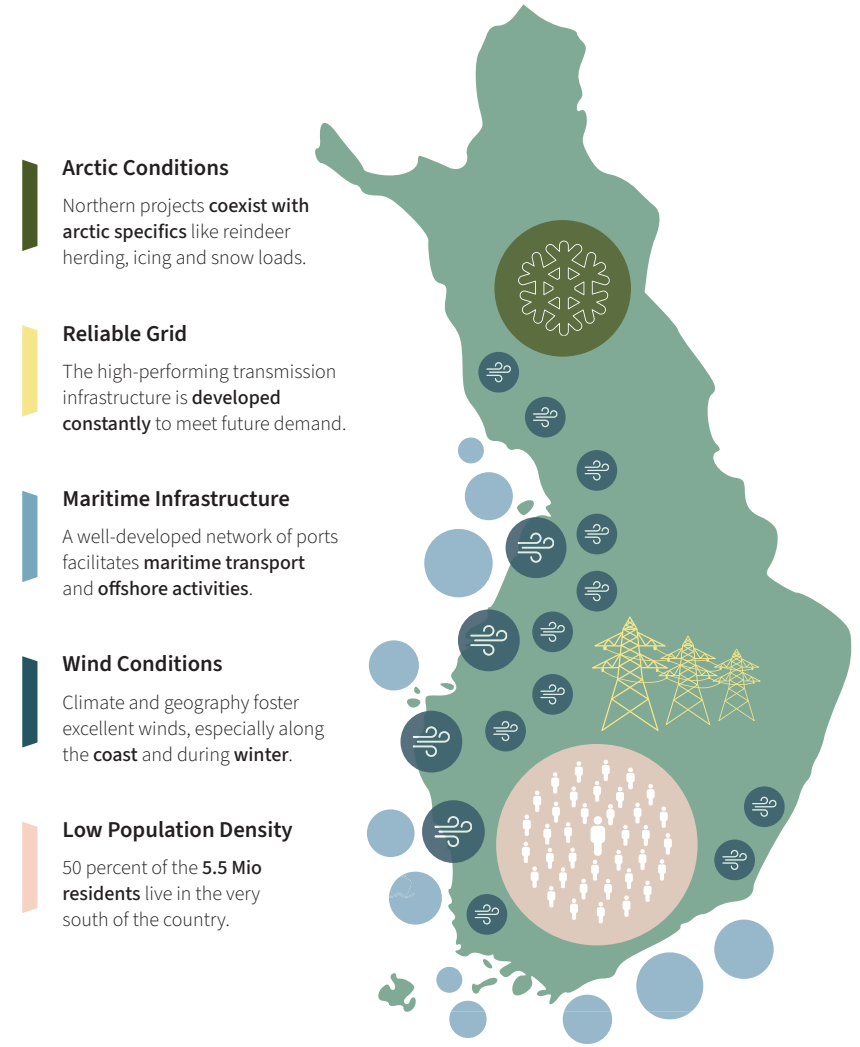
Wind conditions, especially in the coastal and northern regions, are ideal for onshore wind. At the same time, the consistent winds and comparably shallow waters of the Baltic Sea provide excellent conditions for offshore wind farms. While irradiance levels are lower than in other parts of Europe, advances in technology allow Finland to harness solar energy effectively.

Finland boasts a well-developed energy infrastructure, including power grids and natural gas pipelines. The country's ports play a crucial role in importing and exporting equipment and materials, as well as in supporting offshore activities. The concentration of industries and the excellent district heating network create beneficial synergies and allows for the effective use of waste heat.

Moreover, renewable energy aligns with Finland's broader national security objectives. By eliminating reliance on fossil fuels and decentralising energy production, Finland bolsters its energy security and mitigates risks associated with energy imports.

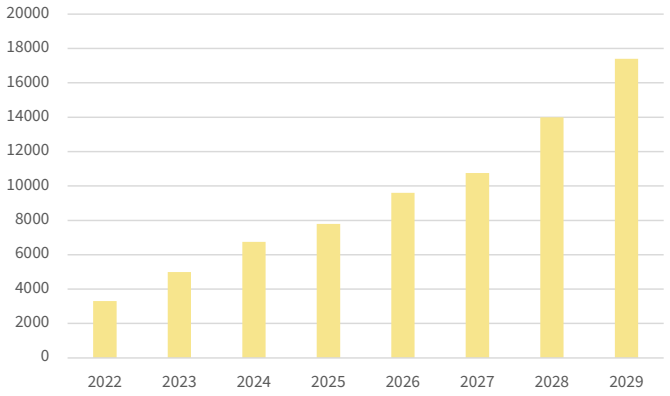
Business Environment

Finland's dynamic and entrepreneurial business culture fosters innovation, encourages companies to explore sustainable solutions, and facilitates collaboration among businesses. Finnish organisations typically have flat hierarchies, enabling efficient decision-making and open communication.



The energy sector has the benefit of local world-class expertise in clean energy technologies. Companies investing in renewables can tap into this knowledge base, benefiting from research, development, and skilled professionals.

Finnish legal culture puts an emphasis on non-binding guidance and best practices. Authorities are not shy to provide guidance and actively collaborate with project developers to establish optimal permitting approaches. This is particularly valuable in the dynamic field of renewables, where regulations tend to lag behind technological advancements.



Onshore and offshore wind: Current and projected capacity (MW)

Source: Fingrid [6]

Renewable Sectors

Onshore Wind

Finland's journey in onshore wind energy has been a remarkable success story. In under a decade, wind power has transitioned from a niche technology to the **most cost-competitive form of power generation** and key driver in the country's green transition.

Both 2022 and 2023 were record years in wind farm construction. In 2022, Finland ranked number two (2,430 MW)[7], and in 2023 number four (1,278 MW)[8], in Europe in terms of newly installed onshore capacity.

Despite the rapid expansion, the growth potential remains substantial. The Finnish transmission system operator (TSO) Fingrid estimates that by 2030 the installed wind capacity onshore and offshore will be 21,200 MW[9]. While the west coast and Lapland remain hotspots, there is a growing trend of moving inland, including the eastern part of the country where significant efforts are being made to coordinate wind farm development with national defence needs.

Project sizes vary considerably from a few turbine projects to large wind farms in the hundreds of MW range. Individual turbines are comparatively big with the average capacity being more than 6 MW for operational projects, and 8 – 10 MW for projects under development.

One business model commonly used by utilities is the so-called "Mankala"-model, where electricity is supplied at cost price to the owners of the project company. Outside of these arrangements, revenues are typically secured by long-term power purchase agreements (PPA) with corporate and industrial offtakers or utilities. The ramp-up in clean hydrogen and Power-to-X projects, as well as data centres, are expected to create a whole new offtaker market over the coming years.

The rapid growth in variable energy production is not without challenges, and Finland has seen the first cannibalisation effects in recent years. Electricity prices

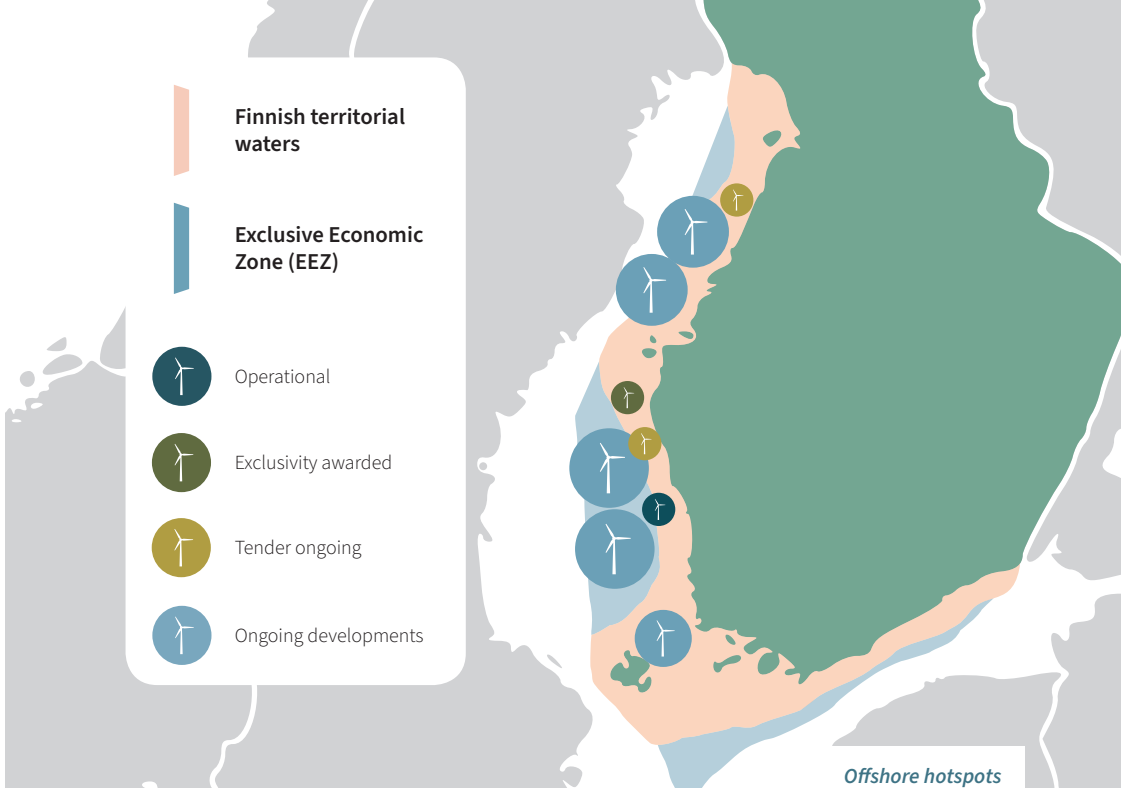
Common business models of Finnish wind farms

have become increasingly volatile and are typically at their lowest at times of high wind power production. This has created difficulties for projects with baseload PPAs, which were still rather common in the Nordics until a few years ago. In addition, despite the generally stable grid, Finland has experienced the first instances of grid curtailment in local hotspots.

To mitigate the mismatch of production and pricing, developers are seeking to optimise their portfolio by combining different assets and revenue streams. The trend is towards hybrid projects that combine wind power with PV, energy storage and/or hydrogen production. Especially wind and green hydrogen are poised to grow together, mutually enabling and accelerating each other's expansion.

Offshore Wind

Finnish offshore wind is an emerging industry with huge potential. Although the installed capacity is still modest, the pipeline is extensive, and project development has accelerated in recent years. The Finnish government considers offshore wind as the **single most critical means of achieving the green transition**.



Offshore hotspots in Finnish territorial waters and the EEZ

Beneficial wind conditions, relatively shallow waters and lower salinity, as well as proximity to the coast make Finland ideally suited for offshore projects. Wind farm construction, installation and maintenance is considerably less complex and expensive compared to other regions such as the North Sea.

Finland's expertise in shipbuilding, steel structures and maritime operations, including in arctic conditions, complements its fully developed coastal industrial sector. The ports are ideally positioned to support offshore activities and serve as strategic hubs for renewable energy projects.

Due to its higher capital-intensiveness, the offshore industry has been particularly attractive for major international players, many with know-how from offshore activities in other regions and a strong presence in the Nordics. In addition, large

domestic players from the onshore sector are seeking to expand their operations into offshore.

The project pipeline encompasses both territorial waters and the Exclusive Economic Zone (EEZ). While the EEZ lies beyond state borders, Finland has exclusive rights for conducting economic activities there.

Within territorial waters, the sites for offshore projects are administered by Metsähallitus, a state-owned company, and use rights are granted based on auctions. In addition to the already auctioned offshore rights in Korsnäs, two projects – Ebba and Edith – are currently undergoing a tendering process, with plans to kick-start two more areas still in 2024.

Under Metsähallitus' lead, the projects undergo a predevelopment and the preliminary endorsement of key authorities. Following the tendering, the selected developers continue their permitting, technical design and construction. The main steps along the permitting route resemble onshore development but individual prerequisites partly differ due to characteristics and interests specific to the sea context.

Use rights in the EEZ are currently being clarified. A draft government bill issued in May 2024 introduces a new tendering process and clarifications to permitting. In a nutshell, the government will pre-select certain areas for which companies (or consortia of companies) can submit tenders. Tenders will be awarded based on certain quantitative and qualitative criteria yet to be specified. The winner is granted exclusivity for procuring an exploitation permit that allows the use of the area for wind farm structures and related research activities. The first tendering process is anticipated to commence in late 2025, with a decision on exclusivity expected during the following summer.

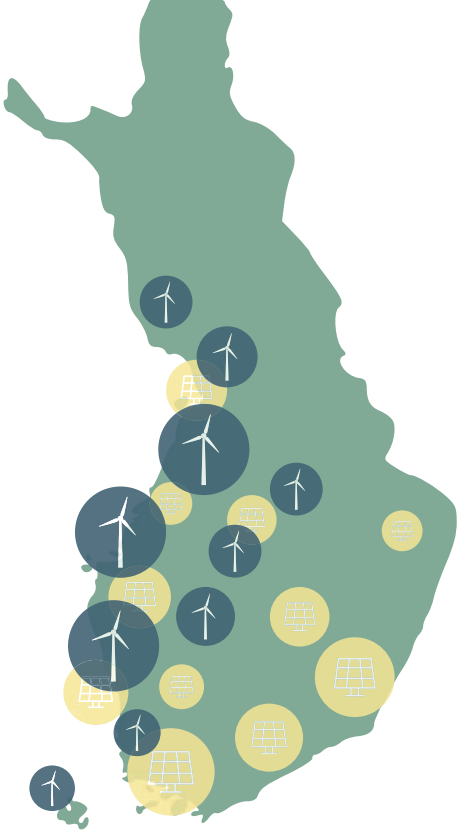
Other ongoing developments include revisiting the property taxation for offshore projects. Furthermore, the Finnish government is investigating possible avenues for increasing the competitiveness of Finnish offshore wind.

		Territorial Waters	EEZ
01	**Land Procurement**	Use rights agreement for pre-developed area, tendered by Metsähallitus	Exclusivity-granting auction system in preparation
02	**Zoning and EIA**	• EIA mandatory for projects of 45 MW or 10 WTGs • Local master plan	• EIA mandatory for projects of 45 MW or 10 WTGs • No zoning required
03	**Permitting**	• Building permit • Water permit • Flight obstacle permit, border guard and Defence Force approval • (Environmental permit) • (Specific permits based on local characteristics)	• Research, exploitation and construction permit(s) • Water permit • Defence Force approval; flight obstacle permit to be introduced • (Environmental permit) • (Specific permits based on local characteristics)
04	**Grid Connection**	• GCA with TSO Fingrid • Permits for power line construction, land redemption and seabed studies	• GCA with TSO Fingrid • Permits for cross-border power line construction • Permit for land redemption and seabed studies in territorial waters

Main steps of project development in territorial waters and the EEZ

Solar

Contrary to popular belief, Finland's solar energy potential is competitive with that of Central Europe, and the country benefits from some unique factors that make solar energy viable. The cool climate and high proportion of diffused radiation enhance productivity. Efficient year-round production is possible with systems that prevent snow-accumulation, and long summer days compensate for the darker winter season.

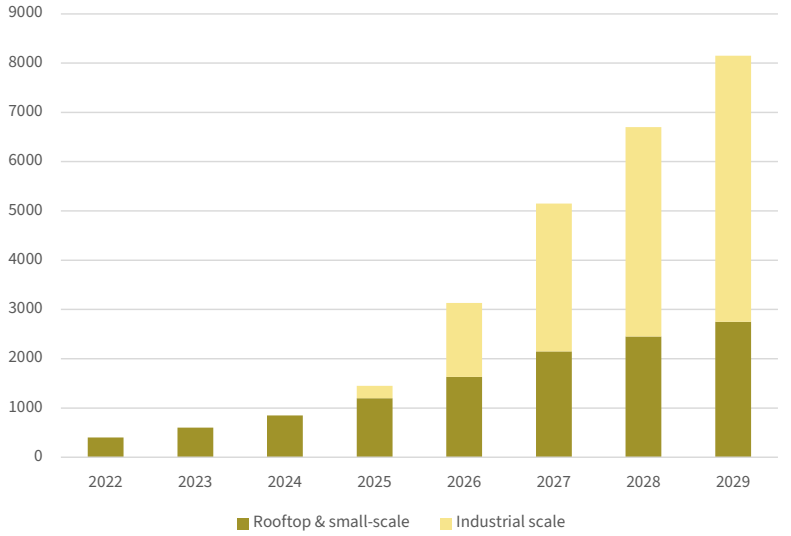


Hotspots of project operation and development

While attractive on its own, a key potential for solar lies in its ability to balance the seasonal and daily profiles of wind. Pooling both assets enables a substantively steadier supply of renewable electricity and enables PV plants to tap into the higher-price low-wind hours. Due to partly different geographical preferences, solar farms are able to utilise areas that are less desirable for wind farms. This allows them to avoid local grid bottlenecks along the wind-heavy coast and cater to the energy demand of inland industry and cities.

Due to the forest-heavy nature, environmental feasibility and social acceptability of individual projects largely relies on site selection. The ramp-down of the peat industry has left rural areas with lucrative brownfield sites where solar parks can be built without significant impact on environmental values and carbon sinks while being able to utilise existing infrastructure.

The installed capacity accumulates mainly from small-scale rooftop applications, but a vast industrial pipeline has emerged within just a few years. A typical Finnish solar project is planned on peatland, field, or commercial forest, with a capacity in the tens or hundreds of megawatts. Although the sector is still relatively new in terms of large-scale operations, it has the advantage of leveraging established technologies and existing value chains. Paired with relatively fast permitting, this allows for the rapid development of projects, outpacing other power generation technologies.



Current and projected solar capacity (MW)

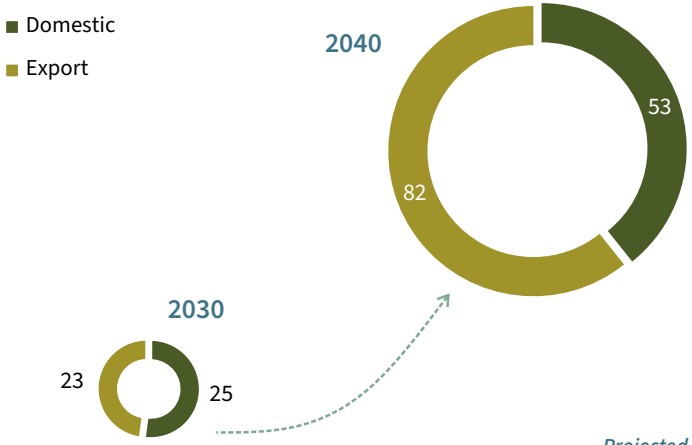
Source: Fingrid [10]

Hydrogen and Power-to-X

With one of the cleanest national energy mixes, abundant renewable energy potential and advanced technological readiness, Finland is well-positioned to become one of the key players in the clean hydrogen space. Finland aims to produce at least **ten percent of the EU's emissions-free hydrogen by 2030**.

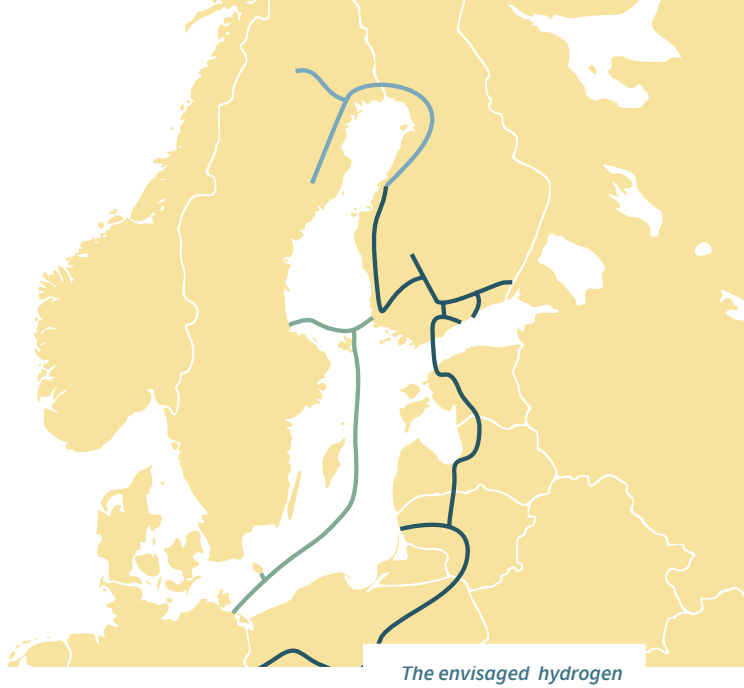
The national hydrogen space is distinctively industry-led, and Finnish clean hydrogen is first and foremost an evident business case. Finland possesses all ingredients for a thriving Power-to-X sector:

- an abundance of affordable and RFNBO compliant electricity.
- the ready availability of biogenic CO2 required to produce RFNBO compliant e-fuels.
- a huge domestic offtaker market for hydrogen and its derivatives.
- the infrastructure required for exporting hydrogen and hydrogen derivatives on a large scale.



Projected clean hydrogen potential (TWh)

Source: Fingrid & Gasgrid [11]



The envisaged hydrogen transport infrastructure

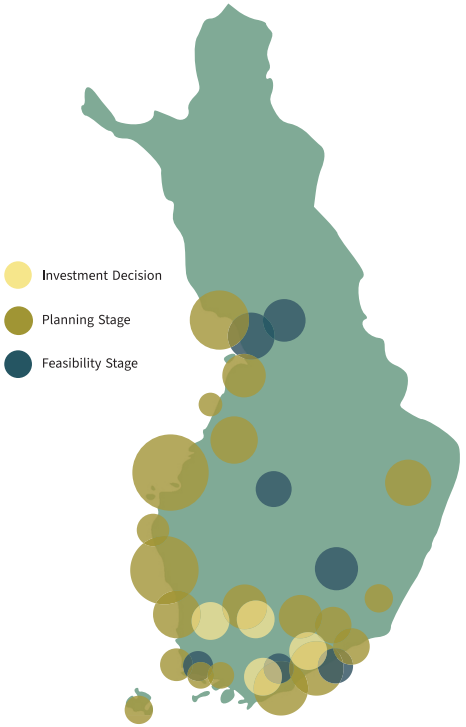
The country is uniquely placed in the production of carbon-reliant molecules due to its expansive forest industry. Pulp and paper mills are large point sources of biogenic CO2. Combined heat and power (CHP) utilities consuming biomass in substantive amounts are another logical reference point and can also harness waste heat from electrolysis and methanation for district heating.

The main use cases for hydrogen and its derivatives are as raw material in the domestic steel and chemicals industry, and as fuels in the transport sector, including shipping and aviation. The ReFuelEU Aviation and FuelEU Maritime targets, and the inclusion of these sectors in emissions trading, is expected to further accelerate the demand for green e-fuels and Sustainable Aviation Fuel (SAF). Hydrogen-to-power or hydrogen-to-heating applications, on the other hand, will likely play a limited role due to the heating system largely relying on electrification and district heating.

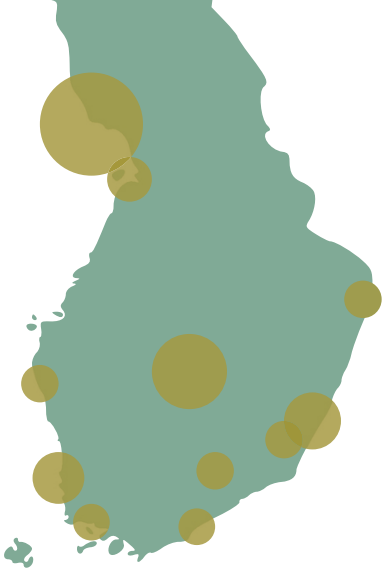
While the domestic industry and transport sectors are the low-hanging fruits in terms of offtakers, production potential and ambitions by far exceed the national demand. Current and forthcoming maritime infrastructure and pipelines are laying the groundwork for expansion into adjacent markets. Key infrastructure initiatives

aim to link Finland to Sweden via the “Nordic Hydrogen Route”, and to continental Europe via underwater pipelines traversing the Baltic states (the “Nordic-Baltic Hydrogen Corridor”) or extending directly to Germany (the “Baltic Sea Hydrogen Collector”).

The rise of a hydrogen economy is well underway. Many planned projects are to be in operation already during this decade, and the first GW-scale facilities are expected to come online in 2030. Pioneering projects focus on ready-to-use, transport-friendly hydrogen derivatives like methane, methanol and ammonia. The range of projects and business cases is diverse: Three- and four-digit green hydrogen and ammonia plants in Kokkola, plans to produce green steel in Inkoo, and a vast lineup



Hotspots for hydrogen and Power-to-X projects



Largest point sources for biogenic CO2

of major e-methane facilities represent only a fraction of the booming pipeline but depict the scale of the ongoing industry ramp-up.

Hydrogen prices are forecasted to be cost-competitive compared to other surplus producers in the Iberian Peninsula and North Africa. A recent manifest of this is the fact that the winning bid in the European Hydrogen Bank’s first bidding round came from Finland. What is more, as a member of the EU, Finland’s renewable and low-carbon offerings are inherently compliant with the union’s quotas. This effectively reduces the risks associated with shifts in foreign policy and the international acknowledgment of environmental credentials.

Carbon capture

Carbon capture has been recognised as an important element in achieving the national climate goals, with the focus increasingly shifting from carbon capture and storage (CCS) to carbon capture and utilisation (CCU). Finland has a significant national advantage in that a substantial portion of CO2 emissions originate from bio-based sources.

Policy targets promote the rise of carbon-capture related business cases. Maintaining and increasing carbon sinks has proven difficult in light of the economic significance of the vast forest resources for industrial usage. Carbon capture technologies and biochar have filled this vacuum as the key route to reaching net-zero targets.

Due to its substantial share of forestry, pulp and paper industry, biorefineries, and bioenergy production, Finland generates significant amounts of biogenic CO2 from a relatively small number of large point sources. The country's comprehensive port and rail network guarantees economical transport from sources of carbon to utilisation sites.

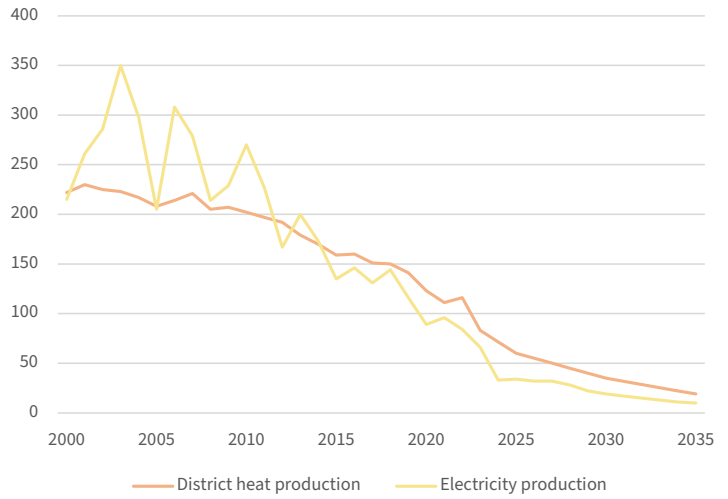
The greenhouse gas calculation rules enable emitters of biogenic CO2 to decrease their emissions while commercialising their carbon for additional revenues. As the production of synthetic methane, methanol, and SAF increases, the anticipated future demand for biogenic carbon is substantial.

Renewable Heating

Given Finland's geography and climate, heating naturally plays a key role in the energy sector. The system rides on centralised production solutions and biofuels, characterised by industrial self-supply and a comparatively low share of oil and gas-fired boilers in residential use in favour of district heating and direct electricity.

While heating has so far depended on fossils to cover full demand and ensure security of supply, the balances have tilted heavily in favour of renewables in the 2010s and 2020s. In district heating, peat, coal and natural gas still dominated the first decade of the millennium, but now represent less than a third of the total fuel intake, while renewables have all but doubled their share in the past ten years. The statutory deadline for phasing out coal is 2029, but major facilities have already switched to other sources, with the remaining ones planning to do so during 2025.

The largest individual source in the current heating mix are wood fuels, representing nearly a half of the heat production for district heating, and three quarters for industrial applications. Amongst the industry, the traditionally large but still growing share of renewable fuels, mostly black liquor, is attributable to the forest industry's

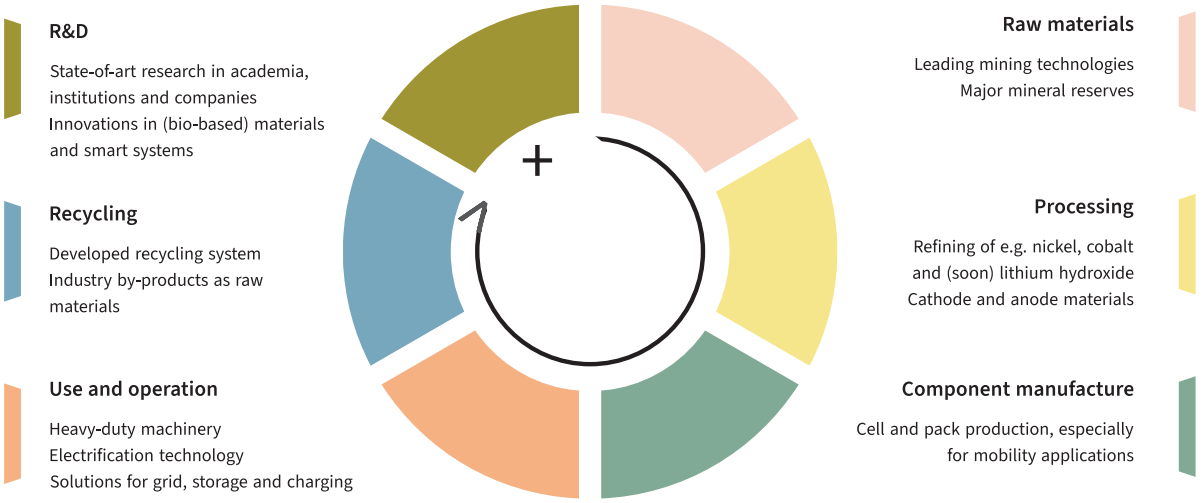


Statistical and projected emission factors for heat and electricity (t CO_2 / GWh)

Source: Statistics Finland [15], Fingrid [16] & Finnish Energy [17]

role as one major consumer. In further support of the transition, power utilities are increasingly electrifying their processes and actively investing in heat pumps, flue gas scrubbers and electric boilers.

Finland is a leader in district heating within the Nordic countries, boasting one of the highest per capita usages globally. The country has developed an extensive and efficient district heating network that is continuously upgraded and expanded. This system effectively integrates various energy sources and allows for the utilisation of waste heat from industrial processes, including Power-to-X facilities.



Finnish battery value chain

Energy Storage

As the share of decentralised and intermittent renewable energy increases, storage is taking on a central role in enabling its smooth integration into the energy system and in shaving consumption and production peaks. In upcoming years, the bulk of the needed storage capacity is expected to derive from dedicated batteries and Power-to-X applications. Significant intra-day and seasonal variations are typical, which emphasises the significance of storages for different durations.

A pioneering and growing battery economy is one corner stone of Finland's industrial strategy. Strong metallurgical knowhow, ample natural resources and investments into recycling technology support the build-up of domestic production and refinery capacity for battery chemicals and materials. This leaves Finland with a unique capability to map the entire battery value chain – sustainably.

Beyond batteries, the background as raw material producer provides brownfield sites for pumped hydro, compressed air and solid mass storages in decommissioned mines. Given the prominent role of district heating, also investments into thermal storages can be utilised in scale. A recent case in point is the massive cavern storage in the capital region boasting an 11.6 GWh capacity, but storages for heat and cold have decades of history in serving the networks.

Large energy storages are developed both as hybrid arrangements connected to other energy projects, and as stand-alone projects. These investments can tap into the commercial rationale of increasing system stability, bridging the gap between variable production and often fixed consumption, and shifting the load away from high-price hours, through several business models or their combinations:

- supporting the commercial viability and security of supply of own production or offtake
- providing energy storage as a service to energy market participants
- participation in the balancing markets to provide services to system operators

- trading energy in the electricity markets in accordance with electricity price variations

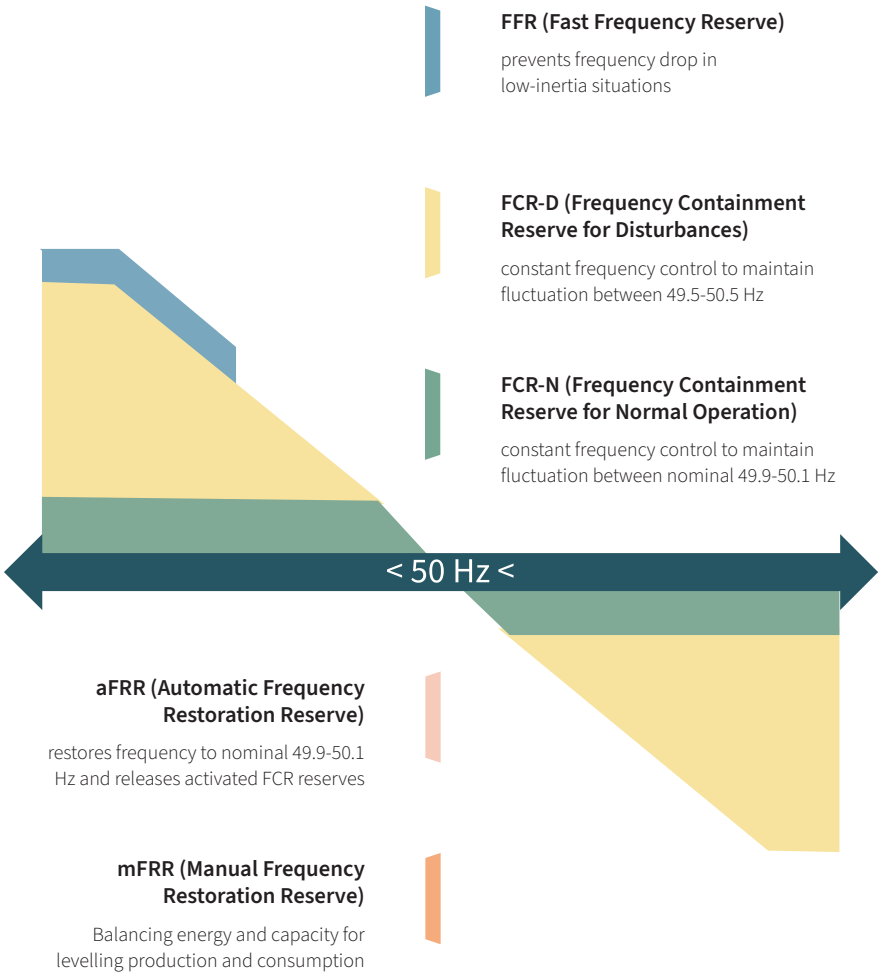
Double taxation has been removed for most industrial-scale electro-chemical storages if prudently organised, either by virtue of these automatically constituting a part of the grid or a power plant, or through the possibility to apply for tax-exempt energy storage status. For smaller units and pumping stations, electricity tax may still be triggered multiple times, but this is intended to be addressed through future legislation.

Reserve Markets

The Finnish TSO Fingrid procures different kinds of reserves to balance the grid. These include power plants, consumption units and energy storages that can adjust their power in accordance with the needs of the grid.

The reserve markets are based on auctions and the bulk of compensation is paid for maintaining the reserve capacity, regardless of whether the reserve is activated or not. In some reserve products, changes in the energy production caused during activation are also compensated.

Wind energy is well-suited for decreasing production when there is a need for down-regulation. The potential for extra revenue in the reserve market becomes particularly appealing during periods of low electricity prices. Recognising this, the Finnish TSO has pinpointed wind farms as valuable assets for providing reserve power. Efforts are underway to tailor their offerings to enhance the appeal and profitability for the wind power industry. Additionally, long-term contracts as a means to secure steady income streams are being explored.



Reserve product portfolio procured by TSO Fingrid

A Finnish Project in a Nutshell

Legal Framework

Due to Finland being an EU member, the legal framework is strongly influenced by Europe-wide harmonization initiatives. In the area of energy markets in particular, most laws are based on European directives and regulations.

As in many other European countries, Finland has no uniform legal framework for individual renewable sectors. Projects are typically subject to a variety of regulations that are not necessarily harmonised and may not fully address the unique characteristics of certain technologies. Consequently, the success of these projects hinges on the ability to devise a development strategy that is fast and efficient, while also mitigating legal compliance and bankability risks to ensure the project's viability.

Project Development

While individual prerequisites depend on the type of the project, the permitting process generally follows the same principal stages.

Environmental Impact Assessment

Mandatory above certain thresholds or case-by-case

Environmental Permit

May be required case-by-case depending on nature of activities and emissions (noise, flicker, heat etc.)

Land Use Planning

Typically via master and/ or detailled plan

Chemical Permit

Required for processing or storing certain chemicals

Building Permit

Commonly required for all significant structures

Specific Permits

Depending on nature of activities and impact protected species, water bodies, aviation, radars etc.

Typical elements of permitting renewable projects

The overall suitability of the planned activities in the intended area is evaluated on a more general level during environmental impact assessment (EIA) and zoning, with a more detailed assessment conducted during permitting. Finnish law does not currently provide for a one-stop-shop permit, but projects regularly require several specific permits, each having their own prerequisites and avenues for **appeals**.

Environmental Impact Assessment (EIA)

A formal EIA is mandatory for certain types of projects, including:

- Wind farms with at least 10 WTGs or a nominal capacity of at least 45 MW.
- PV plants involving changes in forest and wetland areas of 200 hectares or more.
- Power lines with a voltage at least 220 kV and a length of over 15 km.

- P2X projects where several processes are integrated to produce organic or inorganic chemicals.

In addition, an EIA may be required on a case-by-case basis if the project has the potential to cause comparable significant environmental impacts. In new types of projects with no established administrative practice, it is not always clear where to draw the line. There is a trend to conduct an EIA also where it is not clearly required, as this enhances the bankability of a project and allows for comprehensive stakeholder engagement early in the development.

Land Use Planning and Zoning

Land use planning in Finland is based on a three-tier hierarchy:

- **Regional plans** direct land use on a regional level. They commonly allocate areas for activities or interests with regional significance and set out the broader lines of inter-municipal development.
- **Local master plans** design the land use structure on a municipal level. A local master plan coordinates the general distribution of land for different needs within a municipality, several neighbouring municipalities (joint municipal master plan) or a specific subarea (partial local master plan).
- **Detailed local plans** are tools for the detailed organisation of land use, building and development. The planning typically caters for urban settlement and industrial and commercial areas, coordinating the location and volume of construction and their infrastructure.

The required level of planning varies based on the project scale and impact. For instance, large-scale wind farms often require consideration at both the local and regional level. Projects that are situated in industrial zones or close to existing facilities usually need more than a local master plan, and a detailed local plan may be necessary. Although zoning requirements are quite established for well-known technologies like wind farms, there is still some uncertainty regarding newer types of projects, such as solar and Power-to-X.

On a local level, zoning is the prerogative of the municipality and essentially dependent on political decision-making. The potential for increased tax revenue and economic development often motivates municipalities to support renewable energy initiatives. However, securing local backing at an early stage is crucial for the success of these projects.

Permitting

The Finnish permitting landscape is structured around sector-specific permits that each regulate specific aspects of the project:

- Practically all industrial scale renewable projects require one or more **building permits**.
- Depending on the potential impact, projects may require an **environmental permit**, which can place constraints on the operation. Wind farms, for example, typically require an environmental permit if there is a risk of exceedance of applicable noise or flicker limits. Other factors that trigger a need for an environmental permit may include involvement of chemicals, notable heat emissions or pollutants.
- A **water permit** may be required if project construction or operation has water management implications, such as effects on aquatic resources or environment. This naturally applies to offshore wind but can also become relevant for cooling water arrangements of exothermic processes or drainage systems in solar farms, for example.
- Wind farms typically require **flight obstacle permits** due to their potential interference with aviation.
- Considering national security interests, activities that could affect military aviation, radar systems, or involve seabed research within territorial waters, require the authorisation of the **Defence Forces**.

- Environmental and cultural values, such as protected fauna and flora or ancient relics, may need to be accommodated through **special (exemption) permits**.

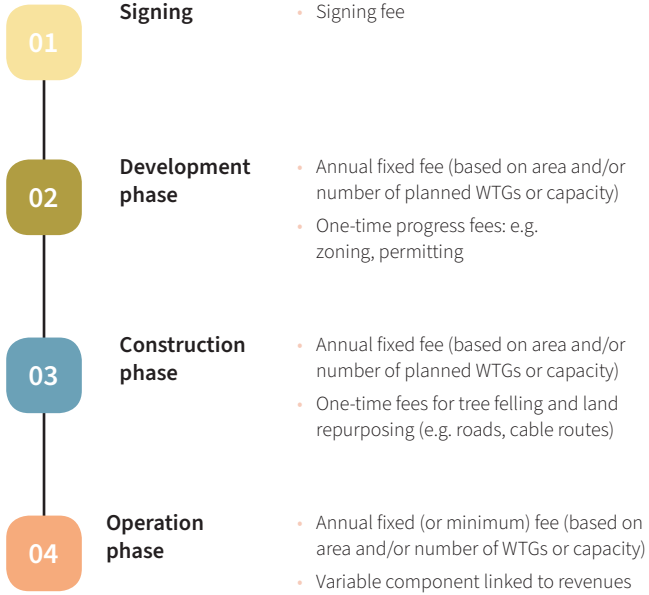
Enhanced safety requirements apply to the handling and storage of **chemicals and pressurised gases**, as well as the construction and operation of dedicated infrastructure and equipment. Renewable fuels such as hydrogen, biogas, e-methane, and ammonia are classified as hazardous substances and fall under the chemical safety regulations. This includes permitting of facilities and infrastructure, additional criteria for site selection, and compliance monitoring.

Land Procurement

Finnish renewable projects can reach substantial sizes, with capacities in the three-digit range covering multiple square kilometres of land. This underscores the importance of land rights procurement and subsequent contract management.

The rights to the project area are typically procured by long-term lease and use rights agreements rather than by purchasing real estate. Depending on the project location, one may encounter various forms of land ownership, each with their own challenges:

- Many areas consist of a multitude of small properties each owned by different private landowners. It is not uncommon for large-scale projects to require agreements with hundreds of landowners, which makes contract negotiation and management complex. Making the process manageable will often require putting some form of landowner representation in place, so that communications can be channelled through an organised body rather than negotiating with each landowner individually.
- At the other end of the spectrum are vast state or forest-utility owned plots. While dealing with fewer contracting parties simplifies matters, landowners in this category often refrain from committing to binding agreements, or even discussing commercial terms, until the project has reached a certain level of maturity (such as a legally binding master plan). As a result, land procurement and associated cost risks are deferred to a relatively late stage of the project.
- With the rise of Power-to-X projects that rely on access to port and rail infrastructure or proximity to industrial hubs, an emerging trend is municipality-led land development, followed by (quasi) public calls to tender or apply for pre-zoned sites. Specifics depend on the municipality, but often sites are offered for long-term lease either for a general activity type and construction size, or for a more limited usage with the intention to form a strategic partnership around a pre-defined functionality.



Common lease fee elements for land lease agreements

As the renewables industry has matured, landowners have become more coordinated and aware of the business side of land access. Consequently, lease arrangements have grown more complex. In sought-after areas, it is not uncommon for lease payments to include multiple elements, such as payments tied to various project milestones, fixed lease payments based on capacity or area usage, and a share of the revenues or income generated by the project.

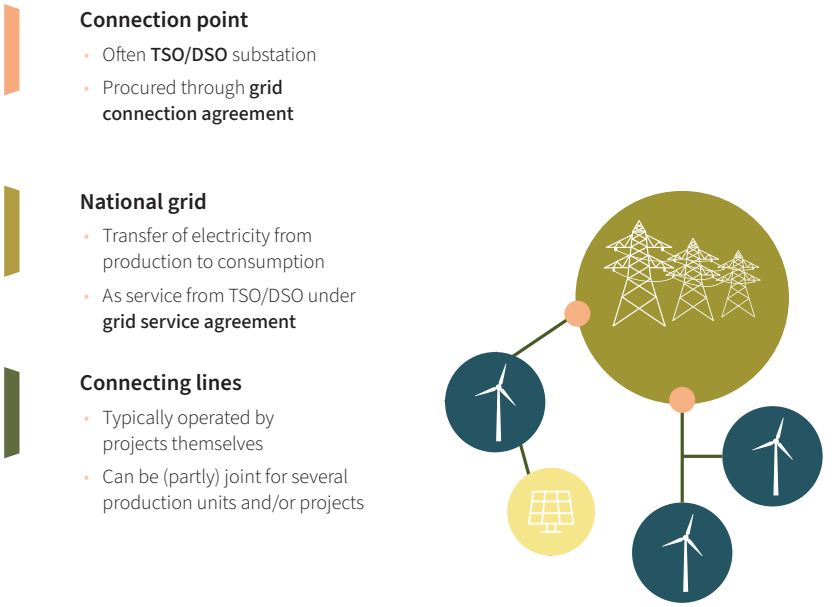
As a rule, making a project bankable requires that leaseholds for all essential plots are registered with highest priority. This becomes a challenge where parts of a property have been secured by neighbouring projects, or where different assets of a hybrid project need to be accommodated in the same area. Giving lenders the necessary degree of comfort will typically require arrangements between different lessees to ensure that each party's land access is adequately secured. This may include creating corporate structures that hold any land that is jointly used.

Grid Connection

While the Finnish power grid is generally high-performing, localised bottlenecks and capacity shortages exist in certain hotspots. Grid availability is often a temporary constraint, as power lines are continuously upgraded, and additional substations are built to meet growing demands. However, for many projects, the available grid connection remains the most crucial factor in terms of project timeline for achieving commercial operation.

Grid operators do not offer binding capacity reservations before a project has progressed significantly in development (typically until zoning has been completed). Therefore, it is crucial to assess available capacity early on and continuously monitor it throughout the development process.

In remote regions favoured by large projects, connection distances can be substantial. To address the financial and environmental challenges posed by these distances, an emerging trend is to create joint infrastructure arrangements with neighbouring projects. While this approach enables more business cases and fosters beneficial collaborations, it is essential to meticulously craft the contractual and corporate framework. This ensures that each participant project secures reliable access to the joint assets in a bankable manner.



Architecture of a simple joint grid connection

The commercial viability of hybrid projects will often depend on whether and to what extent different assets can be operated "behind-the-meter". The existing electricity market rules are somewhat restrictive and can easily lead to grid fees or grid operator obligations being triggered when production facilities, consumption units and/or energy storage interact with each other or the grid. This requires careful project design wherever different asset classes are involved. Legislative changes aimed at better accommodating hybrid projects are anticipated, but the specific details remain under consideration.

Construction

The contracting approach depends on project and developer (or financer) specifics and preferences, but commercial realities often guide the selection of the procurement structure:

- Where the technology and unit composition are quite standard, it is common for project developers to implement their projects through **turn-key EPC** (engineering, procurement and construction) contracts. This approach transfers the construction risk to the contractor. However, for more complex plant designs, it could lead to higher procurement expenses and narrow down the pool of appropriate EPC contractors.
- A common alternative to an EPC contract, especially in wind farm construction, is to implement the project with a **BoP** (Balance of Plant) contract model. Under a typical BoP contract, the power production units, such as WTGs, including their delivery and assembly are excluded from contractor's scope and subject to a different agreement with the equipment supplier.
- For complex installations, especially in the emerging sectors of the green transition, **EPCM** (engineering, production, and construction management) contracts are commonly used. In these arrangements, the risk and responsibility are distributed between the client and the EPCM consultant. Nonetheless, the project owner retains access to comprehensive technical expertise and process organization skills throughout the construction phase.

Finnish law does not specifically address work or construction contracts. Instead, Finnish contracting practice heavily relies on standardized contract terms developed by industry stakeholders. The Finnish general conditions for building contracts (YSE) 1998 terms are widely used in construction contracts. While they are not directly applicable unless explicitly referenced in the contract, these terms express the expectations of Finnish parties when entering construction contracts and are often treated as if they were the law.

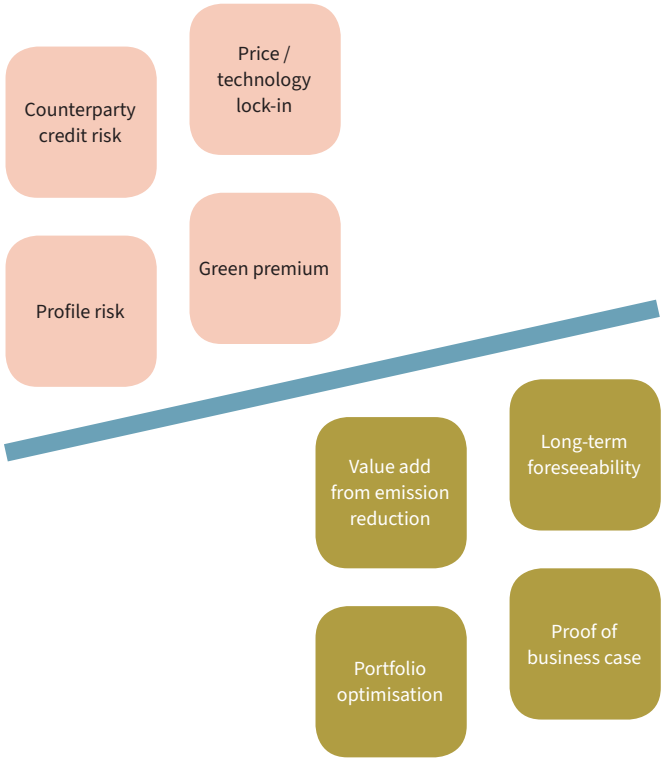
Risk management and Finnish compliance know-how should be factored in when negotiating and drafting construction contracts:

- Construction activities trigger mandatory obligations related to work health and safety. The overall responsibility for health and safety during design and construction, and fitness and safety of the design and end-product, lie with the owner. However, ensuring compliance and nominating qualified persons for statutory functions is often reorganised contractually.
- Clear allocation of scope and interfaces plays a significant role when contracting separate work packages, and in defining the line between client and contractor responsibilities. To ensure timely completion, processes for proceeding with disputes, modification and additional work are often used, and such mechanisms are in place also under the YSE terms.
- Liability for delays and costs attributable to other (sub)contractors or external factors such as changes of law, are a central commercial question and a common cause for disputes also in the Finnish context. The extent to which the contractor undertakes to bear the risk of additional workload and expenses, and the cost such risk-bearing is available at, varies extensively between projects and can become a hotly debated topic in negotiations.

An essential part in ensuring a construction project's success is naturally the choice of contract partner(s). Expertise in the field and familiarity with the local legal and administrative framework allows a contractor or consultant to accurately assess the fitness of the design and its implementation for the Finnish environment, and factor in and insure its risks to support financially sound procurement terms. Ability of all contractors and subcontractors to perform in accordance with good industry practice and bear their liabilities in case of default is paramount to the robustness of the delivery chain. Contractual requirements for personnel expertise and availability as well as prerequisites for subcontracting are often employed for ensuring prudent performance throughout the chain.

Operation

Operating in the electricity and gas markets calls for procuring trading services, forecasting and fulfilling market participant obligations (such as balancing responsibility and REMIT requirements), including instances where a project runs merchant. Major direct marketers provide options to cover all or most of these aspects, but more bespoke solutions are also available.



Interests to be balanced in offtake agreements

Establishing a project's business case and proceeding to final investment decision (FID) typically relies on long-term offtake agreements. Partner selection depends on project specifics and offtaker expectations. Power Purchase Agreements (PPAs) and Hydrogen Purchase Agreements (HPAs) in the renewables sector must meet stringent sustainability requirements aligning supply and demand both temporally and geographically. These agreements also introduce constraints on managing underproduction and non-compliant output. For conventional industries aiming to decarbonise a steady supply is crucial, but resource pooling and supplementation from the nuclear-heavy grid can accommodate fluctuations and save emissions.

For producing synthetic fuels, biofuels, and other renewables-based hydrocarbons, sourcing electricity and raw materials makes up the bulk of OPEX. While key consumables are expected to be available, their suitability varies by project. Viability depends on eligibility, unit price, logistics, and profile compatibility, influencing procurement strategy. With no dedicated marketplace for hydrogen or CO2, bilateral arrangements are common. RFNBO criteria are also pushing market participants towards direct PPAs for renewable electricity sourcing.

Value chains for the operational period are typically considered during preliminary planning and established early through site selection, project partnerships, and letters of intent. The integrated utilisation of side streams such as waste heat and carbon capture are highly site-specific, and optimal conditions, or "sweet spots", are limited and subject to competition.

Partnerships with suppliers and existing developers often extend into the operational phase. It is common to arrange future maintenance of key installations and equipment as part of supply agreements. Some developers with operational expertise offer plant management services to investors entering the market upon project completion. Major utilities and energy producers with an established domestic presence, on the other hand, possess the necessary competencies in-house and outsource only specialised services.

Company Management

Like in other jurisdictions, individual projects in Finland are commonly organised in a single purpose vehicle (SPV), typically in the form of a limited company (osakeyhtiö, Oy). The Oy is an independent legal entity that is "bankruptcy remote", i.e., the insolvency of the SPV does not put the parent company at risk beyond the loss of equity or debt investments. Furthermore, the assets of the SPV are unaffected by the insolvency of the parent company and can thus serve as collateral for financing.

Setting up a private limited company is a straight-forward process of creating a Memorandum of Association and Articles of Association and filing these with the Trade Register in a start-up notification. No share capital is required, but agreeing on a subscription price remains an option. The mandatory founding documents are public, but the shareholders can specify their relationship further by entering into a shareholder agreement. In essence, the effort going into founding an SPV rides on the degree of customisation needed for the project set-up.

The governance of an Oy is structured around a board of directors consisting of one to five members holding a general competence to run the administration of the SPV, and a general meeting, the top-level decision-making body of shareholders with competence in designated high-priority matters. A managing director can be appointed to handle day-to-day business.

M&A

When entering into agreements on the acquisition of a Finnish project, it is advisable to choose Finnish law as the governing law. While parties can typically select their preferred jurisdiction for the contract, the actual transfer of assets must occur under Finnish law. Additionally, many provisions such as conduct of business, tax clauses, etc. must be tailored to align with Finnish law in any case.

As in other jurisdictions, the typical project sale and purchase agreement under Finnish law includes detailed provisions on the seller's liability, including representations and warranties, and provisions concerning the extent and limitations of liability in case of non-fulfilment of warranties. However, Finnish courts are inclined to disregard even explicit contract wording if they find that it does not correlate with the facts. Neither party can therefore rely on contract clauses relieving them from their own diligence.

For the seller, it is common to limit all liability to the warranties explicitly stated in the contract. However, if the court (or the arbitral tribunal) finds that known facts of relevance have not been adequately disclosed, it may disregard the limitation of liability. Hence, the seller's risk control requires that the seller assesses the facts that need to be disclosed in a process that is commonly called a seller due diligence. Needless to say, the seller must also make sure that the warranties given are fulfilled.

For the buyer, in turn, it would be risky to rely entirely on warranties when the buyer would have had the opportunity to conduct their own scrutiny of the facts in a due diligence review. The degree of care expected from the buyer will depend on the circumstances – the value of the transaction, the availability of relevant documentation, and the expertise of the parties, amongst other factors. If the expected diligence is forgone, the buyer may be prevented from invoking a warranty, or claims may be adjusted to account for the buyer's negligence.

Financing

Private investments in Finnish projects typically combine equity and debt financing, with the latter primarily being sought in the form of non-recourse project financing. Project finance does not have a long tradition in Finland but has gained popularity with the rise of energy projects. As Finnish banks take a somewhat conservative approach, a significant portion of projects continues to be financed by other European banks.

Investors seeking funding must present their project in a way which will convince the lenders. This includes a suitable range of contractual relationships to secure the project resources and evidence that the permits required under public law have been obtained. The cash flow forecast must provide a sufficient reserve so that there is no question mark over whether all liabilities will be met under any circumstances (stress test).

From the perspective of the financing bank, the success of the project depends on all parties involved (sponsors, authorities, suppliers, insurance providers, etc.) making their contributions in full and in accordance with the contract at the scheduled times. This means that:

- The project participants must be known to be reliable.
- There is clear contractual definition of the obligations of the various participants and adequate compensation is stipulated in the event of breach of contract.
- The various contracts must be reasonably coordinated to ensure the project implementation according to the cash flow and profitability calculation.

Banks will instruct their own trusted technical experts and lawyers to analyse the technical and legal risks involved in a project. If this due diligence exercise throws up problems, this will cause delay and it is possible that the loan conditions will become less favourable or that financing may not be forthcoming. To minimise the risk, an operator should conduct its own technical and legal assessment as soon as possible and, in any event, before the start of the financing negotiations.

The security package plays a key role for the project financing loan decision as the sponsors do not assume any personal liability. Next to an adequate proportion of equity financing, the bank will typically require pledges on all relevant project assets, the SPV's bank accounts, and the shares in the SPV itself.

Taxation

Corporate Tax

In Finland, corporate income is taxed at a general rate of 20%. Foreign players are taxable for their income originating from Finland, in particular certain revenue streams related to Finnish companies and real estate, as well for activities carried out from a permanent establishment. The specifics depend on the tax treaties in force for each country. In particular, land rights and SPVs, as well as having a fixed office or a sufficiently long construction, can cause tax liability and related registration, accounting and tax declaration requirements to realise.

The fiscal plan of the government provides for a **tax credit for large-scale green investments** that promote the transition to a net-zero economy. This includes sectors like battery production, hydrogen projects and clean steel manufacturing. The plan includes a 20% tax deduction from corporate tax up to 150 million euros.

Property Tax

One crucial component of the operational expenditure for renewable projects, and a significant incentive for local development, is the property tax that is payable to the municipality.

The property tax rate is determined by the municipality. The maximum rate is between 1 % and 6 % for real property in general (depending on the type of land), and 3.1% for power plants such as wind and solar farms with a capacity of 10 MVA or more.

The initial tax value is 75% of the construction costs of the taxable components, which is then depreciated by 2.5% annually down to 40% of the initial tax value.

For wind turbines, taxable components include the foundation, tower, and outer shell of the nacelle. Machinery and equipment (such as blades) are not included in the tax bases. For PV plants, taxable components include foundations and mounting structures.

Calculation example of property tax for onshore WTG:

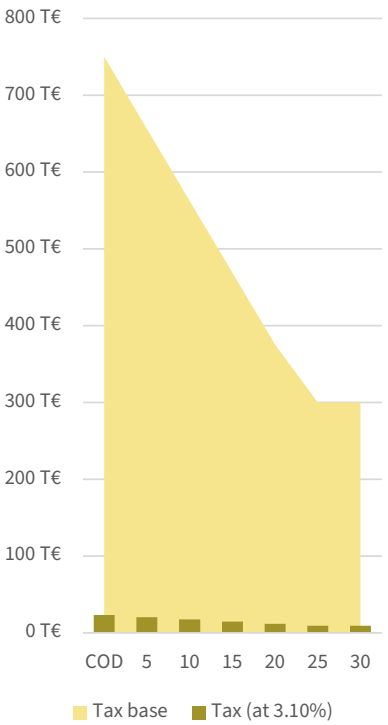
For a **new WTG** with total investment costs of **3.5 M€**, of which the foundation, tower, and nacelle shell account for **1 M€**, the tax base is **750 T€**:

75% x 1,000,000€ = 750,000€

The tax base is **depreciated** annually by **2.5%**, resulting in a **minimum tax base of 300 T€** after ca. 25 years of operation.

40% x 750,000€ = 300,000€

If the municipality applies the **maximum rate** (currently 3.1%), the **annual tax** starts at **23,250€** and is reduced down to **9,300€** during the project lifetime.



Project M&A

Transfer Tax

Transfer tax is imposed on the transfer of real estate (tax rate 3%) and shares in Finnish companies (tax rate 1.5%). As real property includes land lease agreements, transfer tax is typically triggered in both asset and share purchases related to renewable energy projects. Share acquisitions between two foreign companies is only subject to Finnish transfer tax if the target is mainly engaged in real estate activities. Due payment of transfer tax is a prerequisite for registering the transfer of land rights, and for being added to the company's list of shareholders.

VAT

Share deals are generally not subject to VAT. Assets deals, on the other hand, typically have VAT implications, notable exemptions being certain business transfers and the transfer of land rights. The tax rate is 25.5% as of September 2024. Liability for paying VAT lies generally with the seller, but reverse charge-mechanisms apply in certain cross-border applications. For M&A transactions including differently treated asset types, purchase price allocations should be provided.

Sales Profit

The Finnish fiscal system does not set out a separate tax rate for possible sales profit; rather profits from share and asset deals are taxed alongside other corporate income at the applicable rate (currently 20%). However, profits from the sale of shares pertaining to the operative assets of a business are exempt.

Carrying Forward of Losses

Acquisitions can impact the ability of the target to carry forward tax losses from previous years. Tax losses may become forfeited if there is an ownership change, but it is possible to apply for a dispensation ruling from the tax authorities that allows to utilise the carry-forwards also post-transaction. In practice, the dispensation is often granted if the operations continue substantially unaltered and there are sufficient business reasons behind the transaction.

Subsidies and Public Support

At a national level, investment projects and studies can benefit from the energy aid if they contribute to energy conservation and efficiency or rollout of novel production technologies. For renewable energy, the emphasis is currently on those

projects that employ new technology and increase the balancing capacity of the energy system.

Since subsidy schemes and their eligibility criteria vary on a yearly basis, open calls for applications and restrictions from already obtained grants should be checked case-specifically. Several projects are under development with funding from earlier financing rounds. Solar power, as well as storage and heating applications have been strongly represented in the RRF (Recovery and Resilience Facility) funding for clean transition and energy infrastructure projects, and several major projects around Power-to-X and heating boast an IPCEI (Important Projects of Common European Interest) status.

As a novelty, a **tax relief for large-scale industrial investments** is on the political agenda. While renewable electricity production will likely be excluded, other renewable fuels and storage applications, upstream production of essential raw material, components and equipment, as well as downstream decarbonisation and energy efficiency measures at the offtaker's end would be covered.

Projects in Finland are eligible for EU mechanisms such as the **Hydrogen Bank**. Through awards from its domestic pillar, a fixed premium (in €/kg) is available for RFNBO-qualifying hydrogen based on auctions. Depending on their specifics, energy projects may qualify for funding also through the Connecting Europe Facility, Horizon Europe and InvestEU, to name a few, and loans can further be obtained through the European Investment Bank.

The intention to utilise public funding needs to be considered against the overall design of the project and its timeline. Subsidies are generally geared towards facilitating projects that could not otherwise be realised, and reaching FID or making irreversible financial commitments can disqualify a project. Due to the relatively tight timeframes, ability to perform within expected deadlines is critical, and sufficient maturity at the time of application is needed for the project to be eligible. Employing a grant also normally contributes to the de minimis quota of the entity and can directly affect eligibility for other subsidies or even certain market activities, in particular within the RFNBO regime.

Useful Contacts

Networks and advisors

Bergmann Attorneys at Law

Helsinki-based law firm focused on energy, construction and infrastructure projects.

www.bergmann.fi

Business Finland

Agency owned by the Finnish government, which inter alia helps foreign companies to establish and expand operations in Finland.

www.businessfinland.fi

Both2nia

Network of stakeholders in the hydrogen economy with the goal to establish Europe's largest hydrogen cluster around the Gulf of Bothnia.

www.both2nia.com

FinnCham

Network of various trade associations and Finnish Chambers of Commerce around the world.

www.finncham.fi

Finnish Energy

Sector organisation for companies in the energy sector, promoting energy and labour market policies.

www.energia.fi

Finnish Gas Association

Association for promoting the operating conditions of the gas sector. Members include companies from the hydrogen and renewable synthetic gas industry.

www.kaasuyhdistys.fi

Finnish Ports Association

Association representing all significant Finnish export and import ports. Promotes inter alia the energy transformation in the maritime sector.

www.finnishports.fi

Renewables Finland

Industry association for the wind and solar energy sector in Finland. Activities include advocacy, providing market information, training and networking events.

www.suomenuusiutuvat.fi

Hydrogen Cluster Finland

Network of companies and industrial associations, aiming to promote the hydrogen economy, create business opportunities, and facilitate information sharing and collaboration.

www.h2cluster.fi

The Bioenergy Association of Finland

Industry association for the bioenergy sector. Promotes sustainable use of biomass including biogenic carbon capture and utilization.

www.bioenergia.fi

The German-Finnish Chamber of Commerce

Promotes German-Finnish economic relations as part of the international network of German Chambers of Commerce abroad. Organises B2B events and matchmaking in Germany and Finland.

www.ahkfinnland.de

Energy and environment policies

Ministry of Economic Affairs and Employment of Finland

The ministry responsible for, inter alia, energy policy and integration of the national preparation and implementation of climate policy.

www.tem.fi

Ministry of the Environment

The ministry responsible for climate, housing, biodiversity, sustainable use of natural resources, and protection of the environment.

www.ym.fi

Authorities and public administration

Centres for Economic Development, Transport and the Environment (ELY Centres)

15 ELY Centres responsible for the regional implementation and development tasks of the central government. ELY Centres are involved in the assessment of environmental impacts of projects.

www.ely-keskus.fi

ELY Centre for South Ostrobothnia

Dedicated contact point authority for renewable energy projects, offering national permit guidance.

www.ely-keskus.fi/ely-etela-pohjanmaa

Fingrid Oyj

Enterprise in majority state ownership, acting as TSO responsible for the Finnish electricity transmission grid.

www.fingrid.fi

Finnish Energy Authority

Licensing and regulatory authority regulating and promoting operation of the electricity and gas markets, emission reductions, energy efficiency and use of renewable energy.

www.energiavirasto.fi

Finnish Safety and Chemicals Agency

Licensing and supervisory authority promoting the safety and reliability of products, services and industrial activities.

www.tukes.fi

Gasgrid Oy

State-owned enterprise responsible for the Finnish gas and hydrogen transmission networks.

www.gasgrid.fi

Metsähallitus

State-owned enterprise managing and protecting state-owned land and water areas.

www.metsa.fi

Regional State Administrative Agency (AVI)

Six regional agencies responsible for carrying out executive, steering and supervisory tasks related to, inter alia, environmental protection, environmental safety, and public safety.

www.avi.fi

Upcoming Events

Wind Finland
1st Oct 2024, Helsinki

Wind power seminar organised annually by Renewables Finland, with a focus for 2024 on sustainability in the wind power industry.

www.windfinland.fi

Energy 2024
22nd to 24th Oct 2024, Tampere

Biennial energy trade fair that covering the whole energy sector, including players from the renewables, energy storage and Power-to X space.

www.energiamessut.expomark.fi

Kokkola Material Week
11th to 14th Nov 2024, Kokkola

Seminar week on material chemistry with coverage of R&D developments bearing inter alia on biomass, battery and hydrogen value chains.

www.materialweek.fi

Wind Finland Oulu
6th Feb 2025, Oulu

Annual event of Renewables Finland, focusing on the construction and production phases of wind power.

www.windfinland.fi

Nordic Hydrogen Week / Northern Power
11th to 13th Feb 2025, Oulu

A week of events surrounding hydrogen, including a business event with presentations, exhibitors and networking dedicated to the H2 value chain and mobility.

www.oulu.com/northernpower

Vaasa EnergyWeek
17th to 20th Mar 2025, Vaasa

International trade fair and networking event focused on renewables, smart energy, gas markets and energy storage.

www.energyweek.fi

Wind Finland Offshore
21st May 2025, Helsinki

Annual offshore edition of Wind Finland that brings together stakeholders from the offshore wind industry.

www.windfinland.fi

Solar Power Finland
22nd May 2025, Helsinki

Seminar and networking event on solar power, hosted for the first time by Renewables Finland.

www.tuulivoimayhdistys.fi/en/events/solar-power-finland-2025

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About Bergmann

Bergmann is a boutique law firm specialised in energy, infrastructure and construction sectors in Finland. Our team of industry-oriented lawyers supports clients in all stages of renewable projects from their development and acquisition through construction and operation.

Our firm has a strong track-record in the wind power sector, and our intimate knowledge of the energy markets and complex contract arrangements makes us the experts of choice for power trading, energy storage and Power-to-X. With our goal-oriented mindset and common-sense approach, we are the perfect partner for companies that value pragmatic advice and real-world solutions.

Services for the renewable energy sector

Project development and management

- Regulatory framework
- Project agreements
- Financing arrangements
- Taxation

Project acquisition and divestment

- Due diligence
- Financing and structuring
- Contract drafting and negotiation
- Process and document management

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