

Smart Energy

Last modified: 05.11.2020

PART I: GENERAL INFORMATION

Key points and main messages:

- The climate and biodiversity crisis is something we all must tackle. Smart energy is a necessary piece of our sustainable energy future. It can be defined as a cost-effective, sustainable, secure and advanced energy system which focuses on renewables and high efficiency.
- Finland has developed both intellectual capital and high-tech solutions. Together these have contributed to the nation's current strengths in smart energy.
- Finland's climate and lack of fossil fuels has forced it to become an expert in efficiency solutions and renewable sources of energy.
- Traditionally wood has been a major source of renewable energy in Finland, but currently the fastest growing energy source is wind power.
- Finland's expertise in smart energy is based upon a history of using renewable energy, strong support from society and public officials, rare mineral resources, world-class research and an innovative private sector.
- Finland's know-how in smart energy includes smart buildings, district heating, waste-to-energy, circularity, batteries, bioenergy and software.
- Finland has a history of working with international partners and in global markets. The smart energy sector is an important export industry, with one estimate placing it at 25-35% of total exports.

How to portray Finland?

- **Position** Finland as a global forerunner in smart energy.
- **Highlight** Finland's unique smart energy strengths in raw materials as well as intellectual assets such as relevant software expertise.
- **Profile** Finland as the perfect place to research, test and produce smart energy solutions.

Finland is in the vanguard of smart energy

The demand for energy is growing and the world needs new ways to produce, store, distribute and consume energy in efficient and sustainable ways. According to the International Energy Agency (IEA) fossil fuels ultimately accounted for more than 81% of production in 2018.

With no deposits of coal or oil within its borders, Finland has a history of developing renewable energy solutions. Today Finland is a leading country in smart energy. A combination of groundbreaking renewable energy technology, smart networks and automation has made Finnish smart energy solutions among the most advanced in the world.

According to the Finnish Ministry of Economic Affairs and Employment, 40% of Finnish energy comes from renewables. The IEA says inefficiencies cost the average national grid 5-18% of electricity transmitted, but the national operator Fingrid says Finland only loses 1.5%. Investments in new equipment, transmission lines and software improves grid efficiency.

In 2020 the Environmental Performance Index ranked Finland the seventh cleanest country in the world and the first in air quality. Finland has also been ranked as the world's happiest country by the UN's World Happiness Report in 2020.

Finland's expertise in smart energy is based upon a variety of complimentary factors: a history of using renewable energy, strong support from society and public officials, rare natural resources, world-class research and an innovative private sector. The Finnish state has pledged €100 million to the Smart Energy Finland Program, while energy is key for the Finnish Innovation Fund Sitra. Finland's total government-funded R&D leapt 58% from 2019 to 2020, according to Statistics Finland. The private sector has invested in software, AI and power-to-x, among other sectors.

As the world moves into a fully renewable and sustainable future, Finland is the perfect place to research, test and produce smart energy solutions.

Background:

- Finland has no usable old fossil energy deposits such as oil and coal. Because of this Finland has for decades focused on developing the energy it does have, such as renewable hydroelectric and wood-based bioenergy. The harsh climate has forced Finland to develop efficiency solutions, such as district heating and smart grids. District heating takes “waste” heat from industry and uses it to heat homes. According to Statistics Finland more district heat came from renewables (15.3 TWh) than fossil fuels (13.2 TWh) in 2019.
- Finland has also focused on human resources and education, leading it to have one of the most highly-skilled workforces on the planet. Some of the main energy research groups are Aalto University, Lappeenranta University of Technology, the University of Vaasa and VTT Technical Research Centre of Finland. Sitra is a major energy think tank.
- In the modern age of sustainability and renewability Finland has found its old skills in high demand. Finnish mobile communications and software skills are now required for Internet of Things (IoT) solutions and smart energy grids. In the IoT, sensors are placed on equipment and relay information wirelessly. This information can warn operators if equipment is about to fail or help decide which power generation assets should be used in a flexible system, for example. This increases efficiency and reliability.
- The centuries-old forestry industry is rapidly developing renewable biofuels. The forestry industry is also innovative in circular solutions, such as using waste and side streams as sources of energy. Renewable wood represents 28% of Finnish energy consumption, according to the National Resources Institute Finland.

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Background continued:

- Finnish industrial companies have always needed to look abroad because the domestic market is small. Now these smart energy solutions are in demand worldwide and some Finnish companies are leaders in their sectors.
- Finland offers a stable and predictable operating environment. Investors, entrepreneurs and academics do not need to worry about drastic changes in policy based on who wins elections. The Fund for Peace has ranked Finland as the most stable country in the world for eight straight years.
- Finland has excellent sea, rail and internet infrastructure for global trade.
- One of Finland's main strengths is the holistic view of the smart energy ecosystem. Cross-sectoral collaboration is important at all levels, from policy formation and R&D to production and distribution.

Facts and stats:

- Business Finland has invested €2 billion in low carbon innovation projects in the last 13 years. During that time a third of Business Finland funding has been energy related.
- Important minerals for batteries can be found in Finland. It is a producer of nickel and is the only EU country with its own cobalt production. The production of lithium and graphite are also planned.
- Finns are highly productive and skilled workers. About 90% of adults speak English, according to Statistics Finland. The OECD's 2019 Education at a Glance report ranked Finland as ninth in the world and the best in Europe in average educational attainment.
- Eurostat says Finnish energy prices for non-households, including taxes, are the third lowest in the EU.
- Finland's energy grid is among the best in the world. In 2015, the transmission reliability of the national grid was as high as 99.9998%, and the average forced interruption was a little more than 1 minute. Power loss in the transmission and distribution grid is about 1.5% of total electricity consumption, the best in Europe, according to Fingrid.
- Power-to-X solutions, a way to convert and store energy, have drawn considerable attention. The problem with renewable solar and wind energy is that they do not produce power on demand, but only when the sun shines or wind blows. Power-to-x seeks to solve this challenge by taking excess power and converting it to a fuel which can be accessed later on demand, such as methane or hydrogen. This technology is a main focus in the Smart Technology Hub in Vaasa.

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Facts and stats continued:

- The smart energy sector is an important export industry, with one estimate placing it at 25-35% of total exports.
- Finland is a forerunner in the quest for carbon neutrality and smart energy. Already 40% of Finnish energy is produced from renewables.
- Finland has a goal of being coal-free in 2029.
- According to Prime Minister Sanna Marin's Government Programme in 2019 Finland will be carbon-neutral by 2035, and the world's first fossil-free welfare society. These are some of the most ambitious goals in the world.
- The Information Technology & Innovation Foundation (ITIF) says Finland is one of the top three countries making a contribution to the global clean energy innovation system, relative to the size of their economies. ITIF also says Finland is one of only two countries in the world who are investing as much as experts recommend in clean energy research.
- Wind power production is growing at a 24% annual rate, the fastest-growing energy source, according to Statistics Finland. The Finnish Wind Power Association says 18,500 MW of projects are currently under development, as of 2020. One project, Arctic Energy Forerunners, is considering an ambitious plan to harvest wind energy above the Arctic circle and transmit it to southern Finland and into central Europe.

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Some Finnish companies in the field:

- [Bamomas](#) – software for industrial battery systems
- [BaseN](#) – software and data analytics
- [Emtele](#) – automation and communication services for energy networks
- [Finnish Minerals Group](#) – mining and battery ecosystem
- [Fortum](#) – energy production and distribution
- [Fourdeg](#) – intelligent heating
- [Geneset](#) – portable and flexible power generation
- [Haltian](#) – sensors and software for the IoT
- [Helen](#) – energy producer in Helsinki area
- [Ionsign](#) – IoT solutions for energy and utility networks
- [Leanheat](#) – IoT solutions for buildings
- [Metso Outotec](#) – develops hardware and software for basic materials
- [Neste](#) – fuels and fuel distribution
- [Nokia](#) – telecommunications
- [Oilon](#) – produces heat pumps and burners
- [Plugit](#) – electric vehicle charging
- [Satel](#) – mobile communications and control systems
- [Sova 3D](#) – digital planning of urban environments
- [Savosolar](#) – solar power
- [St1](#) – fuels and distribution; largest wind power producer in Finland
- [Teraloop](#) – energy storage
- [TietoEVRY](#) – software and consulting
- [Valmet](#) – technologies, automation and services for energy production
- [Wapice](#) – software and consulting for IoT solutions
- [Woima](#) – waste to energy
- [Wärtsilä](#) – energy production and software for energy systems

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Programs and main markets

- [Smart Energy Finland](#)

The program focuses on international expansion and exports of smart energy products and services. [Here](#) is a list of the program's target markets.

- [Smart Otaniemi](#)

Smart Otaniemi is an innovation ecosystem focusing on pilots from a variety of smart energy solutions.

- [Smart Energy Åland](#)

Smart Energy Åland is a pilot and demonstration project for a fully renewable energy system. It tests both technology and economic models.

- [Smart Technology Hub in Vaasa](#)

Led by Wärtsilä, the Smart Technology Hub seeks to build an ecosystem focusing on research and production of maritime and energy solutions.

- [HOPE – Highly Optimised Energy Systems](#)

The program is centred on energy efficiency within energy networks

- [SmartFlex](#)

The goal is to develop new digital solutions and data-based approaches in the design and operation of thermal power plants.

- [Committed](#)

Committed is a program run by private companies to create ecosystems in order to accelerate the transition to clean energy.

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Sites to visit in Finland:

- VTT
<https://www.vttresearch.com/en/>
- Smart Otaniemi
<https://smartotaniemi.fi/>
- Smart Energy Åland
<https://smartenergy.ax/>
- Smart Technology Hub / Wärtsilä in Vaasa
<https://www.smarttechnologyhub.com/>
- Aalto University
<https://www.aalto.fi/en>
- Lappeenranta University of Technology
<https://www.aalto.fi/en>

Experts who can give good lectures on the topic

Please let vie-50 know if you have suggestions of good speakers. We will update this material.

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For social media:

[@Business Finland](#)

[@VTT Finland](#)

[@LUT University](#)

[@SitraFund](#)

[#energy](#) [#bioenergy](#) [#smartgrids](#) [#teamfinland](#) [#P2X](#)

- Did you know Finland is the only EU country with a supply of cobalt, a key component of EV batteries? [#smartenergy](#)
- Finnish [#AI](#) solutions are improving efficiency in [#smartgrids](#).
- [#Bioenergy](#) in Finland is so advanced that the forest industry creates more energy than it consumes.
- In a cold country you need to be energy efficient. Learn how Finnish [#smartenergy](#) solutions can work for you.
- Trees are renewable. Oil is not. Finland's long experience in forestry is turning the country into a [#bioenergy](#) leader.

For further information:

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Tools and materials:

- [Smart energy on Finland Toolbox](#)

A ppt presentation on smart energy based on this material

- [Sitra: energy theme](#)

The Finnish Innovation Fund Sitra is a “think and do tank” which aims to improve Finland’s future.

- [VTT Smart grids and energy systems](#)

VTT puts together a wide range of solutions addressing the whole energy value chain, taking into account electricity, heating, cooling and fuels.

- [VTT Smart city](#)

A smart city is related to the smart energy sector, focusing on data, services, energy, housing and transport in urban environments.

PART II: COUNTRY SPECIFIC INFORMATION

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Key points and main messages:

- What are the most important things to emphasize in this specific country?
- What is our special knowhow that makes us stand out especially in this country?
- Why should someone from this country want to cooperate, invest or buy?

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Elevator pitch: main headline

Write a clear, brief message/commercial about the sector and Finland's knowhow.

- Position Finland: who are we and why people should trust us in this country
- State the problem that needs to be solved in this country and globally
- Present our solution and results with focus on the needs of this country: explain what we do, how we do it and what makes us unique.
- Eliminate jargon but wrap everything into a good story
- Finish with a call to action: what do we want to happen next, where do we want to go?

Main headline

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Background, facts and stats:

- This is the part where you add facts to support and explain your elevator pitch.
- Short history and development of the sector in your country.
- List all essential facts and numbers that a person needs to understand the size and significance of the sector in your country.
- Why and how did this become a key sector for Finland?
- What is the broader role of Finland in this sector, what is our position in comparison to other countries?

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Finnish companies:

- List of Finnish companies operating in this sector in your country including what they have to offer

Team Finland

- *Name of persons in charge of this sector in your country: name, title, organization, email, phone number*

PART III:
INSTRUCTIONS AND BACKGROUND FOR
THIS *INTERNAL* MATERIAL PACKAGE

Material package: instructions

- This is an *internal working paper* to support all Team Finland actors globally to promote Finland and its strengths.
- The Unit for Public Diplomacy of the Ministry for Foreign Affairs coordinates the production of sectoral working papers in close cooperation with Business Finland and other core actors.
- The material will be uploaded to the internal Team Finland section of the Finland Toolbox
- Part I of consists of general information that can be used globally when preparing for meetings, visits, events, campaigns, etc.
- Part II is left blank. All Team Finland teams around the world are encouraged to fill in country specific information – and use it actively!
- If you have questions or suggestions concerning the format or content, please contact The Unit for Public Diplomacy at vie-50@formin.fi.

Country branding and Team Finland work: why do we need common messages?

- **Country branding is advocacy, communications and marketing** that aims to influence target groups' knowledge, opinions and eventually decisions through owned and earned media, events and meetings, among other means.
- **Country branding is carried out by everybody** who speaks about, writes about or documents Finland.
- **Country image work is part of the normal work** of our all Finnish actors abroad when they have meetings, are present in the media, give speeches, etc. It is not just about individual functions or events.
- It is extremely important that **all relevant actors prioritize themes together and deliver the same main messages highlighting Finland's strengths.**
- Sufficient cultural sensitivity is needed, always adapt Finland's strengths to each cultural area and current discussion.

Finland Promotion Board

- Finland's country image work is led by the Finland Promotion Board (FPB).
- In 2019–2023, the member organizations are: Ministry for Foreign Affairs, Ministry of Economic Affairs and Employment, Ministry of Education and Culture, Finnish National Agency for Education, Business Finland, Visit Finland, City of Helsinki, House of Lapland, Finnish Cultural and Academic Institutes, the Finnish Innovation Fund Sitra, Music Finland, Wärtsilä, Finnair and Iceye.