APPENDIX: Project descriptions of energy investment aid decisions 16 December 2022

1. Investments in energy infrastructure (P1C1I1)

In this application category, aid may be granted

- to the owner of the distribution and main grid for projects related to electricity networks and electricity transmission capacity
- for the transfer of low-carbon gases
- for district heating projects: heat recovery to the district heating system, storage or transfer of district heat.

A total of EUR 52,144,759 was awarded to seven projects on 16 December 2022.

Fingrid Oyj's substation project in Hepokorpi, Espoo

Fingrid Oyj was granted EUR 13,720,370 for a substation investment in Hepokorpi, Espoo. The substation is a prerequisite for connecting a data centre planned for the area to the main grid and thus for the large-scale utilisation of waste heat from the centre.

The waste heat to be utilised would replace the use of fossil fuels in the district heating networks operating in the area of Espoo, Kauniainen and Kirkkonummi. In addition, the new substation would also enable the transition of other energy consumption in Espoo to clean electricity.

The project itself will not reduce emissions, but the recovery of the data centre's waste heat is estimated to reduce the area's district heating carbon dioxide emissions by 300,000 tonnes per year. In addition, without the investment, the coal phase-out in Espoo by 2025 will be significantly more difficult. According to the applicant's estimate, the employment impact of the project during construction will be 55 person-years. The indirect employment effects of the project are manifold.

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Fingrid Oyj's synchronous compensator in Kalajoki

Fingrid Oyj was granted EUR 8,000,000 for a synchronous compensator investment to be implemented in Kalajoki. The project will improve the stability of the grid in the Kalajoki-Pyhäjoki area, which will enable new wind turbines to be connected to the grid. In the project, for the first time in Finland, a synchronous compensator will be

built to stabilise a section of the main grid where electricity is produced only by wind and solar power plants.

The synchronous compensator will enable approximately 400 MW more wind power output to be connected to the grid. This corresponds to an increase in electricity production of approximately 1200 GWh per year. Without synchronous compensation, the connection of wind power to the grid would be slowed.

The project itself will not reduce emissions, but the increase in wind power facilitated by it would, in the applicant's estimation, reduce carbon dioxide emissions by approximately 170,000 tonnes per year. The applicant estimates the employment impact of the project during construction will be 35 person-years. The project will have significant indirect effects through investments made possible by the expanding connection possibilities.

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Fingrid Oyj's parallel compensation project in six municipalities in Finland

Fingrid Oyj was granted EUR 3,200,000 for a parallel compensation project to be implemented in Petäjävesi, Jämsä, Espoo, Nykarleby, Hausjärvi and Alajärvi. The project will enhance the electricity transmission of Finland's main grid by investing in capacitors for substations located in the said municipalities. This will maintain the grid voltage even in the event of faults, thus maintaining the stability of the grid.

According to the applicant's estimate, the project will increase the transmission capacity of the main grid from northern to southern Finland by 500 MW, i.e. enabling the connection of equivalent wind power output to the electricity grid in northern Finland. This corresponds to approximately 1500 GWh of wind power electricity production per year. With parallel compensation, electricity transmission capacity can be increased by one tenth of the price of a new power line.

The project itself will not reduce emissions, but the increase in wind power facilitated by it would, in the applicant's estimation, reduce carbon dioxide emissions by approximately 200,000 tonnes per year. The applicant estimates the employment impact of the project during construction will be 33 person-years. The indirect effects are estimated to be significantly greater, as the project will facilitate new wind power and other green transition projects.

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Helen Oy's Eiranranta heat pump plant

Helen Oy was granted EUR 14,538,750 for a heat pump investment in Helsinki. An underground heat pump plant producing district heating and district cooling will be implemented in the project.

The plant will have a district heating capacity of 90 MW and a district cooling capacity of 60 MW and will produce approximately 300 GWh of district heating and 9 GWh of district cooling per year. The heat pumps will use renewable electricity and utilise the low-temperature waste water flow, from which heat has already been recovered in the

heat pump plant. The heat and cold produced will be delivered to Helsinki's district heating and district cooling networks. The heat energy produced will mainly replace the heat produced with fossil fuels.

According to the company, the investment will reduce carbon dioxide emissions by approximately 83,000 tonnes per year. According to the applicant, the employment impact of the project during construction will be approximately 120 person-years and the plant would not create new permanent jobs.

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Loiste Lämpö Oy's project for the renewal of heat production in Kajaani

Loiste Lämpö Oy was granted aid of EUR 5,356,780 for the project, the purpose of which is to increase the production and use of renewable energy and reduce the use of fossil fuels in Kajaani's district heating production system.

According to the applicant, the project will be an advanced pilot system in which heat produced from several waste and environmental heat sources will be transferred to the district heating network at a lower temperature than usual. The production, distribution and use of heat will be controlled by a control system based on artificial intelligence.

As a result of the project, the quantity of wood chips used in CHP production will decrease by approximately 261,000 MWh. Use of natural gas will fall by approximately 5,000 MWh.

Reducing the use of natural gas will cut carbon dioxide emissions by approximately 936 tonnes per year. According to the applicant's estimate, the employment impact during construction will be approximately 150 person-years. In the light of current information, no new permanent jobs will be created as a result of the project.

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Tampereen Sähkölaitos Oy's project for power plant heat recovery with heat pumps

Tampereen Sähkölaitos Oy was granted aid of EUR 5,062,404 for a project in which the heat remaining in flue gases from the Naistenlahti power plant's flue gas cleaning system will be used in the production of district heat.

The project will help produce approximately 138 GWh of district heat per year. The savings in primary energy consumption will be 115 GWh. The project will reduce use of natural gas by approximately 50 GWh annually. Use of wood fuels will decrease by approximately 88 GWh.

According to the company, the saving in the use of natural gas will reduce carbon dioxide emissions by approximately 9,600 tonnes per year. According to the applicant's estimate, the employment impact during construction will be approximately 80 person-years and 0.5 jobs will be created as a result of the project.

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Keskusosuuskunta Oulun Seudun Sähkö's project to convert Liminka's district heat production to renewable energy sources

Keskusosuuskunta Oulun Seudun Sähkö was granted aid of EUR 2,266,455 for the project, the purpose of which is to convert Liminka's district heat production to be carbon neutral. In the project, own solar electricity production will be increased and the burning of peat and light fuel oil will be discontinued.

According to the applicant, after the project is completed, Liminka's district heat will be produced for approximately seven months of the year with combustion-free heat production.

The project will, according to the applicant, replace, on an annual basis, approximately 16,066 MWh of energy consumption based on peat and light fuel oil by switching to the use of heat pumps, electricity storage and thermal batteries, while also utilising solar electricity production with an energy community model.

Reducing the use of peat and light fuel oil will cut carbon dioxide emissions by approximately 5,500 tonnes per year. According to the applicant's estimate, the employment impact during construction will be approximately 26 person-years. No new jobs will be created as a result of the project.

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2. Investments in new energy technology (P1C1I2)

In this application category, aid may be granted to

- projects that promote the production of renewable energy with the help of new energy technology
- in particular, projects that invest in offshore wind power, renewable transport fuels, biogas, non-combustion-based heat production, large-scale solar energy production and energy storage

A total of EUR 57,071,388 was awarded to five projects on 16 December 2022.

Suomen Lantakaasu Oy's demonstration of a liquefied biogas hybrid production model

Suomen Lantakaasu Oy was granted EUR 19,150,731 for biogas plant investment in Kiuruvesi and its nearby municipalities. The investment project will implement a central plant producing liquefied biogas as well as three pressurised biogas production plants delivering biogas to the central plant. The combined annual production of the plants will be 115 GWh of liquefied biogas, which will be used primarily as fuel for heavy transport. As input feed, the plants will primarily use livestock manure, grass and food industry side streams as well as wood chips for the heat production of the process.

The investment includes digestion plants, gas processing and liquefaction units, end product storage and related equipment. According to the company, the investment will reduce net carbon dioxide emissions by approximately 53,000 tonnes per year. The company estimates that the employment impact during construction will be

approximately 250 person-years and 36 new jobs will be created as a result of the project. Suomen Lantakaasu Oy is owned by Valio Oy and St1 Oy.

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EPV Aurinkovoima Oy's industrial-scale solar power plant investment in Lapua

EPV Aurinkovoima Oy was granted EUR 12,000,000 for an industrial-scale solar power plant investment in Lapua. The power plant will be built on an energy peat production area withdrawn from use. The plant's peak power (panels) will be 100 MWp. The power plant will produce approximately 90 GWh of electricity per year. In terms of its scale, the project is exceptional in Finnish conditions. Bifacial panels will be used in the power plant, and the project will also demonstrate a new kind of inverter technology developed in Finland as well as motorised double-axis trackers, of which at least 50 will be installed, for a total of 1,000 panels. The trackers will improve the efficiency ratio of the system. The project has been preceded by a testing and development project.

According to the applicant, the investment will reduce carbon dioxide emissions by approximately 8,000 tonnes per year. The labour requirement during construction in Finland will be approximately 30 person-years, and four new jobs will be created.

The European Commission must approve the decision before the aid can be allocated.

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Callio-Hitura Solarpark Oy's industrial-scale solar power plant investment in Nivala and Pyhäjärvi

Callio-Hitura Solarpark Oy was granted EUR 12,100,950 for an industrial-scale solar power plant investment in the municipalities of Nivala and Pyhäjärvi. The power plants will be built in and near the Hitura and Pyhäsalmi mining areas. The solar parks will have a total peak power (panels) of 75.42 MWp and they will produce approximately 66 GWh of electricity per year. Electricity storage facilities with a total capacity of 7.5 MWh will be built in connection with the parks. In terms of its scale, the project is exceptional in Finnish conditions. All the panels to be installed will be bifacial.

According to the company, the investment will reduce carbon dioxide emissions by approximately 5,900 tonnes per year. The labour requirement during construction in Finland will be approximately 120 person-years, and five new jobs will be created.

The European Commission must approve the decision before the aid can be allocated.

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IBV Lappi Oy's industrial-scale solar power plant investment in Rauma

IBV Lappi Oy was granted EUR 10,285,507 for an industrial-scale solar power plant investment in Rauma. The power plant will be located mainly in old peat production areas withdrawn from use. In terms of its scale, the project is exceptionally large. The plant will have a panel output of 89 MWp and will produce approximately 89 GWh of electricity per year. Bifacial panels will be used in the project.

According to the applicant, the investment will reduce carbon dioxide emissions by approximately 8,000 tonnes per year. The project's labour requirement during construction in Finland will be approximately 60 person-years. No new jobs will be created in the company, because the company will use subcontracting in operations.

The European Commission must approve the decision before the aid can be allocated.

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CPC Lakarin Aurinkovoima Oy's industrial scale solar power plant investment in Rauma

CPC Lakarin Aurinkovoima Oy was granted EUR 3 534 200 for an industrial-scale solar power plant investment in Rauma. The power plant's panel output will be 30 MWp and the estimated annual electricity production will be approximately 30 GWh. In terms of its scale, the power plant will be large in comparison with the solar power plants built in Finland to date. All the panels to be installed will be bifacial. Preliminary preparation of the project is already far advanced, and the solar park would be completed relatively quickly.

According to the applicant, the project's carbon dioxide emissions reduction impact will be approximately 2,700 tonnes per year. The labour requirement during construction will be approximately 30 person-years, and one new job will be created.

The European Commission must approve the decision before the aid can be allocated.

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3. Low-carbon hydrogen, and carbon capture and utilisation (P1C2I1)

In this application category, aid may be granted to

- projects that replace the use of fossil fuels in industry or transport through the production of low-carbon hydrogen
- projects that involve carbon capture, storage and utilisation

No aid was granted to this project package on 16 December 2022. Important hydrogen projects of common European interest (IPCEI) will also be funded from this project package. The remaining budget authority available has been transferred to Business Finland for IPCEIs in Hydrogen. Business Finland will make the funding decisions later.

4. Direct electrification and decarbonisation of industrial processes (P1C2I2)

In this application category, aid may be granted to

- projects that promote electrification and decarbonisation of industry through heat pump technology, electrification of steam production and surplus heat from industry
- projects that improve energy efficiency: e.g. surplus heat from manufacturing industry can be utilised in production processes or as district heat

A total of EUR 9,979,921 was granted to four projects for the direct electrification and decarbonisation of industrial processes on 16 December 2022.

Adven Oy's project for the direct electrification of an industrial evaporation process

Adven Oy was granted aid of EUR 3,617,757 for a project in which the degree of electrification of an industry unit process will be increased by replacing an evaporation process based on biomass and fossil fuels with an evaporation process based on electricity.

The purpose of the project is to renew the industry's energy-intensive evaporation process with an integrated MVR evaporator.

According to the applicant, the project will increase the degree of electrification of the industry unit process by approximately 80 percentage points from the current situation and reduce the energy consumption of the process, on an annual basis, by more than 80% compared with the current situation.

According to the applicant, the reduced use of steam would reduce carbon dioxide emissions by more than 5,000 tonnes per year. As a result of the project, nitrogen and sulphur oxide emissions will also decrease significantly. According to the applicant's estimate, the employment impact during construction will be approximately 35 person-years. One new job will be created as a result of the project.

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Adven Oy's production process electrification project in Jeppo

Adven Oy was granted aid of EUR 963,764 for a project in which the LPG used in the production of steam in a production process will be replaced by electricity.

The project will replace, on an annual basis, approximately 20,000 MWh of energy consumption based on LPG. The annual production of solar electricity is estimated to be around 2,000 MWh.

According to the applicant, replacing LPG with electricity would reduce carbon dioxide emissions by approximately 5,500 tonnes per year. In the applicant's estimation, the employment impact during construction will be approximately 10 person-years. One new job will be created as a result of the project.

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Knauf Oy’s energy-efficient dryer for a plasterboard factory in Kankaanpää

Knauf Oy was granted aid of EUR 2,837,000 for a project in which the LPG currently used in a plasterboard production process will be replaced by electricity. The purpose of the investment is to improve the energy efficiency of the dryer used in the manufacturing process and at the same time enable reductions in greenhouse gas emissions.

In the project, the LPG burners of the plasterboard factory's drying oven will be replaced with electric elements and, at the same time, the structure of the oven will be renewed to make it more efficient in terms of energy use. According to the applicant, the project will, on an annual basis, replace approximately 35,000 MWh of energy consumption based on LPG by switching to electricity. Replacing LPG completely with electricity would reduce carbon dioxide emissions by up to 8,000 tonnes per year.

In the applicant’s estimation, the employment impact during construction will be approximately 4 person-years. No new jobs will be created as a result of the project.

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Tervakoski Oy’s energy electrification project in Janakkala

Tervakoski Oy was granted EUR 2,561,400 for an electric boiler investment at the company’s Janakkala paper mill. The investment will replace the use of natural gas in steam production. With the investment, the company is aiming to create one of the first mills in the world to have carbon dioxide-free paper production.

The electric boiler output would be 50 MW and it would produce approximately 180 GWh of steam per year. The steam will be used in paper production with the mill’s four paper machines. Given the very high efficiency of the electric boiler, Tervakoski Oy would make significant savings of energy through the investment.

According to the company, replacing natural gas with electricity would reduce carbon dioxide emissions by approximately 38,000 tonnes per year. The investment’s construction-period and indirect employment effects will total 53 person-years.

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Table 1. Energy investment aid decisions under Finland's Recovery and Resilience Plan by project type.

	Authorisation (€)	Decisions 4.10.2022 (€)	Number 4.10.2022	Decisions 16.12.2022 (€)	Number 16.12.2022	Remaining (€)
Energy infrastructure investments (P1C1I1)	154 350 000	0	0	52 144 759	7	102 205 241
Investments in new energy technology (P1C1I2)	124 350 000	28 469 973	2	57 071 388	5	38 808 639
Low-carbon hydrogen, and carbon capture and utilisation (P1C2I1)	127 000 000	65 628 400	2	0	0	61 371 600*
IPCEIs in Hydrogen (Business Finland)*		-	-	-	-	
Direct electrification and decarbonisation of industrial processes (P1C2I2)	47 500 000	5 729 490	2	9 979 921	4	31 790 589
Total	453 200 000	99 827 863	6	119 196 068	16	172 804 469**

* The remaining authorisation available has been transferred to Business Finland for IPCEIs in Hydrogen. Business Finland will make the funding decisions later.

** Remaining funding without IPCEIs in Hydrogen.