

LIST OF PROPOSALS PRE-SELECTED FOR A GRANT¹

First call for small-scale projects launched pursuant to Commission Decision C(2020) 8188 of 1 December 2020 amending Decision C(2020) 4352 of 2 July 2020 as regards the launch of the call for proposals for small-scale projects in 2020

No.	Project acronym	Sector	Location	Coordinator and other participants	Project description
1	W4W	Biofuels and biorefineries	ES	WAGA ENERGY (FR)	WAGA 4 WORLD The project aims to be the first global demonstration of an innovative combination of high performance cryocondenser and methane recovery module technology which generates market compliant biomethane from landfill gas containing more than 10% of air, in countries without any feed-in tariffs. The unit will process 2,000 Nm ³ /h of raw biogas and inject 70 GWH/year of biomethane. To achieve this, the project aims to significantly reduce the production costs of biomethane from landfill gas . This will enable the substitution of fossil-derived natural gas and can thus lead to GHG savings in two areas: fugitive emissions at landfills are reduced because operators have an incentive to capture and sell the biomethane, while natural gas will be replaced by biomethane. As a result, the project has the

¹ The information provided is subject to the conclusion of an individual grant agreement between the project applicant and CINEA.

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					potential to reduce GHG emissions by 97% in comparison to a reference scenario ² .
2	SKFOAAS	Refineries	ES	SKF ESPAÑOLA, S.A. (ES)	<p>SKF RecondOil As A Service</p> <p>The objective of the project is to install and operate a first-of-a-kind, stand-alone processing plant for regenerating industrial oils. Using an innovative Double Separation Technology (DST), almost all contaminants up to the nano size particles will be removed: both contaminants (over 99%), as well as harsh oxides resulting from the catalytic action in the oil and the effects of heat and pressure over time. Oils that would have typically reached the end of their lifetime can therefore be recovered and reused. The project will therefore contribute to the circular economy. The capacity which the new plant will be able to process ranges between 1000 and 6000 m³/yr, depending on the viscosity of the oils. Based on volumes of recovered oil production, the project would sequester 28 times as much CO₂ emissions as emitted in a reference case.</p>
3	Silverstone	CO ₂ transport	IS	CARBFIX OHF (IS)	Silverstone: Full-scale CO₂ capture and mineral storage at the Hellisheidi power station

² The relative GHG emission avoidance of the projects is based on the Innovation Fund methodology, which compares the emissions caused by the project to the emissions that would occur in absence of the project. This methodology excludes certain project emissions considered as minor and allows for emission credits for CO₂ captured and used, for timed operation of a plant to match low carbon intensity of the electricity grid or for non-principal products. This may result in high relative emission savings in certain cases. For details, see the [Methodology](#).

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		and storage		ON Power (IS)	<p>The project involves the design, construction and commissioning of a plant that dissolves CO₂ in water as it flows into subsurface basalt rocks, where it is fixed into stable carbonates: a process known as carbon capture and mineral storage (CCMS). The project will bring CCMS, which is not yet commercial elsewhere, to full commercial scale. A key innovation is the use of direct water capture of CO₂ compared to traditional solvent-based capture – and demonstrating that this approach can offer the capital and operational cost savings to make it competitive. The process will be entirely self-sufficient in terms of water, energy, storage, raw materials with no associated by-products to dispose. The total nominal capacity of the facility will be 34,000 tCO₂/yr. The project would avoid almost 100% of GHG emissions compared to a conventional technology.</p>
4	CCGeo	Renewable heating/cooling	HR	AAT Geothermae d.o.o. (HR)	<p>Closed Carbon Geothermal Energy</p> <p>This project will generate CO₂ free heat and power by using a novel combination of existing technologies from other industries to exploit geothermal energy and dissolved natural gas from the same source (geothermal brine). Five processes make up the closed-loop geothermal power plant: extraction of a geothermal fluid (brine); separation of dissolved natural gas from the geothermal fluid; utilisation of geothermal gas in three engines for the generation of electricity and heat in a combined heat and power (CHP) system; extraction of CO₂ from the engine exhaust gases using an amine</p>

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					scrubber; and, finally, compression of the recovered CO ₂ and injection into the geothermal reservoir from which it was extracted. To produce electrical and thermal energy (net power production of 22,357 MWhe and net of 29,250 MWhth of thermal energy) the input is geothermal brine with dissolved hydrocarbon gases. This translates into 8,200 hours of constant baseload operation. The project has the potential to eliminate 98% of the GHG emissions avoidance associated with a conventional technology.
5	DrossOne V2G Parking	Intra-day electricity storage	IT	EPS E-MOBILITY S.R.L. (IT)	<p>DrossOne Vehicle-to-Grid Parking</p> <p>The project will demonstrate the feasibility of a large-scale, centralized vehicle-to-grid (V2G) system by using the stationary storage associated with the electric vehicles (EV) in the car park of their manufacturer, before being shipped to car dealerships and a stationary storage unit consisting of second-life batteries. The project will provide fast reserve ancillary services to the grid operator (such as balancing, frequency and power regulation), as well as real time services, by using a system with 280 bidirectional fast chargers. The use of a special charging infrastructure allows EV batteries to be controlled individually and operated in parallel. This means the V2G system allows for scalability of a wider range of EV battery sizes and voltages and will provide insights on the state-of-charge and state-of-health³ of the</p>

³ A measure of the condition of a battery pack, battery or cell. The unit is percentage points.

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					battery. As a result, this project would avoid 100% of GHG emissions produced by a conventional technology.
6	Green Foil project	Other energy storage	SE	GRANGES FINSPÅNG AB (SE)	<p>Low CO₂ Footprint Battery Foil/Current Collector for Li-ion Batteries Production</p> <p>The project is focused on increasing the downstream manufacturing capabilities of a rolling mill to be able to deliver aluminium battery foil, for use as a cathode current collector, which is required as input material when producing electric vehicle battery cells. Target production capacity for 2025 is forecast to be around 5,122 tons of aluminium battery foil, which represents 8% of the overall market. The innovative elements associated with the project are twofold: firstly, the use of both primary metal with an already low CO₂ footprint (i.e., 5.5 kg CO₂/kg per kg foil) and secondary metal and end-of-life recycled scrap; secondly, the installation of an innovative surface treatment technology, called corona treatment, which enables the use of the end-of-life aluminium scraps. Compared to a reference scenario using a conventional technology, the project would avoid 100% of GHG emissions.</p>
7	TLP	Chemicals	SE	Ren Com AB (SE)	<p>Thermoplastic lignin production - Creating a green industry to replace fossil-based plastics</p> <p>The project involves the construction of a biorefinery producing a biomaterial that is renewable and which is used in the manufacturing process of packaging films (i.e., wrapping plastics and plastic bags). The goal is to replace polyethylene, the most used fossil-based plastic,</p>

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					<p>with the new and innovative material made from lignin, a low-value side-stream of the pulp and paper industry. This will be the first biomaterial produced from lignin for bioplastics, which displays key properties, such as sufficient good water resistance and thermoplastic performance, coupled with a cost-efficient production process. Success with the new material product will pave the way for it to replace other fossil-based plastics, such as polypropylene and acrylonitrile butadiene styrene. The production capacity of the plant will be 10,000tpa, and the project would avoid 78% of GHG emissions compared to a reference scenario.</p>
8	HYVALUE	Hydrogen	ES	TUBACEX NOVARGI	<p>Novel upcycling production process based on an innovative circular business model for urban waste streams valorisation for the generation of high quality hydrogen</p> <p>The project aims to produce hydrogen, for sale to the transport and energy intensive industry sectors, based on an innovative production process using municipal solid waste (MSW). The upgrading and combination of state-of-the-art gasification technologies for the cracking and pyrolysis employed to produce hydrogen represent the innovative elements of the project. Specifically, the system is designed to prioritize low energy (temperature) processes to the maximum extent, whilst minimising the high temperature process heat duties. All this translates into high hydrogen production yields with a more energy efficient process. The production capacity of the project</p>

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					is forecast to be 1,600 t/y of hydrogen from 12,000 tons of MSW. Overall, the project is forecast to avoid all of GHG emissions of the conventional technology.
9	EVVE	Intra-day electricity storage	FR	ELECTRICITE DE FRANCE (FR) DREEV (FR)	<p>First European Large-Scale Vehicle-To-Grid Demonstrator for an efficient decarbonisation of the energy sector</p> <p>The project aims to demonstrate the innovative vehicle-to-grid (V2G) technology based on the implementation of a hundreds chargers virtual power plant (VPP), making it a first-of-a-kind, large-scale demonstration in Europe. Another innovative element is related to the business model, which aims at providing a stack of services such as electricity bill management, peak shaving and ancillary services. The virtual power plant will be made of 800 distributed bidirectional charging stations and electric vehicles (EV) across Europe with a large part in France. By using the storage capacity of EV fleets from real users, including EDF own EV fleet, up to 8.4 MW / 34 MWh will be aggregated by DREEV's platform during nine years of operation. Services stacking will be able to both generate savings and revenues for the users and avoid GHG emissions. Overall, the project is expected to avoid 100% of GHG emissions compared to current conventional technologies.</p>
10	EB UV	Iron and steel	FR	ARCELORMITTAL CONSTRUCTION	<p>EB/UV curing without Gas (Electron Beam curing without gas)</p> <p>The aim of the project is to deploy a first-of-a-kind full</p>

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				FRANCE (FR)	scale curing process specifically for solvent-free topcoat paint. The three main innovations of the project (i.e., electron-beam curing of solvent-free paint, Ultra-Violet (UV) technology and Electron-Beam curing to adjust the gloss of the paint, and the use of an infrared heating system) allow two environmental problems to be solved: curing the paint at room temperature by electron radiation and using solvent-free solid paint. Although the capacity of 100,000 tons of pre-painted steel coils per year will not change, the new process is forecast to save up to 31% in GHG emissions compared to a scenario not including the innovation. Beside this, less energy would be used as input and curing would be done at room temperature instead of incineration of solvents.
11	AGGREGACO2	Glass, ceramics and construction material	ES	PETROLEOS DEL NORTE SA (ES) O.C.O Technology Limited (UK)	Fabrication of CO2 negative AGGREGates based on disruptive accelerated carbonation processes fuelled by carbon capture in refineries The project involves designing and building a production plant for the manufacture of carbon negative aggregates by means of the so-called Accelerated Carbonation Technology (ACT). This technology revalorises residues from incineration plants by converting them into carbonate minerals by introducing CO2 captured from refinery processes, in this case a Steam Metane Reformer. The project will represent the first commercial production plant of carbon negative aggregates in the EU, as well as the first in the world to introduce industrial ACT processes within refinery plants. The

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					plant will treat 22.000 t/y of residue and have a production capacity of 56,000 t/y. The project would sequester 16 times as much CO2 emissions as emitted in a reference case.
12	MaxAir	Solar energy	FR	SunPower Manufacturing De Vernejoul SAS a subsidiary of Maxeon Solar Technologies (FR)	<p>Revolutionary Lightweight & Performant Conformable Solar Panels, with Racking Free Installation for Efficient Avoidance of GHG Emission</p> <p>The project will build an automated production line in the manufacturing facility owned by Maxeon Solar Technologies located in Porcelette, in north-eastern France, for the manufacture of photovoltaic (PV) modules, as well as conducting research into ways to improve materials and optimize production processes. The Maxeon Air PV modules will be a first-of-a-kind, conformable, lightweight, robust, racking free and fire-certified sticky solar panel, enabling its installation in inaccessible places. A cumulative installation of 1.4 GWp is planned over a 10-year period, i.e., the equivalent of 7.2 million MWh of generated electricity. Key innovative features of the project include the lightweight nature of the modules which reduces the load on the structures they are installed on, and the capability of the modules to deliver up to 35% more energy from the same space. The project would avoid 100% of GHG emissions compared to a reference scenario based on a conventional panel technology.</p>

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13	ZE PAK green H2	Hydrogen	PL	ZESPOL ELEKTROWNI PATNOW-ADAMOW-KONIN (PL)	<p>5 MW green hydrogen production facility</p> <p>The project aims to build a pilot water electrolysis system to produce green hydrogen for use in the transport sector. The system will comprise two Proton Exchange Membrane (PEM) electrolyzers powered by renewable sources, originating from both an on-site solar photovoltaic plant (60%) and external suppliers (40%). The production capacity is expected to achieve 710 tons of hydrogen per year. The main innovative element of the project is the construction of a self-designed electrolyser stack allowing for energy efficiency savings of 5%. Whilst the revised EU ETS benchmark is 6.63 tCO₂/t hydrogen, the emissions per unit of produced hydrogen for the project are calculated at 0.51 tCO₂eq/t hydrogen. Overall, the project is forecast to avoid 96% of GHG emissions compared to a conventional technology.</p>
14	LK2BM	Pulp and paper	PT	NAVIGATOR PULP SETUBAL, S.A. (PT)	<p>Conversion of a pulp mill fuel source to biomass</p> <p>The aim of the project is to reduce direct greenhouse gas emissions from the pulp mill's lime kiln. A pilot-scale rotary kiln burner and its wood powder feeding lines and equipment will be designed and built, in order to allow a fuel shift to 100% hardwood residues (eucalyptus sawdust) and softwood (pellets), replacing the current natural gas-fired in the existing pulp mill's lime kiln. Considering the lime kiln equipment is responsible for most of the fossil fuel consumption in a pulp mill, the key innovative element of the project relates to the use of hardwood residues, which are generated in wood</p>

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					handling operations, in a lime kiln whilst ensuring that the integrity of the kiln is maintained compared to a standard gas-fired kiln. Although no changes in the production capacity of kraft pulp are envisaged, the conversion of the lime kiln will lead to a decrease in emissions of. The project would avoid 76% of GHG emissions compared to a reference scenario.
15	NorthFlex	Intra-day electricity storage	PL, SE	Northvolt Battery Systems AB (SE)	<p>De-carbonizing temporary power & flexible storage</p> <p>The project seeks to scale-up a lithium-ion battery energy storage system (BESS) comprising two units: an individual self-contained, industrial-grade, high energy-density battery pack and a central power hub. The project introduces an innovative battery pack technology coupled with innovations in manufacturing which will lead to batteries with 50% higher energy density and 50% weight reduction compared to the state-of-the-art. After ramp-up of production, the project expects to place an annual capacity of 457 MWh on the market. Overall, the project is forecast to avoid 100% of GHG emissions compared to a conventional technology.</p>
16	SUN2HY	Hydrogen	ES	SUN2HY (ES) REPSOL (ES) ENAGAS (ES)	<p>First small-scale deployment (FSD) of a pre-commercial plant based on photoelectrocatalytic technology for hydrogen production</p> <p>The aim of the project is to design, implement and validate a pre-commercial stage production plant comprising photoelectrochemical cells able to directly convert solar energy to chemical energy and split water into hydrogen and oxygen with no external energy input.</p>

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					<p>The project involves disruptive photoelectrocatalysis (PEC) technology with a solar to-hydrogen (STH) efficiency above 13%. With a scale of >1m² per module, and an adequate stability of between 70,000-80,000 hours, the project will provide an important step on the path to commercial scale. The total production capacity is forecast to be around 200 tons hydrogen per year. The produced hydrogen will supply refuelling stations serving the transport sector (i.e., freight buses, trucks and light duty vehicles). The project has the potential to reduce GHG emission by 94% compared to a reference scenario.</p>
17	TFFFTP	Pulp and paper	SE	Essity Hygiene and Health AB (SE)	<p>Towards a Fossil Fuel Free Tissue Production</p> <p>The project involves the replacement of fossil fuel derived liquified natural gas (LNG), that has been used to date to dry paper, with a new on-site gasification plant that uses wood waste to generate a bio-syngas. Direct connection of bio-syngas production to paper machines makes this a first-of-a-kind project globally and supports overall the site's decarbonisation measures. Other innovative and bespoke elements for the project comprise adaptation of the burners and a burner control system, both of which aim to tackle the challenges associated with the fluctuation in the calorific value of the bio-syngas. The annual production capacity of the paper machines benefiting directly from the bio-syngas is 69,000 tons of paper. In addition, the project is expected to avoid 72% GHG emissions in comparison to scenario</p>

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					not including the innovation.
18	CO2-FrAMed	Solar energy	ES	<p>ACCIONA ENERGIA S.A. (ES)</p> <p>Universidad Politécnica de Madrid (ES)</p> <p>Federación Nacional de Comunidades de Regantes (ES)</p> <p>Consultora de Ingeniería Rural y Agroalimentaria (ES)</p> <p>Qualifying Photovoltaics (ES)</p> <p>Comunidad General de Riegos del Alto Aragón (ES)</p>	<p>CO₂-Free Agriculture for the Mediterranean region.</p> <p>The project involves the construction of 12 stand-alone large-power photovoltaic irrigation systems (PVI) without the use of back-up batteries and with minimal risks to integrity of the infrastructure. The project's innovative elements are threefold: a new technology (first developed under Horizon 2020) which solves the intermittency problem of PV sources; advanced monitoring and automated analysis of key system parameters; and, an innovative financing model that creates a pool of power purchase agreements (PPAs) totalling 7.35 MW capacity: sufficient collateral to be tied into green bond issuance. The pooled PPA approach also avoids Operations & Maintenance costs falling to farmers because they simply pay for the service provided and do not need to be involved in maintenance issues. Overall, the PVIs will extend the total irrigated area by more than 2,400 ha, with farmers benefitting from zero-carbon irrigation at competitive electricity prices. The project would eliminate all GHG emissions compared to a reference scenario.</p>
19	CarBatteryReFactory	Other energy storage	DE	FENECON GMBH (DE)	<p>Assembly plant for serial production of industrial energy storage systems based on second-life car batteries and disruptive full-pack technology</p> <p>The aim of the project is to develop, build, and operate a new site for manufacturing an energy storage system</p>

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					<p>(ESS) based on zero- and second-life electric vehicle (EV) batteries. The innovativeness of the project is both process- and product-related: for the use of second-life EV batteries no dismantling, rebuilding or partial scrapping is involved, such that a sustainable value chain is set in place. On the product side, this would be the first use of second-life storage as a product and not as a project. The project would also be the first to use liquid cooling technology in stationary applications. The initial production capacity of the ESS system will be 200 MWh (equivalent to 400 containers with 500 kW/kWh on average). The use of the produced storage systems would save 100% of GHG emissions compared to a conventional technology.</p>
20	GREENMOTRIL	Other energy storage	ES	<p>MONTAJES ELECTRICOS CUERVA S.L. (ES)</p> <p>Autoridad Portuaria de Motril (ES)</p> <p>Siemens S.A. (ES)</p>	<p>Development and operation of a GREEN energy community in the port of MOTRIL</p> <p>The aim of the project is to transform a seaport into a self-managed energy community using renewable energies and storage technology. The project will enable the seaport to become the first in Europe to operate completely off-grid, as a fully renewable and self-managed energy community. Heterogeneous technologies, devices, platforms and systems involved will be integrated through a multi-energy management system employing innovative algorithms. The suite of technologies in this project comprises a 4 MW photovoltaic plant, a 1.55 MWh storage system (with grid-forming capacities and frequency supply), separate</p>

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					microgrid management and communication systems, and a robust cybersecurity framework. All in all, 6,300 MWh of renewable energy will be used every year and the project would achieve a reduction of 100% of GHG emissions compared to a reference scenario.
21	WH	Renewable heating/cooling	FR	Water Horizon (FR)	<p>Water Horizon Renewable Energy Solution</p> <p>The project aims to recover waste heat, store it in thermal batteries and transport it to consumers as renewable energy. This will be the first mobile thermal battery in the world able to recover waste heat from industrial activities, to store this energy through a high-density technology avoiding any loss over time, and to deliver the stored energy to large consumers with heating or/and cooling needs. The thermal battery will have a 1MW capacity and able to provide 6 GWh/year (4 GWh in heat and 2GWh in cold). Overall, the project is forecast to avoid 100% of GHG emissions compared to a conventional technology.</p>
22	PIONEER	Other energy storage	IT	<p>AEROPORTI DI ROMA SPA (IT)</p> <p>Fraunhofer-Institut für Solare Energiesysteme (ISE) (DE)</p> <p>Enel X S.r.l. (IT)</p>	<p>airPort sustainability second life battery storage</p> <p>The project involves the design, construction, start-up and operation of a system made up of second-life batteries from the automotive sector for the storage of excess power produced by a 30MW solar photovoltaic plant. The project will be developed at an airport and the energy stored will cover evening peak-demand while also providing flexibility. It is the first of its kind globally: there are no projects of this size that use "real" second-life batteries from multiple original equipment</p>

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				Protos Energy srl (IT)	manufacturers. An additional innovative feature relates to the development of equipment able to check the state-of-health of the batteries before they are connected to the system. The energy storage system will have a rated capacity of 5MW/10MWh. New battery construction will be avoided due to the project. Overall, the project is forecast to avoid 100% of GHG emissions compared to a conventional technology.
23	BCP	Glass, ceramics and construction material	FR	SAINT-GOBAIN GLASS FRANCE (FR)	<p>Batch and Cullet Preheating technology: first-of-a-kind, commercial-scale demonstration towards decarbonization of flat glass production</p> <p>The project aims to demonstrate, at commercial scale, a highly innovative method of recovering and using waste heat from off-gases generated by the float line furnace of a 220,000 tpa capacity glass manufacturing plant. The technology works by using the waste heat to preheat batch and cullet before it enters the float furnace. With the modification, the plant is forecast to achieve a reduction of between 8 to 12% in its current gas consumption - or 35 GWh/year – and achieve CO2 emission reductions of about 7% - or about 6000 tpa - compared to a reference scenario (this innovation is also compatible with hydrogen, which would bring down CO2 emissions even further). If successful, the technology could be replicated across other European glass manufacturing sites.</p>
24	HELEXIO line	Solar energy	FR	ARCELORMITTAL CONSTRUCTION	<p>Demonstrating manufacturing for innovative BIPV roof components</p>

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				FRANCE (FR)	<p>The aim of the project is the full-scale manufacturing of combined steel roof and photovoltaic (PV) solutions. This Building Integrated PV (BIPV) technology will be the first of its kind to be deployed into the non-residential buildings market. In particular, while being economically viable, it will also address key market criteria required by end-users (i.e., being lightweight, having a low carbon footprint, offering flexible solutions adaptable to all roof designs, and being easy to implement). The annual production capacity of the manufacturing line will be up to 220,000 m² of BIPV roof. The project would avoid 100% of GHG emissions in comparison to a reference scenario.</p>
25	DMC	Renewable heating/cooling	HR	NEWHEAT (FR)	<p>DECARBOMALT CROATIA The project seeks to decarbonize the malt industry via the construction of both a solar heat plant and storage facility for the purpose of supplying renewable heat to (pre)heat hot air for drying the malt. Due to the combination of solar thermal, heat storage and two types of heat pumps in industrial application at the largest scale in the EU, the project will reach more than 50% of the total process heat needs of the site. With an installed thermal power capacity of 20 MWth and a storage capacity of 500 MWh, the project will supply around 20 GWh/y of heat, while avoiding all GHG emissions of the conventional technology.</p>
26	AAL SEB	Non-ferrous	IE	AUGHINISH ALUMINA	<p>Installation of a 25MW high pressure electric boiler to increase the usage of renewable energy and by</p>

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		metals		LTD (IE)	<p>doing so further reduce the carbon footprint of the Alumina refinery</p> <p>The project aims to partially decarbonise production of high-pressure steam used in an alumina refinery, by substituting existing gas-fired boilers with an electrode boiler powered during peak renewable production, consuming power that would otherwise be constrained or curtailed. This will be the first application of a high-pressure electric boiler within an energy intensive industry. The use of smart controls enables the interaction of the electric boilers operated by a non-constant supply of renewable energy with existing steam generation. Thus, the plant's constant steam demand is fully covered. The project will also offer frequency response services to the grid reducing the requirement for fossil fuel generators. The 25 MW high pressure electrode boiler will deliver 40t/h (i.e., 28GWh per annum) of zero carbon heat. As a result, the project would avoid 5% of GHG emissions compared to a conventional technology.</p>
27	GtF	Intra-day electricity storage	AT	<p>EVN AG (AT)</p> <p>cyberGRID GmbH & Co. KG (AT)</p> <p>EVN Energievertrieb GmbH & Co. KG (AT)</p>	<p>Green the Flex</p> <p>The project aims to integrate multiple platforms into one entity (a virtual power plant - VPP) which brings flexibility in electricity demand from both households and businesses into the market – i.e., the existing control reserve market provided by the transmission grid operator or possible future markets to smaller assets like heat pumps or electric car charging stations. Generated</p>

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					<p>revenues and other benefits are in turn passed on to households and businesses participating in the VPP. In terms of its innovativeness, the project will use remotely controlled home optimization devices and existing communication channels from original equipment manufacturers to achieve load shifting potential and increase self-consumption. This potential will then be aggregated and used to provide energy market potential and grid stability services, especially control reserve, being the main innovative element. Over three years the project will aim to connect and integrate 2,781 devices to the VPP, with the objective of reaching a theoretical peak power of more than 6 MW available to the energy system – or 4.4 GWh per year of load shift potential. This project would avoid all GHG emissions produced by a conventional technology.</p>
28	NAWEP	Wind energy	NO	KITEMILL AS (NO)	<p>Norse Airborne Wind Energy Project</p> <p>The project will build and operate one of the world's first airborne wind energy (AWE) arrays to be connected to the power grid, with no aviation or environmental restrictions in place. Compared to a conventional horizontal axis wind turbine (HAWT), the weight of the AWE plant is 77% lighter. Despite current differences in generation capacity between the two turbine formats, if successfully demonstrated, project will seek to continue to scale the technology to be cost competitive with HAWT . The envisaged production capacity of the AWE array is 1.2MW (12 systems of 100kW each). The</p>

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					project is expected to accrue 300,000 operating hours over a 3-year period. The project would avoid all of GHG emissions compared to a reference scenario.
29	FirstBio2Shipping	Biofuels and biorefineries	NL	ATTERO BV (NL) Bio-LNG Hub Wilp B.V. (NL)	<p>First Bio-LNG to marine shipping</p> <p>The aim of the project is to decarbonize the maritime sector by demonstrating the first industrial plant producing renewable, low-carbon bio liquified natural gas (bio-LNG) in a standardised and scalable fashion, enabling the cost-effective substitution of heavy fuel oil (HFO). The plant consists inter alia of a gas treatment unit, a bio-LNG polishing and storage unit and a carbon capture unit. At the core of the process is a novel technology called iLNG. The novel integrated system aims to overcome hurdles such as low bio-LNG qualities (i.e., containing amines), high methane slip (due to CO₂ venting), high temperature demands in gas treatment technologies, and high costs for disposal of wastewater and toxic chemical waste. The demonstration plant aims to produce 6 million Nm³/year of biogas, 2,400 tons/year biomethane and 5,000 tons/year bio-CO₂. The project would reduce GHG by 92% compared to a reference scenario.</p>
30	E-PROOF	Intra-day electricity storage	EE	OÜ TS Laevad (EE)	<p>Integrated Battery Power for MS Piret – E-PROOF – Electric Propulsion for Ferry</p> <p>The project seeks to decarbonize maritime transport by integrating batteries into the propulsion system of a passenger/car ferry and allowing diesel engines to run only in challenging situations, such as sea ice build-up. It</p>

No.	Project acronym	Sector	Location	Coordinator and other participants	Project description
					<p>combines three main innovative elements: firstly, the demonstration of electric maritime transport in latitudes with shelf ice; secondly, an upgraded energy management system (EMS), with a predictive element, to allow the ferry's energy demands to be balanced with the limited energy in the batteries; thirdly, the project proposes the possibility for future integration of an onshore buffer battery, connected to Smart Electricity Grid, to avoid destabilization of the electrical grid by allowing the grid operator to address the charging station remotely and integration of a buffer battery used to balance demand with real-time network capacity at later stage. As a result, the project has the potential to reduce GHG emissions by 61% in comparison to a reference scenario.</p>
31	H2 Valcamonica	Hydrogen	IT	<p>A2A SPA (IT) Snam S.p.A. (IT) FNM S.p.A. (IT)</p>	<p>Green hydrogen for the decarbonisation of Valcamonica</p> <p>The project will produce and store electrolysis-based hydrogen (i.e., green hydrogen) in order to cover the local hydrogen demand from the mobility sector (including rail transport), industrial and logistics sectors. The electrolyser will be powered by renewable energy mainly generated in a waste-to-energy plant. The continuous supply of green hydrogen as a rail fuel, together with the use of renewable energy for its production represent the main innovative elements of the project. Annual production is forecast at around 830 tonnes, based on 43,870 MWh of electricity and 16,600</p>

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					m ³ of water. The project would avoid almost 100% of GHG emitted by a conventional technology.
32	Aquilon	Wind energy	DE	Storengy Deutschland GmbH (DE)	<p>Airborne wind hybrid renewable microgrid with Redox-flow battery to provide flat renewable energy to an industrial site</p> <p>The project aims to cover the passive energy consumption of an underground gas storage site with carbon neutral electricity. The project will comprise an integrated renewable and storage solution, including an airborne wind energy (AWE) production at between 100 - 300 kW scale, ca. 300 kWp of solar photovoltaics and a ca. 400 kW kW / 800 kWh redox-flow battery. The project will demonstrate AWE power generation at pre-commercial scale, as well as the use of a redox-flow battery to smooth AWE power variations and to provide ancillary services. Overall, the project is forecast to avoid 100% of GHG emissions compared to a conventional technology.</p>