

EVIDENCE AND BUSINESS SOLUTIONS: HOW TO REDUCE DEPENDENCE ON RUSSIAN FOSSIL FUELS AND ACCELERATE THE GREEN TRANSITION

ANNEX OF THE BUSINESS LETTER AHEAD OF THE REPOWER PLAN

The EU has been heavily and increasingly reliant on Russian gas. In 2021, the EU imported 155 billion cubic metres of natural gas from Russia, equivalent to approximately 45% of its gas imports and 40% of its total gas consumption. The same year, energy imports from Russia were equivalent to €99 billion. These imports also include crude oil of which Russia was the EU's main supplier in 2020, with a share of 25.7 % of total imports, and hard coal, with a share of 49.1%. The EU's dependency on Russian gas grew in the years from 2014 to 2020.

Below we highlight:

- [Evidence on the role of scaling up renewable energy, electrification and energy efficiency](#)
- [Examples of business solutions across sectors \(renewables, energy efficiency, buildings, materials\) which can contribute to achieving climate and energy security objectives](#)

A growing body of evidence suggests that scaling up renewable energy, electrification and energy efficiency can play a key strategic role to reduce this dependency and demand for gas more broadly.

- According to a recent study by [Agora Energiewende](#), the combination of a rapid ramp up of wind and solar PV with increased energy efficiency in buildings and industry can permanently reduce fossil gas demand by 1200 terawatt hours in the next five years, thereby avoiding 80% of current Russian gas imports.
- Similarly, analysis from [RAP](#) shows that delivering the Fit for 55 Package and accelerating the deployment of clean energy and energy efficiency can reduce gas dependency from Russia by 66% equivalent to a reduction of 101 billion cubic metres by 2025 without necessitating new gas infrastructure.
- Accelerating the deployment of wind and solar projects, the replacement of gas boilers with heat pumps and energy efficiency improvements in both buildings and industry are actions highlighted in the [IEA's](#) 10 point plan for reducing the EU's reliance on Russian supplies.
- According to the European Industrial Insulation Foundation ([EiiF](#)) [2021 study](#), technical insulation of pipes, vessels, tanks and boilers offers an immediately available annual energy savings potential of 160 TWh (14 Mtoe) and CO₂ eq. emissions reduction of 40 Mt in EU 27 industry, equivalent to the annual energy consumption of more than 10 million EU households. Technical insulation has the reduction potential of more than 5% (70 TWh), avoiding 14 Mt of emissions, equivalent to the annual volume of gas needed to heat about 28 million households (12 MWh/household).
- The [Agora Energiewende](#) study also highlights the connection of more buildings to existing district heating as an important short-term measure. It suggests that district heating could have a technical potential to achieve around 125 TWh (~12.5 bcm) in gas savings by 2027.
- District heating (DH) is a proven solution to phase out fossil heating (natural gas, oil and coal) and integrate renewables in a cost-efficient way. Renewables and waste heat sources represent nearly a third of the energy supply used in the DH sector and can grow much further. [Up to the 25% of district heating could be supplied by industrial waste heat](#) and [more than 10% of the EU's total energy demand for heating and hot water could be met by heat from data centers, metro stations, tertiary buildings, and waste-water treatment plants.](#)

- [Heat is half of the energy consumed](#) and European citizens and industries are now facing uncertainty regarding energy supply and costs. Solar heat provides a solution currently used in over 10 million households, hundreds of industries and district networks in Europe. Over 90% of the solar thermal systems installed in Europe are produced in Europe. This technology can be deployed at a fast pace and does not require any critical minerals. With strong measures, the solar heat sector can provide additional 25 TWh of direct heat in the next 2 years, equivalent to 3 billion m3 of gas annually.
- According to analysis by [Cambridge Econometrics](#), achieving the European Commission's Renovation Wave's target of reducing heat demand by 60% across 35 million homes by 2030 could reduce gas consumption from homes by up to 43,000 GWh across Europe annually, equivalent to 25 of the world's largest LNG gas carriers saved each year. It could also cut gas imports by €3.3bn per year by 2030 and significantly improve living standards for approximately 80 million people.
- [The deployment of one million heating heat pumps can reduce demand for gas by about 1.1 – 1.5 bcm , when installed in new single-family buildings, and about 2 – 2.5 bcm when replacing boilers in existing buildings.](#) The deployment of one million sanitary hot water heat pumps can replace the need for approx. 0.3-0.4 bcm of gas. Big heat industrial heat pumps can multiply the impact. A 50 MW district heating heat pump has the same benefit as 2 500 to 5 000 smaller ones, depending on whether it is used to supply heat to new or old buildings.
- [Upgrading the existing 2.3 billion conventional light points](#) for the EU27 in professional and residential segments with efficient LED light source and smart lighting could save 188.6 TWh every year; an equivalent of €59.65 billion if we consider a 50% electricity price increase. This would create thousands of new jobs and reduce the carbon footprint by 50.9 million tons of CO₂, equivalent to 185 power units or to the absorption capacity of 2.3 billion trees. Cities alone spend up to 20% of their electricity bill to light roads and streets. The impact on their balance sheet by upgrading their lighting system is huge as LED lighting can save up to 70% of electricity.
- Insulation can constitute the core of vast national and regional renovation programmes. These could be launched quickly over the coming months, building on existing initiatives including energy efficiency obligation schemes. According to [BPIE findings, adding 20 cm of insulation](#) in attics and roofs can save up to 14% of residential heating energy (254 TWh/year, equivalent to around 25 bcm/year) in the EU, which would reduce gas consumption by 12% and heating oil consumption by 17%.
- [The European Commission](#) finds that by 2030, an accelerated green transition could reduce energy imports by a total of 83-133 billion EUR, amounting to 0.1-0.2% of GDP.
- [A study by Orsted](#) finds that investment of 7-10 billion EUR in wind supply chains is required to achieve an annual deployment rate of 20 GW by 2030. An extra capacity of 30 GW can be put in place by 2030, on top of current targets which has the potential to replace 10% of current gas imports from Russia.
- In the field of transport, increasing rail freight and passengers on rail can improve the EU's energy balance. This is important with the ongoing energy crisis and the EU's energy dependency rate for imported fossil fuels. [Rail transport is seven times more energy-efficient than road and fifteen times less energy intensive than air transport.](#) with four out of five trains already running on electricity. The railway systems allow powering trains directly by renewable energy (1/3 of the energy consumed by rail already comes from renewables) such as solar power. Railways are ready for automated train operations, which are expected to reduce rail's energy consumption by at least 12%.

Accelerating the deployment of these solutions is also imperative to keep 1,5 degrees within reach. [IPCC's report](#) on 'Climate Change 2022: Mitigation of Climate Change', makes it clear that an electrified global energy system, powered by clean renewable power and storage, supported with the rapid phase out of fossil fuels is our only chance to meet the goals of the Paris Agreement and ensure a safer world. The [IEA advises](#) that the amount of solar PV and wind deployment must be double what has been announced globally and that global energy intensity must decrease by [4% a year between now and 2030](#) in order to remain on a 1.5°C trajectory.

Businesses are already developing solutions across sectors (renewables, energy efficiency, buildings, materials) which can contribute to achieving climate and energy security objectives.

Decreasing their emissions in line with the Paris agreement:

- 2735 companies are making commitments to decarbonise their emissions through the [Science Based Targets Initiative](#) with 1356 of them committing across 40+ sectors and countries to align their emission reductions with the 1.5°C target, through [the Business Ambition for 1.5°C](#).
- [Welya](#) offers companies the ability to measure their carbon footprint with the [Carbon Disclosure Project](#). The ACT-assessment methodology designed by ADEME, and adapted by sector of activity, identifies greenhouse gas emissions emitted by an organisation. This creates a starting point for businesses to consider the costs of being reliant on fossil fuels and take strategic action to reduce this reliance.

Increasing investments and demand in renewable energy and electrification:

- [Iberdrola](#) reported record investments of almost €10 billion in 2021, nearly half of which (45%) was allocated to renewables activities. As part of its commitment to the progressive electrification of energy uses, Iberdrola will produce 85,000 tonnes of green hydrogen by 2030, including with the [Puertollano Facility](#), the biggest and one of the most efficient green hydrogen facilities for industrial use in Europe, avoiding 48,000 tonnes of CO2 emissions annually. This facility is part of a major integrated project that aims to develop 800MW of green hydrogen in several facilities in Spain by 2027. [Iberdrola](#) will also invest 1.5 billion euros in the [Tâmega Giga-Battery](#) hydroelectric complex, one of Europe's largest energy storage facilities located in Portugal; this renewable infrastructure will have sufficient storage capacity to serve two million Portuguese households for an entire day and will avoid 1.2 million tonnes of CO2 emissions annually. In total, the company projects to [invest €150 billion](#) in this decade in the energy transition. By 2030, the company will triple its installed renewable capacity in order to achieve 95GW. Playing a key role in this expansion is offshore wind power, with Iberdrola expecting to reach an installed capacity of 4GW by 2025. Additionally, the deployment of smart grids is set to double by the end of the decade.
- [Ørsted](#) has a vision of creating a world that runs entirely on green energy. By 2021, Ørsted has installed 13 GW of renewable energy and aims at installing 50 GW by 2030. In 2025, Ørsted expects to commission the 900MW Borkum Riffgrund 3 offshore wind farm, off the coast of Germany. It was the world's first offshore wind project awarded on a zero-subsidy bid. Bringing in leading corporate partners in signing large-scale power purchasing agreements was key in enabling the final investment decision in this project, showcasing the transformative potential of supply and demand sides working together. Ørsted is well on track to become carbon-neutral in energy generation and operations by 2025, with greenhouse gas emissions intensity reduced by at least 98 % compared to 2006.
- [Siemens Gamesa](#) has invested in an offshore wind focused manufacturing facility in [Le Havre \(France\)](#), the world's first offshore nacelle and blade facility under one roof. The company also developed the world's [first project capable of producing green hydrogen directly from wind](#), in Denmark, which can operate both in "island mode", and connected to the grid. Currently, Siemens Gamesa, together with Siemens Energy, is developing an [innovative solution](#) that fully integrates

an electrolyzer into an offshore wind turbine as a single synchronized system to directly produce green hydrogen, with a full-scale offshore demonstration expected by 2025-2026. Additionally, the company developed [RecyclableBlade](#), the world's first recyclable wind turbine blades ready for commercial use offshore.

- [SolarPower Europe](#) estimates that at least 10GW additional capacity can be already deployed by the end of 2022 by unlocking the rooftop PV potential, and accelerating ground-mounted PV projects in the pipeline. By 2025, an 'accelerated scenario' can deliver 100 GW of solar PV in the year 2025, bringing total European solar capacity to 450 GW.
- [Enel](#), which currently has an installed capacity of 48 GW, almost half of which is renewable, committed to bring forward by 10 years (from 2050 to 2040) its Net Zero commitment covering all GHG emissions along its entire value chain worldwide. To this end, Enel expects to complete the phase-out of all its coal-fired power plants by 2027 and reach a total renewable capacity around the world of about 154 GW by 2030, tripling its 2020 portfolio, while also extending its grid customer base by 12 million and promoting electrification of consumption while focusing on the scale up of beyond commodity services such as public electric mobility or behind-the-meter storage. Furthermore, Enel's [3SUN factory](#) is set to become Europe's largest factory producing high-performance bifacial photovoltaic modules. The factory's production capacity is set to increase 15-fold to 3 GW/year from the current 200 MW through an investment of around 600 million euros. The factory is expected to increase local employment by around 1,000 jobs, alongside acting as a catalyst for reshoring the PV value chain in Europe.
- [Acciona Energia](#)'s investment plan will see the company double installed capacity by 2025 to 20GW and reach 30GW by 2030. The company has started to operate the first green hydrogen hub in Southern Europe of 2.5 MW and developed last year the first industrial microgrid in Spain with Schneider Electric, as well as the first grid-connected floating photovoltaic plant in the country. Through Corporate PPAs, [ACCIONA](#) has reached an accumulated contracted record volume of 5.6 GWh by 2021. In the field of transport, the company provides shared mobility services in six cities using electric motorbikes. At the end of 2020, ACCIONA had a [fleet of more than 12,000 motor-cycles powered by renewable electricity](#), making the company the largest operator in the world in this sector. In 2021, more than 850 tonnes of CO2 emissions were avoided, equivalent to the emissions generated by around 100,000 cars circulating per day, freeing space equivalent to more than 45 football stadiums. ACCIONA Energia is developing a network of interurban fast charging points and manages over 400 third-party points and 10,000 registered users.
- [Low Carbon](#) has reached financial close on the [Mörknässkogen wind farm](#) in Finland. With a capacity of 29.5MW, the project forms part of the company's exclusive pipeline development stretching more than 120MW across the country. The region's climate and its abundant supply of natural wind is expected to see the wind farm deliver a production capacity of approximately 100GWh per annum, capable of powering over 29,700 homes and avoiding more than 20,900 tonnes of CO2 emissions.
- [SSE](#) is a leading generator of renewable electricity and in November 2021, announced a [£12.5bn Net Zero Acceleration programme](#). This includes plans to double its installed renewable energy capacity to 8GW by 2026, and [increase its renewables output fivefold](#) to over 50TWh annually by 2031. To contribute to directly reducing the EU's fossil fuel demand, SSE is developing Ireland's first large-scale offshore wind farm, the 800MW [Arklow Bank](#), and looking to support Ireland's first Hydrogen Valley, as part of the [Galway Hydrogen Hub \(GH2\)](#) consortium, providing green hydrogen for use in transport, industry and within local communities in the greater Galway region. A significant global challenge is how to increase the pace of deployment of clean energy infrastructure. Much will depend on creating investable, long-term frameworks to keep the cost of capital low in what will be a highly capital-intensive transition.

- Companies signed up to the [RE100 initiative](#), committed to source 100% renewable electricity, have a combined demand for renewable electricity of 334 TWh globally which represents a bigger electricity demand than either the UK or Italy.
- [Corporate renewable energy sourcing is booming across Europe](#) as businesses have signed over 15 gigawatts (GW) of renewable power purchase agreements (PPAs) making 2021 a record year.
- [Royal DSM](#), a member of RE100, has effectively decoupled emissions from growth largely by switching to [renewable purchased electricity and improving energy efficiency](#), 5-6% annually in the past years. DSM cut total emissions by 27% in absolute terms since 2016, even as the business has expanded. While DSM has already reached 100% renewable electricity in Europe through existing Power Purchase Agreement (PPA) contracts and pre-production guarantees of origin (GOs), the company continues to look for opportunities for the broader use of sustainable renewable energy, such as heat. Certain sites across DSM already recover waste streams for production of renewable heat, but besides the feedstock used, company applies strict criteria on carbon payback times and management of soil health, water and biodiversity impacts.
- [EDF](#) has signed a fifteen-year PPA with RWE to purchase renewable electricity from Sofia, which will be one of the largest single offshore wind farms in the world due to start generating power in 2025 and set for full generation in 2026. EDF also coordinates the [EVVE project](#), with the support of DREEV and financing from the EU's Innovation Fund. Over a 9-year period, the project aims to install a Virtual Power Plant consisting of 800 V2G bidirectional charging stations, using the Electric Vehicles (EV) energy storage capacities and reaching an aggregated capacity of up to 8,36 MW. The result is a reduction in CO2 emissions by more than 25 000 tonnes.
- [Amazon](#) has invested in 310 renewable energy projects across 19 countries globally, and is Europe's largest corporate purchaser of renewable energy with projects in France, Spain, Ireland and Sweden. These projects will have the capacity to generate over 15.7 GW and 42,000 gigawatt hours (GWh) once fully operational, or electricity output equivalent to powering more than 11 million European homes for a year. The carbon-free energy generated by these projects will help avoid 17.3 million metric tons of carbon emissions annually. Amazon also installs on-site rooftops, or ground-mounted solar photovoltaic systems, and battery storage on buildings across its operations. A rooftop solar system has the potential to generate as much as 80% of a single fulfillment facility's annual energy needs. Additionally, Amazon is expanding its electric delivery fleet and building the supporting charger infrastructure. The company ordered 1,800 electric delivery vehicles from Mercedes-Benz Vans and, in 2021, it delivered more than 100 million packages by electric delivery vans across Europe.
- As part of its [net zero climate roadmap](#), [Nestlé](#) aims at using 100% renewable electricity in all its sites by 2025 by increasing the proportion of renewable electricity that is used in its manufacturing processes through power purchase agreements, green tariffs, renewable energy certificates and on-site production. In the last few months, it has been initiating renewable energy projects across multiple countries, including wind power in [Germany](#) and [the UK](#), solar power in [Spain](#) and hydro power in [Switzerland](#). Furthermore, in support of the EU Green Deal and the [Farm to Fork Strategy](#) for a more sustainable food system, Nestlé has a strong ambition to increase regenerative agriculture and lower the reliance on fossil fuels, and encourages Europe to boost its use of bio-fertilizers.
- [Axfood](#) invests heavily in renewable energy. In addition to the Group's entire fleet of approximately 270 trucks now running on fossil-free fuel, an agreement was signed in April to build the country's largest [rooftop solar power facility](#) by equipping Axfood Group's new, highly automated logistics center north of Stockholm, with solar panels covering a surface of approximately 80,000 square meters. The rooftop solar power facility will comprise more than 16,000 panels and is expected to generate approximately 8.9 MW when fully operational, corresponding to an annual capacity of 7.8 GWh.

- The [Schwarz Group](#) (Lidl, Kaufland, Schwarz Produktion, PreZero) is focusing on electricity from renewable sources to achieve its 1.5° Science Based Targets Initiative goal and will ambitiously expand the share of self-generated renewable energy. As part of its [climate strategy](#), photovoltaic systems will be expanded to 5,000 units by 2025 - with a total peak output of around 700,000 kilowatts.
- [CEMEX](#) and Synhelion produced one of the world's first [solar clinkers](#). Clinkers are a central component of cement, making this a significant step towards creating fully solar-driven cement plants. The initiative is part of CEMEX's [Future in Action program](#), which sets forth ambitions to reduce the carbon footprint of its operations. Fossil fuels are typically used in the production of clinkers, meaning that it is responsible for approximately 40% of direct CO2 emissions that amount during this process. Completely substituting fossil fuels with concentrated solar radiation represents a gamechanger in the industry's efforts to achieve carbon neutrality by 2050. Synhelion's solar receiver can achieve record-breaking temperatures beyond 1,500°C and was successfully used in the production of both cement and concrete.
- [Allego](#) is one of the leading European independent Electric Vehicle (EV) charging solutions providers operating more than 30,800 charging points across the continent. Since [Meridiam's investment](#) in 2018, Allego has expanded and secured a leading position in Germany, the UK, the Nordics and France. This was achieved through several major projects including [Mega-E](#), support to LeasePlan "electrification" and fast charge installations in Shell gas stations. Allego therefore supports the takeoff of EV usage, the [cleanest form of transportation](#) that will reduce dependency on fossil fuels and significantly improve the local environment with positive health consequences.
- REN developed an innovative and patented [solution](#) for charging electric vehicles or electrify remote areas, using the very high voltage network. This solution, suited to several contexts and easily scalable, avoids distribution grid reinforcements and is suitable for applications with superior power requirements, while also helping accelerate electric mobility.
- [REVENGA Smart Solutions](#) has formed an alliance with E4e Soluciones to install two photovoltaic plants for self consumption in its main headquarters in line with its Science Based Target. This will lead to the avoidance of 86,06 tonnes of CO2 equivalent per year.
- In the Gaussan Abbey in Bizanet (France) [Akuo](#), along with its partners [Agriterra](#) and [Les Maîtres de Mon Moulin](#), have developed an agrivoltaic project blending solar energy and organic food production. Addressing the land-use challenges and offering durable economic outlets to the Aude region, the project provides training for local agricultural entrepreneurs while ensuring the sustainability of agricultural activities by powering them with renewable energy. Akuo and its partners contribute to the inclusive and fair transition of the region and the sustainable development of plant species and deserted areas.

Developing clean heating and cooling technologies and energy efficiency solutions for buildings and households:

- [Microsoft](#) has partnered up with state-owned Finnish energy company Fortum to heat up Finnish homes. By capturing excess heat from data-centres that is generated in the cooling process and transferring this to heat homes, services and business premises located in its district heating system. This is estimated to reduce Finland's annual CO2 emissions by 400,000 tonnes.
- [Dalkia](#) conceived and operates two efficient district heating networks in the municipality of Charleville-Mézières (France). 3 290 households are heated with 28 GWh of heat recovered from the Stellantis Factory, the largest foundry in Europe. They cover half of the heat demand and avoid 7000 tons of CO2 each year, complemented by a biomass boiler. [Dalkia](#) also signed

a 12-year energy performance contract with the French county (“Departement des Hauts-de-Seine”). It covers 31 buildings (middle schools) resulting in saving 30% of energy and 600 000 euros per year.

- [Veolia](#) launched an innovative installation in Szlachęcín (Poznan County, Poland) in cooperation with Aquanet and the state entity (NFOŚiGW). The installation recovers heat from wastewater and produces energy and heat in a cogeneration facility, providing 7 700 MWh and contributing to a reduction of 2,000 tCO₂e per year. It supplies heat to 5,000 inhabitants through the local district heating network.
- [Absolicon Solar Collector](#) and other solar thermal actors from Solar Heat Europe [pledged](#) to replace 500TWh of fossil fuels in Europe by 2030, recognising the potential of renewable heating solutions. Solar heat reaches an efficiency of 70-80% and can be stored from summer to winter at €0,4/kWh. Large scale solar thermal can provide 100 TWh of district heating and 200 TWh of industrial heat in Europe until 2030, in line with [IRENA 2030](#) projections.
- [AmbiHeat](#) is a modular heat pump plant developed by [Calefa](#) that produces district heating for the needs of the Orion medical factory in Turku with no CO₂ emissions. The plant utilises outdoor air and industrial waste heat as energy sources. At the same time, it produces cooling for factory processes. This environmentally friendly solution reduces the need for purchased district heating by almost 70%. Most of the energy demand is now met self-sufficiently with the AmbiHeat plant by utilising waste heat from processes and outdoor energy.
- Already today, one-third of Greek households are benefiting from solar water heating saving about 1 billion € this year. Solar thermal systems used in Greece are reducing the dependency on other energy sources and prevent the burning of 650 mcm of gas. The Greek solar thermal industry is ready to quadruple the rate of installation of solar water heaters within the next two years. [Prime Laser Technology](#) supports the immediate replacement of electric water heaters.
- Iberdrola’s [Smart Climate](#) programme includes a variety of energy efficient solutions to optimize heating, cooling, domestic hot water and comfort for households based on efficiency, renewable electricity, district heating projects, insulation and heat pumps, in order to support and drive the current EU Next Generation initiatives to retrofit the existing residential sector.
- [The SuperHomes initiative](#) in Ireland is a one-stop-shop for home energy retrofit from designing the energy solution of the home, to being involved in all the key stages (from tender through to the payment of grant funding). The initiative involves leading contractors and experienced retrofit specialists.
- [Voltalis](#), is a European leader in electrical flexibility and reduction of residential electricity consumption with its energy-saving solutions already equipping more than 100,000 homes. Its innovative solution for active management and reduction of electricity consumption of residential and commercial buildings, primarily for heating, air conditioning and EV charging, is entirely free of charge for users and reduces consumption by up to 15%, enabling significant cost savings. Thus, rather than responding to the increase in energy demand, Voltalis offers a CO₂-neutral solution for intelligent management of electricity consumption, with no loss of comfort for equipped households.
- [FIX](#) is an initiative based in Brussels which employs energy experts/engineers who provide energy audits and advice for schools. The initiative also provides training for low skilled workers for renovation projects including those aimed at increasing the energy savings of buildings through insulation, the replacement of old lighting fixtures, and the placement of thermostatic valves. This combination enables to reach the dual objectives of optimising school infrastructure and energy consumption while providing quality training to low skilled labour. 76% of the people trained find a job after their work experience with the initiative.

Reducing the carbon footprint of materials and increasing their circularity:

- The chemicals used in [Unilever's](#) cleaning and laundry products make up the largest proportion of their carbon footprint (46%) across their lifecycle. By transitioning away from fossil fuel-derived chemicals in product formulations, the company will unlock novel ways of reducing the carbon footprint of some of the world's biggest cleaning and laundry brands. Unilever expects this '[Clean Future](#)' initiative alone to reduce the carbon footprint of the product formulations by up to 20%. Tackling emissions embedded in products will contribute to the company's objective to net zero emissions from its products by 2039, and it is also a way to reduce dependence on fossil fuels as globally, about 14% of the crude oil and gas is used to make chemicals. Unilever has already started putting its strategy into action in several markets including in Slovakia where it is partnering with German biotechnology leader Evonik Industries to develop the production of rhamnolipids, a renewable and biodegradable surfactant.
- SSAB, LKAB and Vattenfall created [HYBRIT](#), Hydrogen Breakthrough Ironmaking Technology, in 2016, with the aim of developing a technology for fossil-free iron- and steelmaking. The goal is to deliver fossil-free steel to the market and demonstrate a complete value chain for fossil-free hydrogen-based iron and steelmaking on an industrial scale as early as 2026. A new facility will be established for first-of-a-kind hydrogen-based direct reduction, with 500 MW fossil-free electrolysis at LKAB in Gällivare. The facility will produce approximately 1.35 million tonnes of hydrogen reduced iron (sponge iron) annually, to be used for producing crude steel amounting to approximately 25% of Sweden's total production. This will reduce greenhouse gas emissions by 14.3 million tonnes CO₂ over the first 10 years of operation, according to the [Innovation Fund](#) calculation model. Furthermore, SSAB will replace its blast furnaces with an electric arc furnace in Oxelösund.
- The Swedish business network the [Haga initiative](#) compiled a list of [100 business initiatives for the circular economy](#) which aim to reduce energy consumption and carbon emissions and increase resource efficiency and the circularity of materials.