

Horizon 2020

**Supporting  
clean energy  
in Europe**

*Last update: September 2018*

*Innovation  
and Networks  
Executive Agency*



# INEA

Innovation and Networks Executive Agency

## ***Making implementation happen***

INEA, the Innovation and Networks Executive Agency, is responsible for managing energy research funded by the European Union's Horizon 2020 Programme in the areas of competitive low-carbon energy and smart cities and communities. Around €3 billion of EU funding is available to support projects in these fields from 2014 to 2020.

The projects are funded in the full range of the research and innovation chain, from the laboratory to demonstrating new technologies at full-scale in the real world.



## HORIZON 2020 ENERGY PROJECTS MANAGED BY INEA COVER **FIVE MAIN AREAS**

The major sources of renewable energy – from wind to wave and from solar to geothermal

Technologies that increase the flexibility of the energy system, such as smart grids and energy storage

Ways to reduce carbon emissions through capture, storage and re-use of CO<sub>2</sub> or more flexible power plants

Social sciences and humanities – to better understand societal and consumer choices that underpin the energy system

Smart cities - the nexus between energy, transport and ICT

THIS BROCHURE PRESENTS

# SEVEN EXAMPLES

HIGHLIGHTING THE VARIETY OF ENERGY  
RESEARCH PROJECTS THAT INEA MANAGES

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### **Project full title**

Energy Cost Optimization using Superconducting Wind Generators - World's First Demonstration of a 3.6 MW Low-Cost Lightweight DD Superconducting Generator on a Wind Turbine

### **Call**

Horizon 2020 Competitive Low-Carbon Energy

### **Field**

Wind

### **Coordinator**

Envision Energy APS, Denmark

### **Total funding**

€13,846,594

### **EU contribution**

€10,591,734

### **Duration**

03/2015 - 02/2019

### **Website**

[www.ecoswing.eu](http://www.ecoswing.eu)

EcoSwing tests the advantages of a novel, high-temperature, superconducting technology that could be used for a new generation of low-cost, lightweight drive-train wind turbines. The demonstration is carried out on a wind turbine in Thyborøn (Denmark).

The most direct advantage of the proposed technology in the EcoSwing generator will be reducing its weight by more than 40% compared to conventional direct-drive generators. This will result in 25% weight loss for the nacelle, which houses all generating components in a wind turbine, and will be a step-change in generator development. In total, EcoSwing will help save 40% of iron and copper used to build a conventional wind turbine, and it will use close to zero rare earth elements.

If successful, the project will be a game-changer in the continuous quest to lower the cost of renewable energy.



# MinWaterCSP

## *Improving the efficiency of solar plants*

### **Project full title**

Minimised water consumption in CSP plants

### **Call**

Horizon 2020 Competitive Low-Carbon Energy

### **Field**

Concentrated Solar Power

### **Coordinator**

Kelvion Holding GmbH, Germany

### **Total funding**

€5,861,372

### **EU contribution**

€5,861,372

### **Duration**

01/2016 - 12/2018

### **Website**

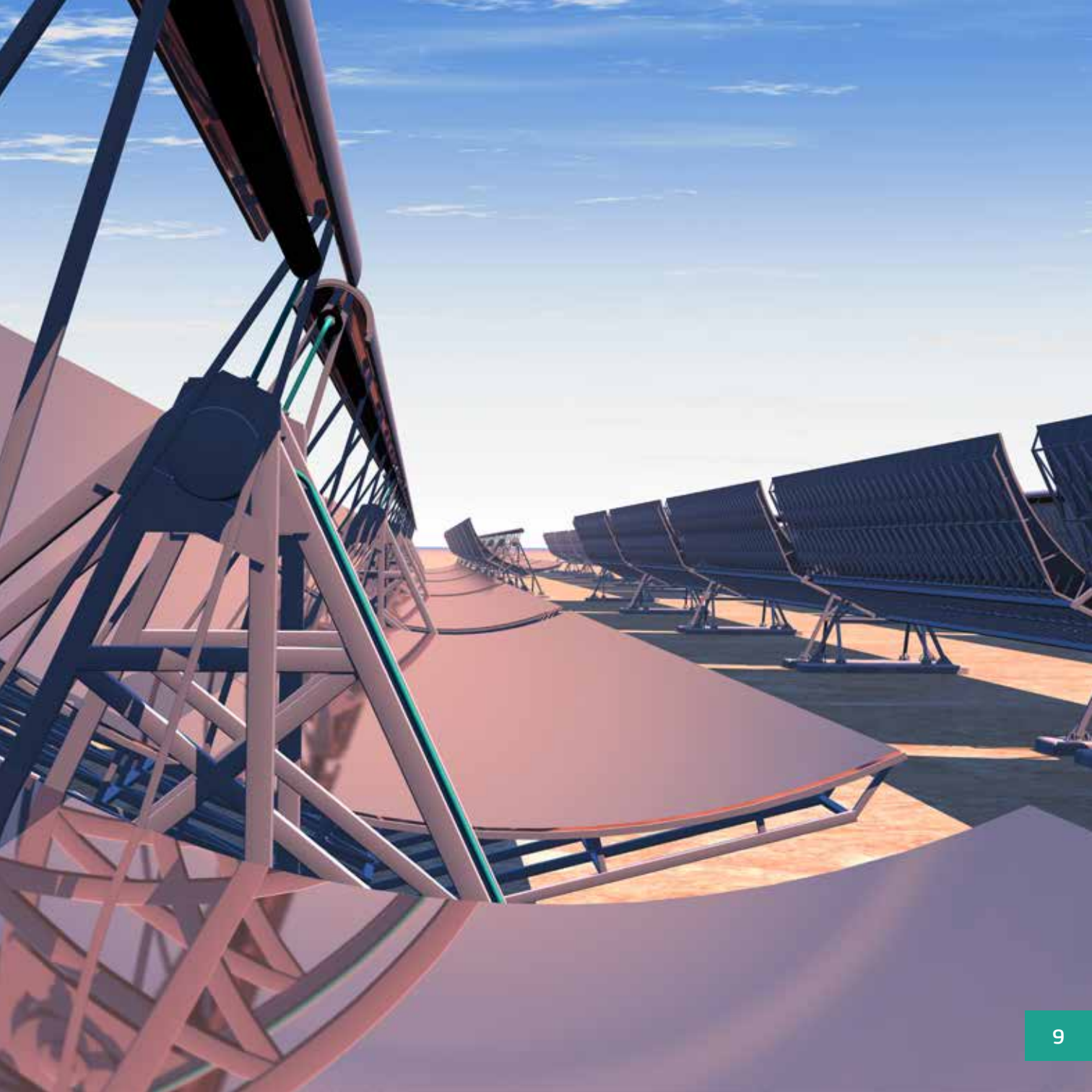
[www.minwatercsp.com](http://www.minwatercsp.com)

The best places to generate concentrated solar power (CSP) are sunny arid regions such as North Africa, the Middle East, South-West USA or Chile. Currently available technologies, however, use a lot of water to clean and cool the mirrors concentrating the energy from the sun. This poses a serious environmental barrier to the development of CSP plants. MinWaterCSP will develop solutions to reduce water usage in operating CSP plants while maintaining their overall efficiency.

The project is developing the next generation of technologies in fields such as cooling systems, mirror cleaning techniques, and water management. The goal is to reduce water evaporation losses by 75% to 95% compared to current wet cooling systems. To complement this, mirror-cleaning water consumption will be cut by 25% through deploying a cleaning robot and reducing the number of cleaning cycles. MinWaterCSP will also develop innovative water management plans for CSP plants in South Africa and Morocco to carry out simulations and test the technologies.

By improving their cost competitiveness, the project will make CSP plants more attractive for investors and thus will drive growth in the sector. It will also contribute to job creation in European companies which provide components for technologically advanced CSP plants.





# CrowdFundRES

## *Innovative approach to financing renewable energy*

### **Project full title**

Unleashing the potential of Crowdfunding for Financing Renewable Energy Projects

### **Call**

Horizon 2020 Competitive Low-Carbon Energy

### **Field**

Renewable Energy Sources - Market Uptake

### **Coordinator**

Wirtschaft und Infrastruktur GmbH & Co.  
Planungs KG, Germany

### **Total funding**

€1,994,915

### **EU contribution**

€1,893,003

### **Duration**

02/2015 - 01/2018

### **Website**

[www.crowdfundres.eu](http://www.crowdfundres.eu)

One of the reasons why the renewable energy market in Europe is developing relatively slowly is the difficulty of financing certain types of projects. Reduced access to conventional capital sources has triggered the emergence of alternative financing schemes, of which the most popular is crowdfunding. The CrowdFundRES project focused on researching crowdfunding as a means to finance renewable energy projects.

CrowdFundRES involved four target groups: renewable energy projects developers whose access to financing is getting more challenging, citizens as individual investors, crowdfunding platforms and decision makers that can implement the policy recommendations to improve the market and regulatory framework for crowdfunding.

The project analysed the target groups' perspectives on crowdfunding through surveys, case studies and workshops. This research resulted in developing guidelines and an eBook for using crowdfunding for financing for renewable energy in Europe. CrowdFundRES has also successfully analysed 18 crowdfunding renewable energy project campaigns. In total, the campaigns raised €29.5 million, and supported the installation of renewable energy technologies with the capacity of producing 100 MW.

CrowdfundRES also promoted the crowdfunding concept for renewables among those who could contribute or raise funds, and encouraged citizens to more actively participate in the energy transition in Europe.

# CROWD FUNDING



# SUN-to-LIQUID

## *In search of a solar fuel*

### **Project full title**

Integrated solar-thermochemical synthesis of liquid hydrocarbon fuels

### **Call**

Horizon 2020 Competitive Low-Carbon Energy

### **Field**

Alternative Fuels

### **Coordinator**

Bauhaus Luftfahrt EV, Germany

### **Total funding**

€6,150,031

### **EU contribution**

€4,450,618

### **Duration**

01/2016 - 12/2019

### **Website**

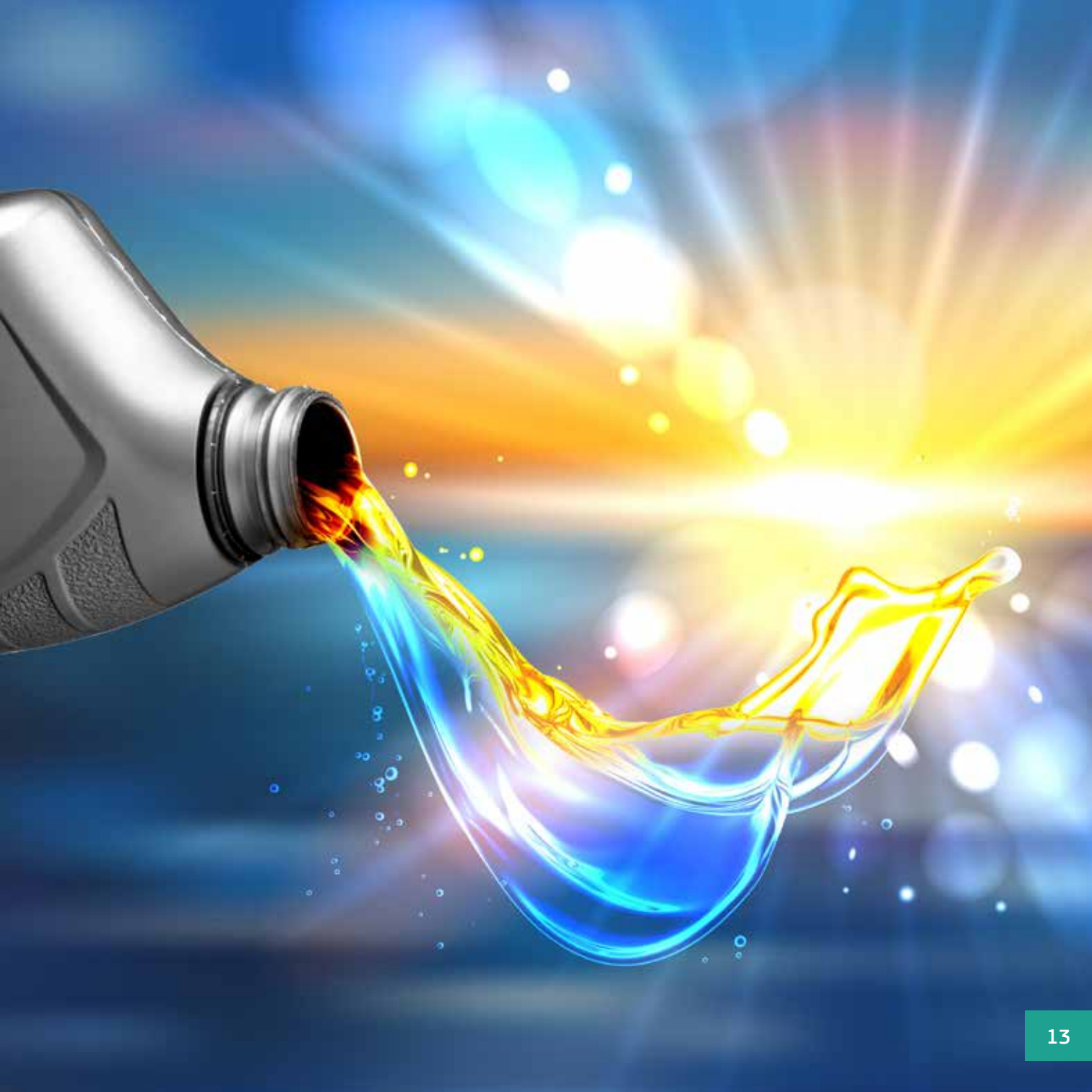
[www.energy.imdea.org/research/projects/sun-liquid](http://www.energy.imdea.org/research/projects/sun-liquid)

Transport is one of the biggest contributors to greenhouse gas emissions and is likely to remain so for many years to come unless alternatives to fossil fuels can be found. One option is to replace petrol or diesel with other renewable liquid hydrocarbon fuels from biomass or other sources. If this were possible, we could continue using the existing fuelling infrastructure without upgrading it.

Currently, virtually all renewable hydrocarbon fuels originate from biomass. The SUN-to-LIQUID technology establishes a radically different approach. It builds on the results of another EU-funded project, SOLAR-JET, which has demonstrated the first-ever production of solar jet fuel at the laboratory scale. SUN-to-LIQUID plans to validate experimentally at the pre-commercial scale the new fuel, which is made from water, CO<sub>2</sub> and solar energy by concentrating solar radiation.

The ambition of the project is to advance solar fuels well beyond the state of the art and to provide the scientific and technological foundations for their competitive industrial exploitation in the years to come.





### **Project full title**

Realising Value from Electricity Markets with Local Smart Electric Thermal Storage Technology

### **Call**

Horizon 2020 Competitive Low-Carbon Energy

### **Field**

Storage

### **Coordinator**

Glen Dimplex Ireland

### **Total funding**

€15,413,331

### **EU contribution**

€11,987,430

### **Duration**

06/2015 – 05/2018

### **Website**

[www.realvalueproject.com](http://www.realvalueproject.com)

RealValue tested the use of Smart Electric Thermal Storage (SETS) space and water heating devices in order to bring cost reductions to consumers and increase the use of renewable energy.

The project installed SETS systems in around 750 properties across Ireland, Germany and Latvia. Using these physical demonstrations, combined with advanced ICT and innovative modelling techniques, RealValue has been able to prove that an aggregated population of SETS can bring benefits to the whole electricity supply chain, from generation and distribution, through to wholesale markets and suppliers, and ultimately to consumers.

SETS provides electric space and water heating in an efficient way and is a key enabler for Demand Side Management. Because the appliances are thermal stores, they allow the supply of energy from the grid to be decoupled from the consumption of energy within the house. SETS is fully electronically controlled and can communicate easily with aggregator software, facilitating the necessary load management for the grid.

In addition to testing SETS, RealValue used modelling to predict the future potential of local small-scale energy across the EU and carried out an in-depth market analysis. As consumer engagement was the key aspect, behavioural studies were conducted through surveys, interviews and observations.

RealValue's main results are available on the project's website.



# REMOURBAN

## *Paving the way for greener cities*

### **Project full title**

REgeneration MOdel for accelerating the smart URBAN transformation

### **Call**

Horizon 2020 Smart Cities and Communities

### **Field**

Smart Cities

### **Coordinator**

Fundacion Cartif, Spain

### **Total funding**

€24,754,878

### **EU contribution**

€21,541,949

### **Duration**

01/2015 - 12/2019

### **Website**

[www.remourban.eu](http://www.remourban.eu)

The REMOURBAN project will transform urban areas in Nottingham (UK), Tepebasi (Turkey) and Valladolid (Spain) into sustainable neighbourhoods to improve citizens' quality of life, whilst protecting the environment, improving the sustainability of urban transport and drastically reducing CO2 emissions.

In these so-called 'lighthouse' cities, the project will test innovative energy, transport and ICT solutions. In total, 920 homes will be retrofitted to reduce building energy consumption by 50%. At the same time, solar panels will be installed to provide additional electricity to households.

In addition, all three cities will use central heating systems driven by renewable sources, and REMOURBAN will help them develop energy storage and smart grid management solutions. The project also plans to replace conventional fuel vehicles with electric and hybrid ones and improve their charging infrastructure. Finally, REMOURBAN will launch a city information platform, providing useful data and services to residents.

Citizens are at the heart of the project. Over 19,000 people will be involved in the project's demonstrations. The project aims to empower them and make them drivers for sustainable development of their cities. REMOURBAN's ultimate goal is to develop an urban regeneration model





# STEPWISE

## *New technology for clean steel industry*

### **Project full title**

SEWGS Technology Platform for cost effective CO<sub>2</sub> reduction in the Iron and Steel Industry

### **Call**

Horizon 2020 Competitive Low-Carbon Energy

### **Field**

Carbon Capture and Storage

### **Coordinator**

Stichting Energieonderzoek Centrum Nederland

### **Total funding**

€12,988,996

### **EU contribution**

€12,968,371

### **Duration**

05/2015 - 04/2019

### **Website**

[www.stepwise.eu](http://www.stepwise.eu)

STEPWISE aims to lower the CO<sub>2</sub> emissions of steel production. It will develop a novel technology to capture the CO<sub>2</sub> emitted when iron ore is transformed into iron.

By improving the existing SEWGS (Sorption Enhanced Water Gas Shift) process, STEPWISE aims to develop the technology to capture up to 85% of CO<sub>2</sub>, while using 60% less energy and lowering the cost of avoided CO<sub>2</sub> by 25%.

In addition to capturing carbon, the technology will also convert the blast furnace gas into purified hydrogen at high temperature and pressure, which can be then used to generate power, or as a chemical in the steel plant.

The project will construct a dedicated pilot installation in a steel mill in Luleå (Sweden) to test the proposed technology and to demonstrate its applicability in a real industrial environment.

The STEPWISE project has the potential to reduce CO<sub>2</sub> emissions in Europe by 21 million tonnes per year, equal to the emissions that would be produced if three million cars completed a ride around the world.



energy & costs



capture CO<sub>2</sub>

## **MORE INFORMATION**

### **Energy research**

[ec.europa.eu/programmes/horizon2020](https://ec.europa.eu/programmes/horizon2020)

Select the 'Energy' topic in the 'Find your area' tab

## **APPLY FOR H2020 FUNDS**

### **Horizon 2020 Participant Portal**

[ec.europa.eu/research/participants/portal](https://ec.europa.eu/research/participants/portal)

## **ASK YOUR QUESTION RELATED TO HORIZON 2020**

### **Research Enquiry Service**

[ec.europa.eu/research/enquiries](https://ec.europa.eu/research/enquiries)

## **BECOME AN EXPERT EVALUATOR**

### **Sign up on H2020 Participant Portal**

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[ec.europa.eu/inea/en/horizon-2020](https://ec.europa.eu/inea/en/horizon-2020)