

| General Information | |
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| Preliminary title of the European Partnerships | Clean Steel & Low Carbon Steelmaking |
| Short description of the partnership | The Partnership will provide an EU critical mass to support research up to industrial scale of breakthrough steelmaking technologies in line with the EU 2050 decarbonisation strategy. |
| Services directly involved | DG RTD D4, D2 and G2, DG GROW C2, DG ENER C2, DG CLIMA C3, DG ENV A3 and C4. |
| Context and problem definition | <p>Currently, steelmaking R&I is covered by RFCS (for incremental progress) and by SPIRE (for industrial symbiosis, especially with chemical industries through carbon capture and utilisation).</p> <p>Steel (and coal) is an emblematic industrial sector since the beginning of EU integration. Today, steel plays a crucial role in the strategic value chain of downstream industries: automotive and other transport means, construction and buildings, energy and defence, mechanical and electrical engineering. Steel is vital to the EU economy as recognised in the Commission's Communications 'Steel: Preserving sustainable jobs and growth in Europe' (COM(2016)155) and 'A renewed EU Industrial Policy' (COM(2017)479).</p> <p>With an output of 170 million tonnes of crude steel per year, the EU is the second largest producer in the world. The Steel sector in Europe has an annual turnover of EUR 166 billion and is responsible for 1.3% of EU GDP but also of 30% of industrial CO₂ emissions and of other pollutants. Europe's competitive position on the global steel market has deteriorated in the last few years. The economic slowdown had a negative impact on global steel demand and the Chinese steel overproduction has depressed steel price worldwide.</p> <p>Decarbonising the industrial sector is another challenge. With the continuation of current efforts and policies, industry can achieve additional greenhouse gas (GHG) emissions reduction by 2050, ranging between 55 to 65% compared to 1990. Nevertheless, such reductions are not enough to reduce the emissions by 80% to 95% and achieve a carbon-neutral economy by 2050. Breakthrough and innovative decarbonisation technologies should be developed and tested at a large scale to demonstrate their feasibility.</p> <p>Currently, there is no commercial technology for achieving deep CO₂ emissions reductions in the steel sector although several recent research, innovation and demonstration projects are promising. But the large size of the investments needed and the long time necessary to implement these new technologies in the steel sector, require large R&I efforts in breakthrough technologies. Furthermore, the uptake of breakthrough technologies within the steelmaking sector will represent opportunities and risks for other environmental issues, such as the circular economy and emissions of pollutants to air and water.</p> <p>Steel is a genuine EU industry with 500 production sites across 23 EU countries. By 2030 and thanks to the Clean Steel Partnership, tens of steelmaking plants in the EU will demonstrate the reduction potential of CO₂ emissions (from 20 to 90% according to different technological paths).</p> |

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| | <p>Under Horizon Europe, this partnership would embrace activities mostly under Cluster 4 ‘Digital, industry and space’ and Cluster 5 ‘Climate, energy and mobility’ and in line with Cluster 6 on Natural resources. The importance of the steel sector, the complexity of the challenges and technologies, the long time period involved and the scale of investments are all arguments in favour of setting up a Clean Steel Partnership between public and private sectors to jointly develop, fund and implement breakthrough research and innovation agendas.</p> |
| Objectives and expected impacts | <p>This is one of the partnerships supporting Europe's industry in its progress towards high value added, low-carbon and pollutant emission and circular products and services, making increasing use of digitisation and smart products.</p> <p><i>Objectives:</i></p> <ul style="list-style-type: none"> • To answer to the challenge of European industrial competitiveness on the world-stage while facing climate change. • To be in line with the Energy Union objectives and the EU industrial strategy objectives - COM(2017)479 and COM(2016)155. • To reinforce the EU autonomy / security (cf. Defence). • To support the EU steel sector to reach the EU long-term targets aiming at 80-95% CO₂ reductions by 2050 and the reduction in CO₂ emissions target by 43% by 2030 compared to 2005 levels. • To upscale large R&I demonstrators and validate the feasibility of the clean steel technological pathways (e.g. Improving energy efficiency beyond the state-of-the art; New smelting reduction technologies; Direct reduction technologies, based on natural gas or on hydrogen; Direct use of electricity for iron ore reduction; Use of biomass in steel production; Recovery of surplus heat; More recycling of steel). • To set up the right Research and Innovation framework to develop key low-carbon technologies and to contribute to an incubator of demonstrative and pilot projects using carbon direct avoidance and smart carbon usage technologies; • To ensure that the uptake of breakthrough technologies by the steel industry remains compatible with the integrated approach to pollution prevention and control established in the Industrial Emissions Directive 2010/75; • To investigate application of digital solutions to steelmaking. <p><i>Expected impacts:</i></p> <ul style="list-style-type: none"> • Enhanced growth of innovative, clean and more competitive European industry with job creation and inclusiveness; • Increased leverage effect with other industries such as the hydrogen economy, the chemical industry, fossil free energy industries and technology providers in the transition to climate neutrality; • Better EU public health (less pollutant emissions resulting in cleaner air and water) and achievement of the EU GHG reduction targets. • Creation of new markets for renewable electricity and for hydrogen economy positive for people, for growth and for the planet: clean and carbon neutral steel, carbon capture and storage, secondary fuels by using CO₂, energy storage. |

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| Necessity test: rationale for a European Partnership | <p>A Clean Steel Partnership has been quoted in the EU in the Commission Communication ‘A renewed EU Industrial Policy’ - COM(2017)479. This Partnership is the most effective to build a critical mass to ensure breakthrough technology in the EU and keeping the industrial leadership in clean steelmaking.</p> <p>This Partnership will allow the EU industry to pool resources in an efficient-way towards a climate-neutral economy.</p> <p>The roll out of some clean technologies will begin in the second half of the 2020s. Research up to industrial scale demonstrator level activities needs for getting industrial-scale demonstrators with 80% CO2 reduction from steelmaking could be expected by 2030.</p> <p>This Partnership will contribute to the evolution to a programming approach in R&I in the steel sector towards a low carbon steelmaking agenda. Such Partnership will be based on the long-term commitment of the EU steel industry.</p> <p>Pan-European public and private investments of several billion Euros are needed to achieve the ambitious industrial and environmental objectives. The demonstration phase of these breakthrough technologies is essential in the initial phase. Neither a single company nor a single Member State can develop on their own the technological breakthroughs needed to drastically reduce CO2 emissions in the steel sector. Bringing down emissions from heavy industry to net-zero by 2050 will require costly new production processes and a 25-60% increase of capital investment. All these costs cannot be borne solely by the EU industries competing worldwide.</p> <p>The European Partnership would allow to get the whole steel industry on board, to cover different technological paths, to share risks among public and private actors and to give birth to a European sustainable re-industrialisation. There is a strong EU added value component in this partnership investing in a modernised and sustainable steel industry.</p> |
| Relevant for the following parts of Horizon Europe | <p>Pillar II 'Global Challenges and European Industrial Competitiveness'</p> <p><input type="checkbox"/> Cluster Health</p> <p><input type="checkbox"/> Cluster Culture, creativity and inclusive society</p> <p><input type="checkbox"/> Cluster Civil Security for Society</p> <p><input checked="" type="checkbox"/> Cluster Digital, Industry and Space</p> <p><input checked="" type="checkbox"/> Cluster Climate, Energy and Mobility</p> <p><input type="checkbox"/> Cluster Food, Bioeconomy Natural Resources, Agriculture and Environment</p> <p><input type="checkbox"/> Cross-cluster</p> <p><input type="checkbox"/> Pillar III ‘Innovative Europe’</p> |
| Currently identified links with other partnership candidates / Union programmes | <p>This Clean Steel Partnership will be largely funded by the European Coal and Steel Community in liquidation (ECSC i.l.) stemming from Protocol 37 of the EU Treaty and its interpretation by the Legal Service - ARES(2018)5746485.</p> <p>Links with other Partnerships currently identified are ‘Made in Europe’ and ‘Carbon neutral and circular industry’.</p> |
| Does the proposed partnership build on currently active ones? | No. |

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| Expected type and composition of partners | <ul style="list-style-type: none"> • EU steel sector has committed 1 Billion Euro to launch this initiative (see letter Eurofer to President Juncker of 25 September 2018 - Ares(2018)4938147) • Major steel companies: ThyssenKrupp Steel Europe, Voestalpine, ArcelorMittal, Salzgitter, TataSteel Europe, Outokumpu, Riva, Ruukki, SSAB, CELSA, SIDENOR, Tenaris and representing the European steel industry, Eurofer and ESTEP for R&I. • Steel research centres: AM Maizières Research (FR), BFI (DE), CRM (BE), CSM (IT), IMZ (PL), K1-MET (AT), SWEREA/MEFOS (SE). • Steel machines providers: Tenova, Danieli, Krupp. • Non Governmental Organisations representing trade unions (IndustryAll) and environmental interests (Green Growth Platform and European Climate Foundation). • Representatives from industry using steel, for e.g. applications for the automotive, defence, construction, space, energy and home appliances sectors. • Possibility to involve the EIB (cf. Innovation Fund) |
| Contributions and commitments expected from partners | <p>The two main sources of EU funding of the Clean Steel Partnership will be the synergies between:</p> <ul style="list-style-type: none"> • Part of the assets of the ECSC i.l. (cf. Protocol 37 of the EU Treaty, Council Decisions 2003/76 and 77 as well as 2008/376); • Contributions from Horizon Europe (Cluster ‘Digital, Industry and Space’ and Cluster Climate, Energy and Mobility). <p>The Innovation Fund (ETS) may be useful for the sequencing of funding towards commercialisation.</p> |
| Currently envisaged implementation mode(s). | <p><input checked="" type="checkbox"/> Co-programmed European Partnership</p> <p><input type="checkbox"/> Co-funded European Partnership</p> <p><input type="checkbox"/> Institutionalised European Partnership</p> <p><input type="checkbox"/> Article 185</p> <p><input type="checkbox"/> Article 187</p> <p><input type="checkbox"/> EIT-KIC</p> |
| Justification of the implementation mode | <p>The Co-programmed European Partnership is the most suitable implementation mode. It ensures in the same time the commitment by industry and the empowerment by Member States (cf. Programme Committee).</p> <p>The Co-programmed Partnership gives a certain flexibility and autonomy in the composition of the Partnership as well as a good control by the European Commission.</p> <p>The Co-programmed European Partnership stimulates healthy competition among technological pathss.</p> |
| Proposed starting year | 2021 |