

# European Union Industry and the Energy Transition

## EsadeGeo Event Brief February 2020

There is little doubt that meeting the Paris Agreement targets (that is, keeping increases in global average temperatures to well below 2°C above pre-industrial levels and pursuing efforts to limit temperature increases to 1.5°C above pre-industrial levels) will involve a race against time to achieve the mass transformation of our present-day energy systems. The EU has sought to establish itself at the forefront of efforts to meet these ambitious targets. Through its Green Deal communication of December 2019, the EU Commission laid out the crucial goal of transforming the Union into an economy with no net emissions of greenhouse gases by 2050.<sup>i</sup>

Reaching this ambitious target will require not only a shift at a societal level, but also the significant involvement of industry within the bloc. Currently, industry is responsible for 20% of total EU emissions.<sup>ii</sup> Adapting industry to meet the EU's climate change objectives will inevitably produce major challenges, including (1) transforming energy-intensive industries on a technological level, (2) maintaining industrial competitiveness, and (3) sustaining employment. Careful and precise policymaking with extensive involvement of all stakeholders will be vital in successfully addressing these challenges.

The following brief summarizes the main findings of an event held at the EsadeGeo Center for Geopolitics and Global Economy in February 2020, entitled [EU Industry and the Energy Transition](#). Speakers at the event addressed the following questions: How are energy transition policies affecting (heavy) industry in the EU today? What approaches can industries and policymakers take to tackle climate change while supporting employment and competitiveness in the EU? In sum: How can a successful energy transition coexist with a strong industry in the EU? For this brief, the speakers' insights were complemented with findings from the most recent literature on the topic.

## Technology

The vast majority of heavy industry within the EU is still dependent on emissions-intensive energy sources, presenting a significant challenge in the 'greening' of the industrial sector. This challenge is compounded by two distinct aspects: alternative technologies are often not yet available – or they are not yet available at scale; and when the technology is available, it is often expensive, cost-ineffective, or geographically mismatched with the locus of industrial production.<sup>iii,iv</sup>

The steel industry exemplifies this dilemma. Under the current proposals in the Green Deal, conventional CO<sub>2</sub>-emitting primary steel production must be phased out altogether by 2050 and no new investments in conventional blast furnaces should be made after 2030.<sup>v</sup> This cannot be achieved without a major shift in technology. Direct avoidance of carbon emissions (through energy efficiency measures, electrification based on renewable generation, or the use of hydrogen) will form one pillar in the transformation, but this alone is insufficient. Many experts note that if the EU is to reach its 2050 target of emissions neutrality, it will need to deploy carbon capture storage & usage (CCS/U) technology alongside hydrogen.<sup>vi</sup>

CCS/U holds the potential to accelerate the reduction of direct emissions from the burning of fossil fuels and energy-intensive industrial processes, as well as help to create negative emissions (in combination with bioenergy (BECCS)).<sup>vii</sup> Even though CCS/U was first deployed at commercial scale in 1972 (for enhanced oil recovery), it is currently at a mixed stage of maturity. Certain industries, such as steel production, coal-fired power and gas processing, have demonstrated CCS/U at scale, yet others, like the cement industry, lag behind. Moreover, the large-scale deployment of CCS/U faces many obstacles, including massive upfront costs and high operational costs, insufficient incentives, potential issues related to public perception,<sup>viii</sup> risks related to the coordination of investment decisions, and the danger of possible leakages.<sup>ix</sup> Owing to these challenges, many in the industry do not see it as a cost-effective solution to reducing emissions.<sup>x</sup>

Similarly, hydrogen has the potential to decarbonize a range of industries thanks to its versatility, storability and transportability (it can be transported by gas pipelines or in liquid form by ships, much like LNG).<sup>xi</sup> Currently, most of the hydrogen used in industrial production is so-called 'gray hydrogen', which is produced using fossil fuels, thus still resulting in significant carbon emissions. A smaller percentage is produced using fossil fuels in combination with CCS/U technology, thereby reducing overall emissions: this is known as 'blue hydrogen'. The solution with the highest potential for decarbonization is 'green hydrogen': hydrogen generated using 100% renewable energy sources. Like CCS/U, however, green hydrogen poses problems in terms of its costs. With gray hydrogen still far cheaper, industries currently see little incentive to make the switch.<sup>xii</sup> Additionally, there is a mismatch between the geographical locations where EU renewable power sources are based vis-à-vis regions where heavy industry is located.<sup>xiii</sup>

Energy-intensive industries are studying all available technological options. The members of the European Steel Association (EUROFER), for example, plan to reduce CO<sub>2</sub> emissions from EU steel production by 30% by 2030 and by 80-95% by 2050 by increasing the use of hydrogen and alternative renewable technologies, boosting domestic recycling of scrap steel, improving the energy-intensity of furnaces, and applying CCS/U technology.<sup>xiv</sup> In order to decrease its emissions, the steel industry has signaled a need for increased R&D funding, more renewable energy infrastructure near to or connected to industrial regions, and dedicated strategies to advance hydrogen technology.

The further development of the EU's Emissions Trading Scheme could also be a stepping stone to increased R&D in and the application of these new technologies. A higher emissions price would make CCS/U and green hydrogen more competitive with older technologies and less green versions of themselves.

## Competitiveness

The aim of the Green Deal is not just to reduce emissions but to serve as an impetus for growth – in fact, the Green Deal has been presented as the EU's new growth strategy. In 2015, the total aggregate production value of the EU's energy-intensive industries stood at nearly 1.3 trillion euro with a gross value added of 378 billion euro.<sup>xv</sup> For economic reasons, therefore, the Green Deal will need to take account of the global competitiveness of EU industry to ensure that decarbonization does not lead to deindustrialization. High electricity prices are signaled by industry as a threat to competitiveness,<sup>xvi</sup> as is 'carbon leakage': the movement of industry away from areas where strong legislation exists to tackle emissions to locations where regulation is less stringent.

EUROFER notes that the EU consumed as many finished products in 2018 as it did in 2005, yet over that same period, the Union's domestic crude steel production decreased by 14%, the market share of imported finished products increased by more than 80%, and the share of scrap steel exported from the EU increased by more than 95%.<sup>xvii</sup> The association argues that this has translated to leakage of jobs, production and investment, as well as to increased emissions worldwide, as steel imported into the EU typically has a significantly higher CO<sub>2</sub> footprint than that produced in the EU.

Designing policies to maintain competitiveness in hard-to-abate industries while meeting the EU's climate objectives is highly challenging. An idea put forward is the introduction of 'eco-innovation credits' for green-steel in downstream sectors such as the EU automotive industry to encourage the use of green-steel over foreign competitors.<sup>xviii</sup> However,

the most innovative and comprehensive measure currently under consideration is a carbon border adjustment mechanism.

This policy is based on the understanding that carbon leakage will remain a risk as long as international partners do not share the EU's climate ambition. A carbon border adjustment mechanism would seek to add tariffs on external goods depending on how much carbon has been used in their production, thereby reducing the incentives for businesses to relocate industry abroad to circumnavigate carbon pricing policies and levelling the playing field globally. Nevertheless, this tactic does not come without risk, given it could be open to interpretation as protectionism and lead to retaliatory tariffs by external actors on EU goods. The Commission is currently working on WTO-compliant proposals for the mechanism, which it will unveil in 2021 (see also policy table below).

## Employment

The coming energy transition will have a large impact on certain sectors of the economy, and by proxy, on employment in those sectors. Nearly a quarter (24%) of the EU's workforce, for example, is linked to industry (either directly or indirectly);<sup>xxix</sup> and industry accounts for 80% of the EU's goods exports.<sup>xx</sup> Preserving industrial employment (which is related to the competitiveness challenge outlined above), establishing new industries and providing for the upskilling of workers will be critical. This is especially the case where an industry cannot be 'greened', as is the case for coal mining, which currently employs 237,000 people over 108 EU regions.<sup>xxi</sup>

A key aspect of the announcement of the EU's Green Deal, therefore, was its commitment to a 'Just Transition'. The Just Transition concept can be defined as the introduction of measures designed to ensure that neither people employed in carbon-intensive industries nor regions which depend heavily on them for their local economy are left behind by the energy transition.<sup>xxii</sup>

Under the Green Deal, funding for such measures is expected to be delivered via a direct Just Transition Fund provided by the EU budget, a dedicated scheme via InvestEU, and through the European Investment Bank.<sup>xxiii</sup> So far, the reception of the Green Deal by trade unions has been largely constructive: they recognize that while the energy transition may involve significant challenges for industrial workers, the price of non-engagement with the energy transition is significantly worse.<sup>xxiv</sup> The International Trade Union Confederation (ITUC), for instance, has indicated its willingness to work alongside the EU to ensure that the transition not only works to cut emissions to zero and boost economic growth, but also to eliminate poverty, ensure that new jobs are created and are of decent quality, and make sure communities are given a voice in the adoption of new policies.<sup>xxv</sup>

## Final Thoughts

The EU has set an ambitious objective: to become the first carbon-neutral continent in the world. Doing so while simultaneously maintaining strong energy-intensive industries in the EU will pose various challenges, three of which have been examined in this brief. As policymaking progresses, it will be critical to continue involving all stakeholders in the discussions in order to encourage the adoption of new technologies, maintain industrial competitiveness, and sustain employment. The Industrial Forum proposed in the EU's new Industrial Strategy may provide a fruitful space for this dialogue.

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## Annex: Industry-relevant energy transition policies currently under development in the EU

Policy	Stage of development
<b>European Green Deal</b>	The <a href="#">European Green Deal</a> was first presented on December 11, 2019. It sets climate and environmental-related challenges as this generation's defining task and formulates a new growth strategy to transform the EU's society and economy in order to achieve net zero greenhouse gas emissions in 2050. An <a href="#">annex</a> to the deal contains a roadmap of the key actions (policy proposals and strategies) that will fall under the Green Deal, along with an indicative timetable for each of these elements. Some of those elements are already underway – they are detailed in the boxes below.
<b>Climate Law</b>	A <a href="#">European 'Climate Law'</a> was proposed by the Commission in the first week of March 2020 in order to write into law the European Green Deal goal of making Europe's economy and society climate-neutral by 2050. The 2030 emissions reductions target, however, was not finalized under the proposed regulation: the Commission will undertake an impact assessment and amend the regulation to reflect the ultimate outcome (40%, 50% or 55% emissions reductions by 2030). The proposal is now open to feedback, and it will need to go through Parliament and Council before taking its final form and being adopted.
<b>Carbon border adjustment mechanism</b>	The Commission initiated an <a href="#">inception impact assessment</a> for a carbon border adjustment mechanism to reduce the risk of carbon leakage on March 4, 2020. A public consultation is planned for the third quarter of 2020, and a proposal for a directive is planned for the second quarter of 2021. Various policy options are currently on the table, meaning that the shape of the mechanism is not yet clear, though the Commission has stressed that it will be fully WTO-compatible.
<b>Just Transition Mechanism</b>	The European Commission proposed the <a href="#">Just Transition Mechanism</a> on January 14, 2020 to support territories facing serious socio-economic challenges from the transition towards climate neutrality. The objective is to raise €100 billion in Just Transition Mechanism financing for the 2021-2027 period, through three pillars: (1) a Just Transition Fund containing €7.5 billion in 'fresh money' and triggering between €30 and 50 billion in investments; (2) the use of a section of the InvestEU scheme to mobilise €45 billion of investment; and (3) a new public sector loan facility at the EIB, partially backed by the EU budget, to mobilize a further €25-30 billion of investments. In February 2020, the areas which would be eligible for funding were revealed through the Commission's European Semester <a href="#">country reports</a> . Full details on how the money will be spent in these areas remain under development. As part of its coronavirus response, the Commission is now proposing to further <a href="#">top up</a> the Just Transition Fund with an additional €2.5 billion under the next long-term EU budget and €30 billion under the Next Generation EU instrument.
<b>European Industrial Strategy</b>	The new <a href="#">European Industrial Strategy</a> – a framing document to link together different policies and initiatives – was released by the Commission on March 10, 2020. One of its major aims is to integrate the EU Green Deal (in particular, its goal of climate neutrality) with the bloc's industrial policy. The document contains a raft of measures to address this nexus, including the creation of a 'European Clean Hydrogen Alliance' which will seek to replicate the success of the Battery Alliance, as well as additional alliances for low-carbon industries, industrial clouds and raw materials. The Commission has also proposed holding discussions within an "Industrial Forum" including representatives from industry, SMEs, big companies, social partners, researchers and institutions from member states and the EU.
<b>Circular Economy Action Plan</b>	A new <a href="#">Circular Economy Action Plan</a> was published by the Commission on March 11, 2020. The plan is aimed primarily at manufacturing and calls for the scaling up of the amount of plastic and metals that are recycled in the EU as well as reducing waste and reusing materials even before the recycling stage.

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- i European Commission. 2019.
- ii European Commission. 2019 : 7.
- iii Hermwille, L *et al.*, 2019 : 4.
- iv Khandekar G & Wyns, T, 2019: 330.
- v Hermwille, L *et al.* 2019 : 4.
- vi EUROFER Presentation.
- vii Sognaes, I & Peters, G. 2020.
- viii Arning et al. 2019.; Ashworth et al. 2015.; L'Orange Seigo et al. 2014.; Huijts et al. 2007.; de Coninck. 2019.
- ix EsadeGeo Event Brief. 2019: 2-3.
- x Global CCS Institute. 2018.
- xi Leeuwen, J. 2019.
- xii Hulst, N. 2019.
- xiii AEGE Presentation.
- xiv EUROFER Presentation.
- xv Wyns T & Khandekar G, 2019: 326.
- xvi AEGE Presentation.
- xvii EUROFER Presentation.
- xviii EUROFER Presentation.
- xix World Bank. 2019.
- xx European Commission, 2020a.
- xxi European Commission, 2020b: 2.
- xxii In the definition of the International Trade Union Confederation, the Just Transition concept additionally covers the impacts of the climate emergency on workers, their families and communities (ITUC Presentation).
- xxiii EUROFER Presentation.
- xxiv ITUC Presentation.
- xxv ITUC Presentation.

## References:

- Arning, K, Offermann-van Heek, J, Linzenich, A, Kaetelhoen, A, Sternberg, A, Bardow, A & Ziefle, M. (2019). Same or different? Insights on public perception and acceptance of carbon capture and storage or utilization in Germany. *Energy Policy* 125, 235-249.
- Ashworth, P, Wade, S, Reiner, D, & Liang X. (2015). Developments in public communications on CCS. *International Journal of Greenhouse Gas Control*, 40, 449–458.
- de Coninck, H. (2019). *What can the IPCC Special Report on Global Warming of 1.5°C tell us about a CCS and CCU agenda for Europe?* Retrieved from CEPS website: <https://www.ceps.eu/what-can-the-ipcc-special-report-on-global-warming-of-1-5c/>
- EsadeGeo. (2019, May). *Event brief: Decarbonizing the energy sector and industry: The role of CC(U)S*. Retrieved from <https://www.esade.edu/itemsweb/research/esadegeo/201905ESADEgeoCCSEventBrief.pdf>
- European Commission. (2019). *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions – The European Green Deal*. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN>
- European Commission. (2020a). *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions – A New Industrial Strategy for Europe*. Retrieved from [https://ec.europa.eu/info/sites/info/files/communication-eu-industrial-strategy-march-2020\\_en.pdf](https://ec.europa.eu/info/sites/info/files/communication-eu-industrial-strategy-march-2020_en.pdf)
- European Commission. (2020b). *Proposal for a regulation of the European Parliament and of the Council – establishing the Just Transition Fund*. Retrieved from [https://ec.europa.eu/commission/presscorner/api/files/attachment/860470/Proposal%20for%20a%20regulation%20establishing%20the%20Just%20Transition%20Fund%20and%20annexes\\_EN.pdf.pdf](https://ec.europa.eu/commission/presscorner/api/files/attachment/860470/Proposal%20for%20a%20regulation%20establishing%20the%20Just%20Transition%20Fund%20and%20annexes_EN.pdf.pdf)
- Global CCS Institute. (2018). *The global status of CCS: 2018*. Retrieved from <https://www.globalccsinstitute.com/resources/global-status-report/>
- Hermwille, L. et al. (2019, November). Policy paper: Putting industrial transformation at the heart of the European Green Deal. Retrieved from COP21 RIPPLES Consortium website: <https://www.iddri.org/sites/default/files/PDF/Publications/Catalogue%20Iddri/Rapport/RIPPLES%20industry%20green%20deal.pdf>
- Huijts, N, Midden, C J H & Meijnders, A L. (2007). Social acceptance of carbon dioxide storage. *Energy Policy* 35(5), 2780–2789.

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- Hulst, N. (2019). *The clean hydrogen future has already begun*. Retrieved from <https://www.iea.org/commentaries/the-clean-hydrogen-future-has-already-begun>
- L'Orange Seigo, S, Dohle, S & Siegrist, M. (2014). Public perception of carbon capture and storage (CCS): A review. *Renewable and Sustainable Energy Reviews* 38, 848–863.
- Morgan, S. (2020, February 27). Commission lists regions ripe for just transition cash. *Euractiv*. Retrieved from <https://www.euractiv.com/section/climate-environment/news/commission-lists-regions-ripe-for-just-transition-cash/>
- Sognaes, I & Peters, G. (2020). *Carbon capture and storage is necessary to keep global warming below 2°C*. Retrieved from <https://cicero.oslo.no/no/posts/nyheter/carbon-capture-and-storage-is-necessary-to-keep-global-warming-below-2c>
- van Leeuwen, J. (2019). *CIEP paper: Vol. 1. International approaches to clean molecules: Five cases on hydrogen*. Retrieved from Clingendael International Energy Programme website: [https://www.clingendaelenergy.com/inc/upload/files/CIEP\\_Paper\\_2019-01.pdf](https://www.clingendaelenergy.com/inc/upload/files/CIEP_Paper_2019-01.pdf)
- World Bank. (2019). *Data – Employment in Industry*. Retrieved from [https://data.worldbank.org/indicator/SL.IND.EMPL.ZS?name\\_desc=false](https://data.worldbank.org/indicator/SL.IND.EMPL.ZS?name_desc=false)
- Wyns, T & Khandekar G. (2019). Industrial Climate Neutrality in the EU: Outline of an Integrated Industrial Green Deal. *Intereconomics* 54, 325–332.