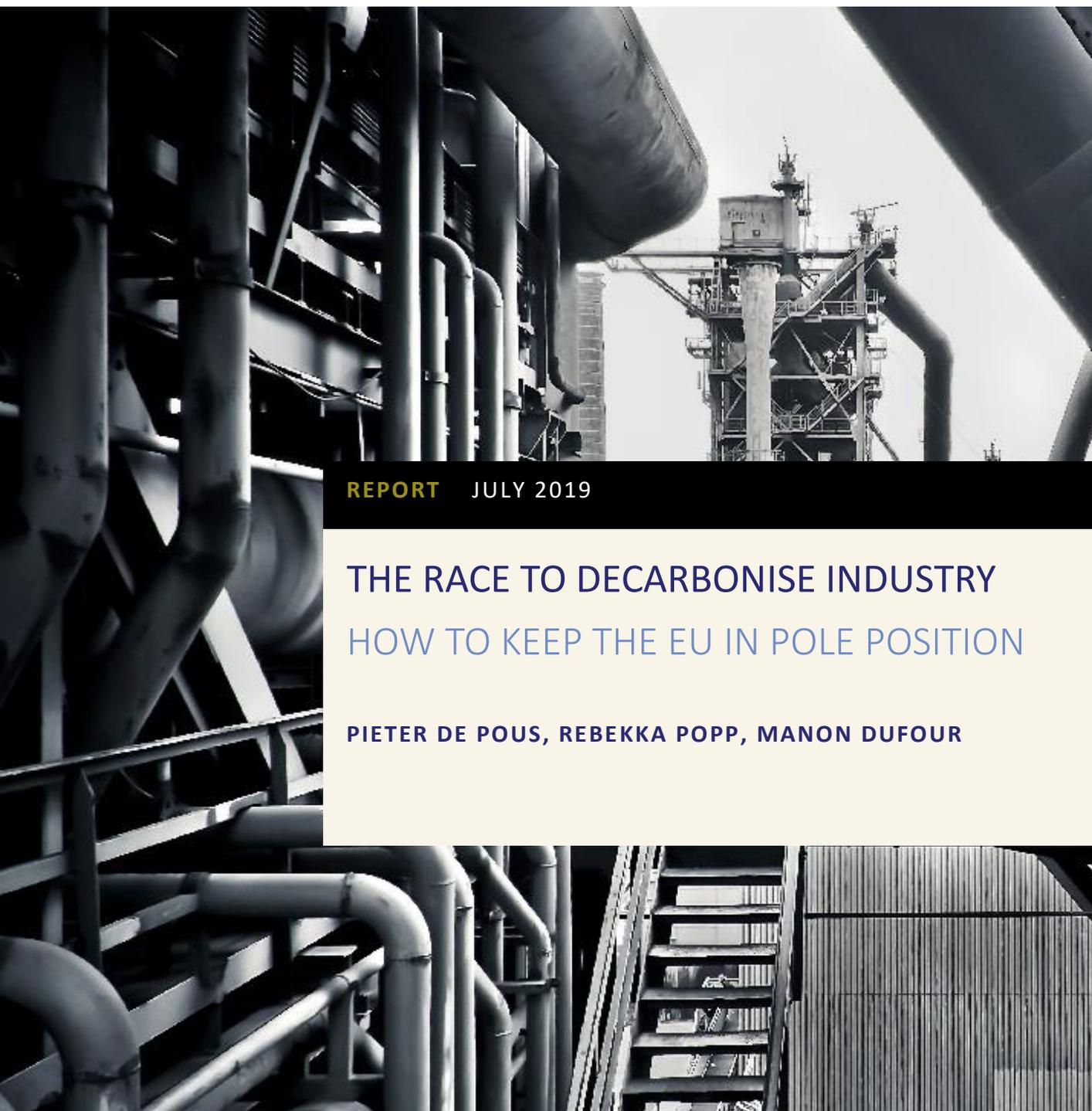




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TOWARDS A CLIMATE-NEUTRAL EU BY 2050
AN E3G SERIES



REPORT JULY 2019

THE RACE TO DECARBONISE INDUSTRY HOW TO KEEP THE EU IN POLE POSITION

PIETER DE POUS, REBEKKA POPP, MANON DUFOUR



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About E3G

E3G is an independent climate change think tank accelerating the transition to a climate safe world. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere. In 2018, for the third year running, E3G was ranked the fifth most globally influential environmental think tank.

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EXECUTIVE SUMMARY

Industrial policy is back *en vogue* in Europe and likely to become a major political priority for the incoming European Commission. With this report, E3G aims to inform the new Commission and European Parliament as well as the 2019 EU industrial strategy on what is needed to modernize European industry in line with our climate objectives.

The report demonstrates that, despite some progress made, the industrial policy debate is insufficiently linked up to European and global decarbonisation efforts, putting Europe at risk of missing opportunities as well as systematically underestimating climate risk for example to supply chains. In fact, the current debate is primarily focused on competition from high carbon industry, making Europe's industry numb to the very price signals that could help it plan towards a carbon neutral way of manufacturing. EU industry needs to get ahead of the competition on low carbon manufacturing, powered by cheap renewables and storage.

In order to modernise its industry, the EU needs to align the renewal of its industrial policy with Europe's vision for climate neutrality. To answer the pressing need to decarbonise and reduce climate risks, it also needs to harness the benefits of disruptive change from technological advancement in artificial intelligence, digitalisation and 3D printing.

The social impacts of this transition will be fundamentally different from those of phasing out coal and other fossil fuels. These sectors and its jobs will disappear completely, whereas industry has a key role in a net zero economy. As it needs to link its transition to the broader developments in automation and digitalization, the Just Transition of industry will need to be embedded in broader efforts to restore and modernise Europe's social contract. At the EU level, this means strengthening skills development programmes and reforming the social dialogue structure to start addressing climate risk and low carbon growth opportunities.

Getting to net zero will require significant up-front investment. This investment will need to come from a reformed EU budget as well as private finance. Firstly, agreeing to an EU budget later this year that ensures at least 40% climate spending, climate proofing and exclusion of fossil fuels in all spending programmes will be key to supporting the industrial transformation. Secondly, the next Commission will need to continue and expand the work it has done on Sustainable Finance, most notably on the new taxonomy to help guide investors to environmentally sustainable activities and new disclosure rules. The rules on corporate reporting will need to be updated by the new Commission in order to enhance transparency on sustainability information, including corporate low carbon strategies.

In order to respond to the growing recognition of the climate emergency and the need to quickly transition to a zero carbon economy, the European Commission's



structures need to be made fit for purpose. Firstly, fundamental to this will be appointing a Vice President for low carbon competitiveness, industry and circular economy. She/he should be reporting to a first Vice President for Sustainable Development who will ensure the new industrial strategy puts the EU firmly on track to reducing its emissions to net zero well before 2050.

Secondly, a new Inter-Institutional Agreement on Sustainable Development, the Rule of Law and Fundamental Rights should be agreed upon. This will ensure a coherent approach between the three EU Institutions and the development of the necessary new instruments to deliver. This should be supported by the creation of a new Clean Economy Observatory which will ensure all EU policies align with the net zero goal.



Figure 1: 5 Key asks for the new European Commission for a renewed EU industrial policy



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INTRODUCTION

With its strategic vision **A Clean Planet for All**, the European Commission has demonstrated that moving to net zero emissions by 2050 is the best chance Europe has to protect its citizens and their prosperity.¹ Reducing emissions to net zero by 2050 will require deep decarbonisation of the European industry sector, in particular the energy intensive industry. The energy intensive industry is responsible for 14% of the EU's total CO₂ emissions.² Its products are widely used and will continue to play a significant role in the zero carbon economy as the energy intensive industry enables solutions like electric vehicles, wind turbines, solar photovoltaics and battery storage.

This deep decarbonisation will take place at a time when manufacturing is facing disruption from technological advancements in artificial intelligence, digitalisation and 3D printing. Therefore, the challenge which the EU is facing goes well beyond switching from fossil to clean, but also the need to help build a decarbonised, new industry that will benefit from these wider disruptions and become part of a new social contract. The long-term vision for the EU's industrial future that the Commission is tasked to present by the end of 2019 is an opportunity to rise to this challenge.³

The mandate for European-level action on industry is particularly strong when it comes to maintaining global EU leadership in low carbon growth through increased climate and clean, efficient energy ambition, defining and upholding global rules for competitive European industries, developing a single market fit for climate neutral heavy industries, supporting innovation through European funding, providing access to relevant data and ensuring cross-border coordination and best practice exchanges.

This report intends to inform the positioning of the new Commission on EU industrial policy as well as the presentation of the draft industrial strategy by the end of 2019. It outlines how the EU can link different policy fields in order to create a modern, competitive and sustainable European heavy industry. To this aim, the first two sections give an overview of the state of play of current discussions on EU industrial policy as well as relevant European industrial actors and their position in the race to decarbonisation. Against this background, the next section develops an enhanced understanding of the global competition challenges the EU currently faces. Hereafter, we suggest how the EU can embed the industrial transformation in broader efforts to restore and modernise Europe's social contract and outline how to finance the industrial transformation. Based on this analysis, the final section makes specific suggestions for how to adjust European governance in order to enable the EU to

¹ European Commission (2018) **2050 Long-term Strategy**

² Material Economics (2019) **Industrial Transformation 2050 – Pathways to Net-zero Emissions from EU Heavy Industry**

³ In March 2019, the **European Council** invited the Commission to present by the end of 2019 “a long-term vision for the EU's industrial future, with concrete measures to implement it”.



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develop an adequate response to the need to transition fast to a zero carbon economy.

STATE OF PLAY

Industrial policy debate in the past has been mostly about how to preserve or restore a status quo. This was for example the logic behind an old EU goal of the European industry contributing 20% to the EU's GDP by 2020, or behind most efforts to avoid industry moving to other parts of the world where production costs are lower. The disruptive effect of new technologies, climate impacts and the pressing need to radically reduce emissions however means that EU industrial debate needs to be modernised as much as the industry itself, if industry is to have a future in the EU.

And whereas the debate on the implications of technological change and disruption is starting to take place, for example on the future of work, the role of humans versus machines in production processes, or the implications of 3D printing for the role of consumers or production locations, the debate on the decarbonisation of industry is still mostly focussed on options to decarbonise production processes as they are today. Ensuring a sustainable future for industry in the EU will however require these developments to be analysed and debated much more coherently.

Irrespective of the question on the role, nature and relative importance of energy intensive manufacturing in tomorrow's industrial landscape, the debate on decarbonising these sectors has made significant progress over the last years.

The technological solutions and policy ideas needed to drive the transition towards a climate neutral industry are broadly available, but their deployment needs not only a well-designed policy framework to support transformational change but also the right political context to adopt that framework.

With regard to technological feasibility, Material Economics' study **Industrial Transformation 2050 – Pathways to Net-zero Emissions from EU Heavy Industry** charts possible decarbonisation pathways for steel, plastics, chemicals and cement production and finds that a net zero heavy industry is technically possible by 2050. This depends, however, on the right policy framework, a 25-60% increase in industrial investment as well as additional investments in other parts of the economy, such as EUR 5-8 billion per year in electricity generation.⁴ Improved materials use and reuse, rapid development and deployment of new industrial production processes and an expansion of renewable energy technologies are key for enabling deep emissions reductions. Carbon Capture and Storage/Utilisation (CCS/U) is also required to varying degrees in the pathways explored but only in very particular circumstances. In the report **The Circular Economy – a Powerful Force for Climate Mitigation**, Material Economics analyses the role of circular economy measures in contributing to

⁴ Material Economics (2019) **Industrial Transformation 2050 – Pathways to Net-zero Emissions from EU Heavy Industry**



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emissions reductions in the heavy industry in greater detail. It finds that demand-side measures can abate more than half of all emissions from the steel, plastics, aluminium and cement industry by 2050, and are often economically attractive.⁵

Similarly, very specific policy ideas for a European industrial strategy compatible with climate neutrality by 2050 exist. Based on Material Economics' sectoral decarbonisation pathways, the Institute for European Studies at the Vrije Universiteit Brussel explores in their study **Industrial Transformation 2050 – Towards an Industrial Strategy for a Climate Neutral Europe** (to which E3G contributed) which European policies are best suited to achieve a climate neutral industry.⁶ It identifies as key elements of a renewed European industrial strategy support for innovation and the scale-up of new low carbon production processes and uses of materials, a combination of standards, regulations, fiscal measures to foster the uptake of circular economy principles, the creation of competitive lead-markets for low carbon solutions as well as the alignment of the energy and industry transition including the development of adequate infrastructure for hydrogen and CO₂. Importantly, as the transition hinges on higher levels of investment by basic material producers, the authors emphasise that the market and regulatory environment needs to ensure that these can be made with acceptable risk levels and avoid the lock-in of high carbon pathways.

A modernization of Europe's industrial landscape also requires taking climate risks into account. Europe is already facing wide-ranging climate-induced impacts such as heatwaves, droughts, wildfires, storms and floods, with direct and indirect effects on ecosystems, the economy as well as human health and well-being in Europe. Weather and climate-related extreme events caused on average annual losses around €13 billion between 2010 and 2017 in the countries of the European Economic Area⁷ and these impacts will amplify with a further increase in global mean temperature⁸, affecting industrial operations. According to a recent study by CDP, 215 of the largest companies globally estimate that **climate risks will lead to costs of one trillion dollars**.⁹ For example, traditional transport routes for inputs and outputs to industrial regions, such as the Rhine, are already becoming less reliable.

A transformation of the European industrial sectors will offer new opportunities to tap into zero carbon growth markets. For example, CDP's report recently showed that the world's biggest companies expect that **producing climate friendly products and services will lead to profits of \$2.1 trillion**.¹⁰ However, for the EU to remain in the

⁵ Material Economics (2018) **The Circular Economy – A Powerful Force for Climate Mitigation**

⁶ Institute for European Studies (2019) **Industrial Transformation 2050 – Towards an Industrial Strategy for a Climate Neutral Europe**

⁷ European Environment Agency (2019) **Economic Losses from Climate-Related Extremes**

⁸ Joint Research Centre (2018) **PESETA**

⁹ CDP (2019) **Global Climate Change Analysis 2018**

¹⁰ CDP (2019) **Global Climate Change Analysis 2018**



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game the transformation will have to happen fast and require prompt implementation of the appropriate policies.

Yet, there is limited awareness among European decision-makers of the benefits from becoming a leading zero carbon industry. Current debates at the European and national level focus on the right balance between openness and protectionism in international trade relations as the EU seeks a response to increased global competition. This resurgence in the industrial policy debate was partly triggered by the **European Commission's decision to prohibit German Siemens' acquisition of the French railway company Alstom** in February 2019¹¹ and has provoked France and Germany to issue a joint **manifesto** which sets out suggestions for a European industrial policy protecting and promoting the creation of 'European champions'.¹² The two countries request, among others, a revision of European competition rules, including a right of appeal of the Council which could ultimately override Commission decisions in this regard. Similarly, the **German National Industry Strategy 2030** released in February 2019 considers state intervention necessary to protect key industries¹³ but this has been met with criticism by industry associations and **prompted the largest German industry association to release its own strategy for the German industry**.¹⁴ Neither the Franco-German manifesto nor the German industry strategy recognize the need to align the development of a European industrial strategy with a climate neutral EU. In fact, in the German industry strategy climate policy is not addressed at all.

The **EU Strategic Agenda** as adopted by European heads of state and government in June 2019 foresees a new industrial strategy, again, however, without addressing the central role decarbonisation plays in such an endeavour, except for a general reference to unprecedented global sustainability challenges.¹⁵

MAPPING INDUSTRY ACTORS IN THE EU

Industry constitutes the largest economic activity in the EU and with 36 million direct jobs it is one of the main employers in most Member States.¹⁶ *Figure 2* gives an overview of employment in selected sectors of the energy intensive industry and their location. While it becomes clear that a large number of jobs will be affected by the

¹¹ European Commission (2019) **Mergers: Commission Prohibits Siemens' Proposed Acquisition of Alstom**

¹² Federal Ministry for Economic Affairs and Energy (2019) **A Franco-German Manifesto for a European Industrial Policy Fit for the 21st Century**

¹³ Federal Ministry for Economic Affairs and Energy (2019) **National Industry Strategy 2030**

¹⁴ BDI (2019) **Deutsche Industriepolitik: Zum Entwurf der Nationalen Industriestrategie 2030** (in German)

¹⁵ European Council (2019) **European Council Conclusions, 20 June 2019**

¹⁶ European Commission (2017) **New Industrial Policy Strategy**



modernisation of industry, a more granular understanding of the effects is required, through for example sectoral decarbonisation pathways. Furthermore, many regions that depend on energy intensive industries for employment are located in Central and Eastern Europe (CEE). Industry is the main employer in the Czech Republic, Poland and Slovenia.¹⁷ Therefore, it is crucial to ensure that zero carbon business also grows in this region. Opportunities include innovation hubs on efficiency equipment or batteries as well as large scale renewable projects in the regions that help attract local manufacturing. In addition, transition super-labs could encourage testing systemic innovation for the transition to a fully decarbonised economy at scale in locations where particularly difficult transition efforts will be required, such as in heavy industrial and coal regions.

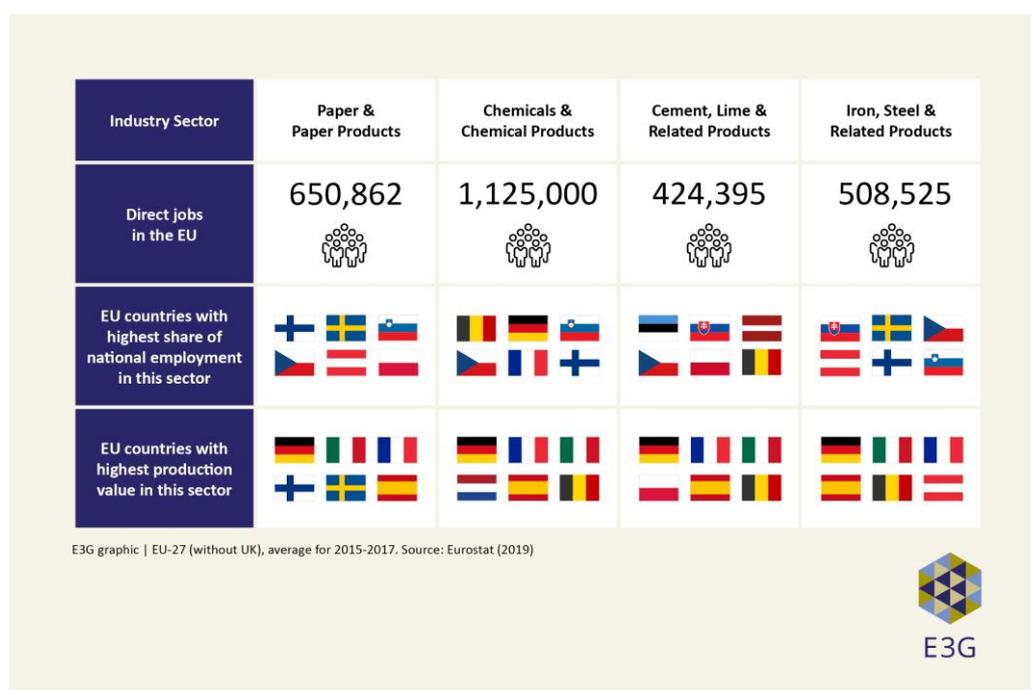


Figure 2: Overview of selected EU heavy industry sectors

With regards to global primary production of energy intensive industrial products and their consumption and, thus, future growth prospects, the largest share takes place in Asia, especially in China. Production and consumption in Asia are expected to further increase. For instance, the chemical industry China currently owns almost 40% of

¹⁷ Eurostat (2017) **Which Sector Is the Main Employer in the EU Member States?**



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global sales and this share is expected to increase to 50% in 2030.¹⁸ Europe continues to constitute an important regional hub for energy intensive industries. For example, while 70% of crude steel production is located in Asia, Europe produces 20% of the global share.¹⁹ However, many industry sectors, such as cement, steel or glass, saw large decreases in production and employment due to financial crisis in 2008 but are slowly recovering.

Some energy intensive industries already see decarbonisation policies align with investing in their competitiveness and have committed to climate action or changing their business models. For example, chemical company **BASF will begin its first battery materials production** in Finland.²⁰ Swedish steel manufacturer SSAB and mining company LKAB have teamed up with the utility Vattenfall to **pilot a steel plant fuelled with hydrogen** from renewable energy sources in order to enable a carbon-free steel industry by 2035.²¹ German ThyssenKrupp declared it would **shift investments to make its steel production carbon-neutral by 2050**, including an end to burn coking coal and potentially replace it with hydrogen given adequate supply.²² Similarly, the world's fourth largest cement company, and the first in the sector, **HeidelbergCement pledged to produce carbon neutral cement by 2050**.²³ While these announcements are a welcome push for a modernized, climate-friendly industry, it often remains unclear which measures the commitments entail and how they will be reached.

European companies using basic materials are also beginning to integrate climate action into their business practices. For instance, German car manufacturer **Volkswagen plans an internal carbon levy** for the use of electricity, heat and fuel as well as compensation for carbon pollution from flights, with the aim of becoming carbon neutral by 2050.²⁴ Furthermore, its first electric car, which is expected to go into production at the end of the year, is planned to be carbon neutral throughout its entire life cycle. Mercedes-Benz producing **Daimler aims to have a carbon neutral new passenger car fleet by 2039**. The company pledged to reach climate neutral production in all European factories by 2022 using renewable energy sources and purchasing emissions certificates. In contrast to other car manufacturers, Daimler also plans to extend its climate action to its supply chain and establish CO₂ targets as a key

¹⁸ CEFIC (2019) **European Chemical Industry Facts and Figures 2018**

¹⁹ EUROFER (2018) **European Steel in Figures 2018**

²⁰ BASF (2018) **BASF and Nornickel Join Forces to Supply the Battery Materials Market**

²¹ SSAB (n.d.) **HYBRIT – Toward Fossil-free Steel**

²² Handelsblatt (2019) **ThyssenKrupp Steels itself for a Carbon-free Future**

²³ Climate Home News (2019) **Cement Giant Heidelberg Pledges Carbon Neutral Concrete by 2050**

²⁴ Clean Energy Wire (2019) **VW Plans Internal Carbon Levy and Carbon-neutral Electric Car Production**



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criterion in making supplier decisions.²⁵ This would be a logical next step for auto manufacturers and other companies to increasingly decarbonise their supply chains.

There is a misalignment between companies' climate targets, as well as their political clout, and the strategic lobbying and clout of their big-tent trade groups in Brussels. **InfluenceMap** observes that auto trade group ACEA, energy intensive industry associations as well as the cross-sector group BusinessEurope engaged in negative lobbying on ambitious climate policy in the EU since 2015.²⁶

In response to the Commission's strategic climate vision, some groups have shifted towards moderately positive positions on climate ambition in 2018.²⁷ In order to engage with the process the trade groups representing sectors like refining, steel, metals and cement presented their own low carbon pathway studies which suggest potential emissions reduction contributions from their respective sectors. In addition, many industry associations and trade unions have publicly spoken out in favour of the Commission's strategic long-term climate vision, although not all support the target of climate neutrality by 2050. For instance, EU Aluminium, Fertilisers Europe, the German Association of the Chemical Industry (VCI), the European Chemical Industry Council (CEFIC), BusinessEurope, Glass for Europe, CEMBURAU, the Confederation of European Paper Industries (CEPI) and the International Lead Association have raised support for the Commission's vision. However, InfluenceMap notes that many of these positive statements have been attached to warnings of the economic consequences of stringent climate policy and are used to demand increased protection.²⁸ In April 2019, more than fifty **EU corporations explicitly called for the EU to achieve climate neutrality by 2050**.²⁹ In contrast, associations such as Eurofer, EU Metal ACEA and the German Industry Association BDI are rather cautious.³⁰

On the side of energy suppliers the transformation of Eurelectric, the influential lobby of the power industry, from a conservative trade body to an outspoken advocate of ambitious decarbonisation goals as well as economy wide electrification shows how this industry is preparing to reposition itself strategically in the European energy market to become the dominant supplier, with little room left for coal, oil and gas.³¹

The voice of Europe's progressive companies from the energy intensive industry will be key over the next months in supporting the implementation of a policy framework that will guide the decarbonisation of their industry. Firstly, they need to make the

²⁵ Daimler (2019) **Ambition2039: Our Path to Sustainable Mobility**

²⁶ InfluenceMap (2019) **The EU's Climate Ambition: Who's on Board (and Who's Not)**

²⁷ InfluenceMap (2019) **The EU's Climate Ambition: Who's on Board (and Who's Not)**

²⁸ InfluenceMap (2019) **The EU's Climate Ambition: Who's on Board (and Who's Not)**

²⁹ Corporate Leaders Group (2019) **Business Leaders Urge EU Heads of State to Signal new Economic Direction towards Net Zero by 2050**

³⁰ See also InfluenceMap's report (2019) **The EU's Climate Ambition: Who's on Board (and Who's Not)** for an overview of positions.

³¹ Eurelectric (2019) **Policy Asks & Deliverables**



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case that increasing EU climate ambition will support European competitiveness and jobs in the global clean economy transition. Secondly, they need to put this as a growth agenda at the top of the European Commission's priorities. There exist already several coalitions of progressive industry actors active at the EU level, such as the Corporate Leaders Group or the We Mean Business Coalition, which would benefit from, for instance, large energy users joining their membership to foster these aims.

RESPONDING TO INTERNATIONAL COMPETITION

As outlined above, international competition has been a major driver of the current debate on industrial policy. This has been dominated by concerns about competition from heavy industry in other countries which are not committed to decarbonise as fast as the EU.³² And it has always led to significant parts of European heavy industry benefiting from generous exemptions, free ETS allowances and preferential tax treatment, followed by calls for border tax adjustments.³³

This debate has however neglected another, and in the long term, much more significant development: Countries are catching up or getting ahead of the EU in low carbon growth markets. **A paper by German Industry Association BDI on China** for example which sets out the EU-China relationship as one of a competition of political and socio-economic systems, is primarily concerned with the risk of Europe falling behind in key new technologies in digital and artificial intelligence without addressing the need to maintain EU leadership in clean technologies.³⁴

A review by E3G of China's Five-Year Plan till 2020 shows that China is now outperforming the EU when it comes to low carbon investment.³⁵ By 2015 China had already caught up with the EU on per capita investment in clean energy and overtaken the EU on renewable energy build rates, research and development (R&D) spending, power transmission grids and electric vehicles. The current Five-Year Plan accelerates China's move into the low carbon economy. By 2020, China plans to more than double its wind energy capacity, nearly treble its solar capacity, and increase electric vehicles by a factor of ten – far outstripping European deployment. Meanwhile, clean investment in Europe continues to fall.

³² See for example the debate on **Carbon Leakage**

³³ CAN-E (2019) **European Fat Cats: EU Energy Intensive Industries: Paid to Pollute, not to Decarbonise**

³⁴ BDI (2019) **China – Partner and Systemic Competitor: How Do We Deal with China's State-controlled Economy?**

³⁵ E3G (2016) **Pulling ahead on Clean Technology: China's 13th Five Year Plan Challenges Europe's Low Carbon Competitiveness**



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Chile's solar boom has been so fast that its grid has been struggling to keep up, leading to an extended period where power prices dropped to zero. In addition to new investments into its grid, it has led to talks about new industrial strategies to use this strategic advantage and first contracts being signed, for example with the Canadian-based Lundin Mining Corporation and AES Gener to provide 1,100 GWh of renewable energy, per year, to its Candelaria Mine Complex in Chile. The contract, due to start in 2023, gives Minera Candelaria access to long-term renewable energy, resulting in decreased electricity costs and accelerating Lundin's transition to a more sustainable mining operation.³⁶

The risk of the EU losing the global race for low carbon competitiveness has implications well beyond the fate of its industrial base. It would also mean that the EU would lose its current role as a de-facto global rule maker.³⁷ In addition to using low carbon tech as much for geo-political as for climate political purposes, China is likely to combine this with the development of an all-encompassing surveillance and social rating system, as suggested by recent reports of a Chinese government requirement for all electric vehicles to transmit location data to a central body, the Shanghai Electric Vehicle Public Data Collecting and Research Center (SHEVDC).³⁸

CONNECTING INDUSTRIAL AND SOCIAL POLICY

Political debate on the social impact of the transition to a low carbon economy has so far focused mostly on sectors like coal where an entire industry with all associated jobs and social functions it provides is set to disappear completely. This led trade unions, initially in North America and then in the EU, to argue the case for a Just Transition for the energy sector to ensure no worker or region would be left behind in the process of change.

With the adoption of the **Solidarity and Just Transition Silesia Declaration** at the 2018 COP 24 in Katowice³⁹, the creation of the EU's Coal Regions in Transition Platform and the central role of the EU's budget in supporting a Just Transition⁴⁰, it has now become an important element of EU climate and energy policies. This has allowed for a debate on a phase out of coal in places where this was previously not possible. The most prominent example was Germany's announcement at the beginning of 2019 to

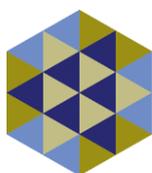
³⁶ Reported for example in Energy and Mines (2018) **Lundin Mining Contracts for 1100GWh of Renewables annually**

³⁷ North Western University Law Review (2012) **The Brussels Effect**

³⁸ Reported for example in The Tellerreport (2018) **Electric Cars: Car Manufacturers Transmit Position Data to Chinese Government**

³⁹ **Solidarity and Just Transition Silesia Declaration** (2018)

⁴⁰ The E3G (2018) report **Funding the Just Transition to a Net Zero Economy in Europe: Opportunities in the Next EU Budget** shows how the next European Multiannual Financial Framework can be aligned with a Just Transition.



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phase out coal by 2035 to 2038 combined with an extensive regional investment programme.

The experience in the coal sector has provided useful lessons on how to manage such processes in other sectors like industry and manufacturing but there are also some very fundamental differences between these sectors. Most importantly, whereas fossil fuel production and consumption are not compatible with a net zero economy, all the modelling so far has shown that manufacturing would not just be compatible but would do very well in such an economy in particular because of the significant investments and developments in infrastructure and buildings.

The transformation to carbon neutral manufacturing will have implications for the kind of skills that are needed and the technologies that will be adopted. Material Economics expects that a modernised industry will offer similar employment levels as today if production does not migrate from the EU as circular economy solutions are more labour intensive.⁴¹

Transforming the European industry may also change the geography of production with proximity to markets and distribution networks becoming more important than proximity to energy sources, although it is expected that in many cases existing sites will be redeveloped. This transformation will be coinciding with market and technology driven processes like automation and artificial intelligence, as well as 'older' drivers such as competitive pressures to reduce costs, in particular labour costs. For example, Volkswagen's recent strategic re-orientation to electrification came together with an announcement to reduce staff numbers and introduce advances in automation, leading to representatives of its employees to express concerns about overall strategic direction.⁴²

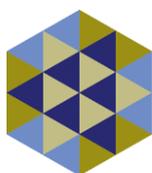
The deep interconnection between these different drivers and the implications this will have for the future of work in general means that the effort needed to address them will have to go well beyond the remits of climate policy and associated Just Transition efforts. This makes the renewal of Europe's social contract an important component of a successful future EU industrial strategy.

For the next EU Commission's political priorities this means two things. First, the EU's pillar of social rights will need to be further developed in order to ensure all Europeans are supported in skills development, access to the labour market, enjoy fair working conditions and a social safety net. The **EU Skills Panorama**⁴³, which provides an overview of short- and medium-term employment prospects and skills needs at European, national and sectoral level, is already a useful instrument that can help map changing skills needs in individual sectors. By developing a renewed skills

⁴¹ Material Economics (2019) **Industrial Transformation 2050 – Pathways to Net-zero Emissions from EU Heavy Industry**

⁴² Deutsche Welle (2019) **Volkswagen Announces up to 7,000 Job Cuts**

⁴³ **Skills Panorama**



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audit with regional data on the skills needs for a climate neutral industry it would support regions, sectors and people in re-skilling for future-proof jobs.

Second, the EU's social dialogue, central to the functioning of the EU's social contract needs to start seriously addressing climate impacts and implications of low carbon growth opportunities. Although the weight of the social dialogue will remain at the national level and the question of how this will need to be organised will be answered differently in each Member State, there is a role for the EU level as well. The sectoral social dialogue committees would be a logical place to discuss the sector specific decarbonisation pathways developed under a new industrial strategy and require the participation of a representative environmental organisation.

FINANCING THE NEW INDUSTRIAL POLICY OF THE EU

A comprehensive assessment by the Energy Transition Commission of annual investment needs for the next 30 years to get to net zero by 2050 has shown that industry investments would need to double from €5 billion under business as usual (BAU) to €11 billion per year⁴⁴ but are still, in absolute terms, small compared to total investments needs of other sectors like buildings (€30 billion additional to €310 billion under BAU)⁴⁵ and transport (€6 billion additional to €194 billion under BAU)⁴⁶.

An analysis by Material Economics finds that the impact on end-user/consumer costs will be less than 1% regardless of the path pursued – but all pathways require new production processes that are considerably costlier to industry, as well as significant near-term capital investment equivalent to a 25–60% increase on today's rates.⁴⁷

The EU's new industrial policy will be developed as a new EU budget will be in its final stage of adoption, creating important opportunities to align EU spending with putting the European Union on a net zero trajectory. Much will, however, still depend on the final negotiations as well as on the implementation of the EU budget. It will be crucial for a final agreement on the EU budget later this year to ensure at least 40% climate spending, climate proofing and exclusion of fossil fuels in all spending programmes to support the industrial transformation and exclusion of fossil fuels in all spending programmes to support the industrial transformation.

⁴⁴ Material Economics (2019)

⁴⁵ Paul Mitchell Real Estate Consultancy & Eurostat (2015) for current investment

⁴⁶ Oxford Economics & Global Infrastructure Hub (2017)

⁴⁷ Material Economics (2019) **Industrial Transformation 2050 – Pathways to Net-zero Emissions from EU Heavy Industry**



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The InvestEU programme will be the EU's main instrument in the EU budget to leverage private investment and help build project pipelines. It replaces the European Fund for Strategic Investments post 2020 and seeks to drive €650 billion investment over the budget period in four so-called windows: sustainable infrastructure, research and innovation, human capital and Small and Medium Enterprises (SMEs). Future projects will include the decarbonisation of energy intensive industries. Robust climate proofing of the InvestEU programme will be important to ensure that projects to decarbonise heavy industry only receive support when a minimum sustainability threshold, in line with the transition to net zero, is met. By doing so, the InvestEU programme can focus on projects which are currently underinvested and help to accelerate investments in these areas.

The EU budget alone will not be enough to fill the low carbon investment gap with the financial sector and industry itself is expected to play a major role as well. Recent advances in the EU's sustainable finance agenda, stemming from the Action Plan on Sustainable Finance⁴⁸, will lead to the reorientation of capital towards sustainable projects and spur innovation in companies, including heavy industry, to align with the transition to a net zero economy.

The EU is developing a classification system, or taxonomy, to clarify for investors the environmental sustainability of economic activities. This will support the flow of capital into sustainable sectors that need financing. Economic activities which lead to a substantial contribution to climate mitigation and adaptation, as well as four other environmental objectives, will be classified as environmentally sustainable.⁴⁹ As part of the development of the taxonomy, a European Commission technical expert group has assessed the main macro-economic sectors of the economy and published a report outlining a list of economic activities which can make a substantial contribution to climate change mitigation.⁵⁰ As well as listing activities that are already low carbon, the assessment includes, and sets thresholds for, activities that contribute to a transition to a net zero emissions economy in 2050 but are not currently close to doing so. These so called 'transition' activities are found largely in heavy industry. Therefore, in addition to the taxonomy providing a framework for investors to make sustainable investments, it will also spur innovation in heavy industry in order to support the transition to a net zero economy. The EU has also created two new categories of climate benchmarks⁵¹, allowing investment portfolios to be better aligned with the Paris Agreement and providing investors with a reliable tool to pursue low carbon investment strategies.

⁴⁸ European Commission (2018) **Action Plan: Financing Sustainable Growth**

⁴⁹ The activities also must meet criteria to do no significant harm to other environmental objectives.

⁵⁰ EU Technical Expert Group on Sustainable Finance (2019) **Taxonomy Technical Report**

⁵¹ European Council (2018) **Press Release: Green finance: Council Agrees Position on Low Carbon Benchmarks and Disclosure Requirements**



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The EU has adopted rules on disclosure of environmental, social and governance (ESG) related risks by institutional investors⁵² and banks⁵³. This means that industry will be under increasing pressure from their own banks and shareholders to demonstrate how they will address climate related risk. Corporates are already expected to disclose material information on key ESG aspects and how risks stemming from them are managed. The rules on corporate reporting are expected to be updated to enhance transparency on sustainability information, including corporate low-carbon strategies, during the next Commission mandate.⁵⁴

In addition to advancing its Green Finance agenda, the Commission should further reduce uncertainty for investors by setting out decarbonisation pathways in the policies with which it will be implementing its industrial strategy.

A major source of uncertainty for investors is related to infrastructure needs of a low carbon industry. As the analysis by Material Economics has shown, investments into new production processes such as switching from coking coal to hydrogen for steel, replacing cement with new cementitious materials like mechanically activated pozzolans or calcined clays, switching to non-fossil feedstocks such as biomass or end-of-life plastics for chemicals and across the board switching to electricity to produce high-temperature heat are presenting themselves as alternative options to choose from. Apart from the open question about the amount of CCS capacity that would be needed, it has also shown that in all pathways CCS is required to some degree.

Given that many companies are facing investment decisions in the coming years that will have long lasting implications for the EU's ability to achieve net zero, it is crucial for the new Commission to help break the deadlock in the debate on CCS. This should happen by supporting the development of pilot projects in the limited number of locations where suitable geological, CO₂ supply and transport infrastructure come together. It is only in such locations that a public interest case for CCS can be made. The access to and use of this infrastructure will need to be organised through the establishment of a hierarchy of needs.

Likewise, in the case of gas, progress must be made in developing a taxonomy of different forms of renewable gas reflecting lifecycle emissions, including fugitive methane emissions, so that it is clear which gases are compatible with a climate neutral pathway.⁵⁵ Given that supply of sustainably produced, climate neutral gaseous energy carriers is likely to be limited and costs higher than for natural gas, instruments need to be developed that prioritise these towards hard to electrify

⁵² European Council (2018) **Press Release: Green finance: Council Agrees Position on Low Carbon Benchmarks and Disclosure Requirements**

⁵³ European Commission (2019) **Adoption of the Banking Package: Revised Rules on Capital Requirements (CRR II/CRD V) and Resolution (BRRD/SRM)**

⁵⁴ The European Commission recently **updated its guidelines on the disclosure of environmental and social information** to boost corporate transparency and performance, as well as encourage companies to embrace a more sustainable approach.

⁵⁵ E3G (2018) **Renewable and Decarbonized Gas: Options for a Zero-emission Society**



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sectors in industry. It is possible that in other sectors demand for gaseous energy carriers will decline substantially, pointing towards the need to rethink the shape of the gas infrastructure. Thinking strategically about the (co-)location of hydrogen generation or infrastructure and energy intensive industry is thus central.

GOVERNING THE NEW INDUSTRIAL POLICY OF THE EU

Winning the race to climate neutrality for the EU's heavy industries will require significant action from industry, consumers and policy makers alike, and at various levels of governance. Whilst industrial policy has so far predominantly been the remit of national policy making and is likely to remain so, more European-level action is now demanded by the rise of common challenges industry must cope with across Europe.

The mandate for European-level action on industry is strong when it comes to

- > Maintaining global EU leadership in low carbon growth through increased climate and clean, efficient energy ambition
- > Defining and upholding global rules for competitive European industries
- > Developing a single market fit for climate neutral heavy industries
- > Supporting innovation through European funding
- > Ensuring cross-border coordination and best practice exchanges

Although the European Commission has five years to develop a European industrial strategy towards climate neutrality many companies will need to be taking investment decisions already in the next two years, which will require focusing on elements with strong EU added value that will support the delivery of deep emission cuts throughout the next two investment cycles till 2030.

In order to develop an adequate response to the growing recognition of the climate emergency and the need to transition fast to a climate neutral economy, the European Commission's new structures need to be made fit for purpose. To begin with, European action on industrial transformation will require intense coordination between a wide range of policy areas that, until recently, were managed separately. The Commission will need to adapt its structure to ensure effectiveness and consistency in its action and most importantly alignment with its decarbonisation goals.



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First off all, the Vice President for Industrial Strategy which has been proposed by many⁵⁶ needs to become a Vice President for low carbon competitiveness, industry and circular economy who will ensure that the EU's new industrial strategy will put the EU firmly on track to reducing its emissions to net zero well before 2050. He/she should be reporting directly to a First Vice President for sustainable development, to drive this agenda and liaise action by a wide cluster of commissioners from Competition, Internal Market, Energy, Climate, Environment, Regional Policy, Research & Innovation, Education, Trade, Finance (and possibly more). This new cluster on industry transformation would co-develop a new engagement strategy towards the EU's global partners, new legislation and funding mechanisms when needed, and ensure frequent exchanges between national and local governments, industry, and stakeholders.

In addition to such a new structure, the Commission must transform its working methods to build climate neutrality and resilience into all stages of policy making. Similar to how the Juncker Commission built their concept of "better regulation"⁵⁷ into its work, the next Commission must embed a comprehensive framework at all levels of policy making to test any new policy against the delivery of climate neutrality by 2050 through the development of an Inter-Institutional Agreement on Sustainable Development, the Rule of Law and Fundamental Rights. Although this should be a Presidential responsibility, operational responsibility should be assigned to the "First Vice President" and be coordinated by the Secretariat General with the support of a new "Clean Economy Observatory". The observatory would be a new independent body set up with the objective of supporting Member States in delivering on their National Energy and Climate Plans through sharing best practices, monitoring financial needs and flows as well as ensuring robust and accountable policy making. It would monitor systemic risks, check consistency of new policies with climate neutrality goals, and guide policy makers with the support of a newly empowered European Environmental Agency.⁵⁸

⁵⁶ Euractiv (2019) **EU Industrial Policy under the Spotlight as Elections Loom**

⁵⁷ "Better regulation is about legislating when this is needed to deliver on shared objectives", more at https://ec.europa.eu/info/sites/info/files/better-regulation-taking-stock_en.pdf

⁵⁸ Set out in E3G (2019) **Making Deep Decarbonisation of the Energy System a Reality**



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TOWARDS A CLIMATE-NEUTRAL EU BY 2050
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This original E3G series identifies key areas for achieving Europe's carbon neutrality objective. The series explores various sectoral analyses and policy avenues for the next European Commission's agenda to implement decarbonisation.