BRIEFING NOTE (Commission Internal)

KEY messages

A strong EU industrial base, including the energy-intensive industries (EIIs), creates jobs and growth in the long term. This is why the Commission adopted in September a renewed industrial policy strategy and proposed an integrated approach.

EIIs, including refining and petrochemicals sectors contribute to the global transition towards a digital, low-carbon, resource-efficient and circular economy by providing materials and products for, for example, smarter and cleaner buildings, vehicles and power supply.

EU EIIs competitiveness depends on several factors including an access to finance for innovation and investments, skilled workforce, affordable energy, CO2 allowances and raw materials, and a global level-playing field.

The EU needs to overcome challenges linked to preserving the EII global position, restoring the capability to attract investments to make their processes and products smarter and cleaner.

We understand industry's concerns about key elements of the EU ETS reform - in particular about the reducing amount of total free allowances available - but it was important to strike the balance for a complex system, under strong technical and political constraints.

Looking ahead, the Commission objective is to ensure cost-efficient implementation of climate and energy policies. Decarbonisation of transport will be a key challenge. CO2 targets in transport will have to be aligned to the EU’s climate and energy goals and be based on a rigorous economic assessment.
Background

**Renewed Industrial Policy Strategy**

On 13 September 2017 the Commission adopted the Communication "Investing in a smart, innovative and sustainable Industry – An Industrial Strategy for Europe", outlining main priorities and key actions for strengthening Europe's industrial base, including: a deeper and fairer Single Market, upgrading industry for the digital age, building on Europe's leadership in a low-carbon and circular economy, investing in infrastructure and new technologies to drive industrial transformation, supporting industrial innovation on the ground, promoting open and rules-based trade and empowering regions and cities to address challenges. The implementation of the strategy will require a joint commitment from industry as well as all relevant European, national and regional stakeholders.

Furthermore, the Commission will organise an annual Industry Day, providing an open forum for stakeholders to contribute to the implementation and monitoring of the strategy, so as to identify further action needed. The Commission will also establish a High Level Industrial Roundtable to provide feedback. The High Level Industrial Roundtable will provide feedback on the Commission's initiatives and actions, and advise on the implementation of industrial policy at different levels. The next and second European Industry Day will take place on 22 and 23 February 2018.

**Importance of EU manufacturing and EIIs in global value chains**

EU manufacturing industry accounts for 15.3% of EU GDP, 75% of EU exports, 65% of EU productivity growth and 80% of EU private spending on R&D. EU EIIs create around 2.6 million direct jobs and contribute to around 15% of EU manufacturing added value.

In order to remain competitive in global value chains, EIIs have to specialise in higher added value and niche products by adding, if possible, new functionalities and services.

The High-Level Group on EIIs allows the Commission to discuss the most pertinent issues that EII are facing. DG GROW also conducted several cumulative cost assessments (CCAs) of EU legislation for most EII sectors (steel, aluminium, chemicals, forest-based, glass and ceramics).
**Access to finance for innovation and investment**

An important level of EU financing is available: Horizon 2020 (including Bio-Based Industries and SPIRE PPP), European Fund for Strategic Investments (EFSI), European Structural and Investment Fund (ESIF) and COSME.

Encourage stakeholders to contribute to the work on the next multiannual financial framework and to participate in the EU programmes and initiatives.

The EU Emissions Trading Scheme (ETS) proposal envisages an Innovation Fund for innovative low-carbon projects (e.g. renewables, carbon capture and storage and utilisation (CCS/CCU) and new technologies for manufacturing sectors).

**Access to right skills**

The technological and environmental transformation faced by EIIs has broad implications for the skills needs.

GROW supports participation of EIIs (e.g. steel and paper) in the Blueprint for Sectoral Cooperation on Skills, which is a framework for strategic cooperation between stakeholders.

It is a bottom-up initiative; hence a strong commitment and pro-active approach by industry to involve all relevant partners is essential for the Blueprint to deliver.

**Access to a global level-playing field (EU TDIs/Trade Defence Instruments)**

EIIs are the main users of the TDIs. The competitiveness of EII depends on effective TDI and the conclusion of their revision is a matter of urgency. GROW welcome the progress in the Council on the TDI modernisation and on the new anti-dumping methodology.

**Access to affordable energy**

Energy is a significant cost component for EIIs, impacting their global competitiveness. Industrial energy prices differentials inside the EU and with the rest of the world should be therefore monitored and reduced.

The taxes and levies component (defined by MS) was the major driver for the overall price increase and its level varies significantly across MS.
Recall that the EU state aid rules allow MS to compensate to certain EIIIs indirect financing costs of renewable energy support schemes.

**Access to affordable CO2 allowances (EU ETS/Emission Trading Scheme)**

The transition to low-carbon economy can provide new opportunities for EII. At the same time, EII are highly exposed to international trade, and consequently – to the carbon leakage risk.

Energy-intensive industries should therefore continue to be protected against the risk of carbon leakage under the EU ETS until there is a real international level playing field.

GROW closely follows the discussions in co-decision on the EU ETS.

**Access to affordable raw materials**

EU EII are faced with volatility of raw materials prices and, in certain cases, security of supply, as the demand increases from emerging economies and for advanced technologies.

The Circular Economy Action Plan and Raw Materials Initiative are key to support industry in securing reliable and unhindered raw materials supply.

**Automotive sector, batteries and mobility packages**

The EU's automotive sector enjoys a central place in Europe’s industrial landscape. It is the employer of millions of Europeans, often in highly skilled jobs and a major investor in research and development. The sector is one of the most competitive in the world and generates a substantial trade surplus for the EU. It is at a junction of many important EU policies including; competitiveness, research, energy, environment, transport, single market, etc. Today's automotive industry is at a turning point: it must embrace the upcoming digital revolution, automated and connected driving, environmental challenges (such as climate goals), societal changes and growing globalisation.

In order to develop a co-ordinated and effective EU approach for the automotive industry in this changing landscape, the European Commission established the High Level Group (HLG) GEAR 2030 in October 2015.

2030 climate targets will require a significantly larger proportion of new cars to be low- and zero-emission vehicles. Battery charged electrical
vehicles are now the leading segment of zero-emission vehicles around the world.

An initiative to set-up mass production of battery cells in the EU by EU manufacturers was launched on 11 October with private companies (BASF, SIEMENS, SOLVAY, UMICORE, etc.). Battery cells are a key technology for electric vehicles but also for energy storage. Most of the battery cells are currently produced in Asia or in the US.

If possible, the 2nd Mobility Package should already announce a comprehensive package of measures in support of battery cells and battery packs manufacturing in the EU including available EU funding (Horizon 2020, Structural Funds, European Fund for Strategic Investments, etc.) that could complement industry investments and MS support (State Aid).

Role of advanced biofuels for the decarbonisation of transport (see in Annex RES memo drafted by ENER in November 2016)

Despite significant growth of renewable fuels since 2009 and EU’s leadership role as the largest producer of advanced biofuels, the transport in the EU still depends on 94% oil supplies to fuel European cars, tracks, ships and planes. In order to foster the decarbonisation and energy diversification of the EU transport sector, the revised renewable energy Directive:

• Introduces an obligation on European transport fuel suppliers to provide an increasing share of renewable and low-carbon fuels, including advanced biofuels, renewable transport fuels of non-biological origin (e.g. hydrogen), waste-based fuels and renewable electricity. The level of this obligation is progressively increasing from 1.5% in 2021 (in energy terms) to 6.8 % in 2030, including at least 3.6% of advanced biofuels. Preferential rules apply to advanced aviation fuels in order to support their deployment in the aviation sector (e.g. their energy content is accounted 20% more).

• To minimize the Indirect Land-Use Change (ILUC) impacts, introduces a cap on the contribution of food-based biofuels towards the EU renewable energy target, starting at 7% in 2021 and going down progressively to 3.8% in 2030.

• Introduces national databases to ensure traceability of the fuels and mitigate the risk of fraud.
**Chemicals & bio-based industries**

Industry driven Public Private Partnerships such as Sustainable Process Industry through Resource and Energy Efficiency (SPIRE) and Bio-Based Industries (BBI) – Joint Undertaking (JU) were cited as “having a key role to play” in the new low-carbon technologies. Various process and product priority lines (ex. renewables/green Hydrogen) were identified including:

- Significantly increased resource and energy efficiency of process technologies;
- Utilisation of renewable electricity, alternative energy sources, production of Hydrogen with low carbon footprint;
- Better utilisation of alternative sources of carbon: biomass, waste & recycled materials (CO₂ and other off-gases from industrial flue gases – chemical valorisation of CO₂ and other gases);
- More robust and tolerant production systems;
- Integration of advanced process modelling, control technologies and digitisation;
- Industrial symbiosis;
- Materials “breakthroughs” including better eco-design of materials, development of advanced sustainable recycling process, high performance functional materials for low-carbon energy, mobility and housing.

**“Green” Hydrogen**

The use of renewable energy to produce “Green Hydrogen” to deliver process decarbonisation, fuel and storage alternatives was mentioned as a potential cross-sectorial deep decarbonisation vertical and the following initiatives and approaches relevant to chemicals were highlight in the workshops:

- Fatal Hydrogen generated as side stream;
- Hydrogen production with CCS.

**CCS/CCU**

Carbon Capture and Storage (CCS) and/ or Usage (CCU) were identified as “end of pipe” and necessary solutions to achieve cross-sectorial deep decarbonisation and the following initiatives and approaches relevant to chemicals were highlight in the workshops:

- Chemical valorisation of CO₂ (and CO) from gaseous industrial effluents;
• Second generation capture technologies (such as high pressure turbines)

*Advanced carbonate fuel cell technology in carbon capture and storage*

Advancing economic and sustainable technologies to capture carbon dioxide from large emitters such as power plants is an important part of ExxonMobil’s suite of research into lower-emissions solutions to mitigate the risk of climate change.

Carbon capture and storage (CCS) is a process by which carbon dioxide that would otherwise be released into the atmosphere is captured, compressed and injected into underground geologic formations for permanent storage. ExxonMobil is a leader in CCS applications with extensive experience over the last three decades with all of its component technologies, including participation in several carbon dioxide injection projects. In 2015, ExxonMobil captured 6.9 million metric tons of carbon dioxide for sequestration – the equivalent of eliminating the annual greenhouse gas emissions of more than 1 million passenger vehicles.

ExxonMobil believes that the greatest opportunity for future large-scale deployment of CCS will be in the natural gas power generation sector. Therefore, ExxonMobil, with partner FuelCell Energy, Inc., is advancing new technology that can substantially improve CCS efficiency, effectiveness, and affordability for large natural gas-fired power plants. Achieving meaningful reductions in greenhouse gas emissions will require a wide range of solutions, and ExxonMobil believes that CCS has the potential to play an important role in managing emissions.

*Carbonate fuel cell technology: better efficiency, more power, and less carbon dioxide*

ExxonMobil’s scientists have been pursuing new technology that could reduce the costs associated with current CCS processes by increasing the amount of electricity a power plant produces while simultaneously delivering significant reductions in carbon dioxide emissions. At the center of ExxonMobil’s technology is a carbonate fuel cell.

Laboratory tests have demonstrated that the unique integration of carbonate fuel cells and natural gas power generation captures carbon dioxide more efficiently than current, conventional capture technology. During the conventional capture process, a chemical reacts with the carbon
dioxide, extracting it from power plant exhaust. Steam is then used to release the carbon dioxide from the chemical – steam that would otherwise be used to move a turbine, thus decreasing the amount of power the turbine can generate.

Fuel cells to capture carbon dioxide from power plants allow a more efficient separation of carbon dioxide from power plant exhaust. This will also increase output of electricity. Power plant exhaust is directed to the fuel cell, replacing air that is normally used in combination with natural gas during the fuel cell power generation process. As the fuel cell generates power, the carbon dioxide becomes more concentrated, allowing it to be more easily and affordably captured from the cell’s exhaust and stored. ExxonMobil’s research indicates that a typical 500 megawatt (MW) power plant using a carbonate fuel cell may be able to generate up to an additional 120 MW of power while current CCS technology consumes about 50 MW of power.

ExxonMobil’s research indicates that by applying this technology, more than 90 percent of a natural gas power plant’s carbon dioxide emissions could be captured. Natural gas is already the least carbon-intensive of the major energy sources.

In addition, carbonate fuel cell technology has the potential to generate significant volumes of hydrogen. Simulations suggest that the new technology can produce up to 150 million cubic feet per day of hydrogen while capturing carbon dioxide from a 500 MW power plant. To put that in perspective, world scale steam methane reforming hydrogen plant produces around 125 million cubic feet per day. In addition, synthesis gas, or syngas, composed of hydrogen and carbon monoxide, can be produced that can be upgraded to other useful products such as methanol, olefins, or higher molecular weight hydrocarbons for transportation fuels or lubricants.

**Next steps in development**

ExxonMobil has been assessing a number of carbon capture technologies for many years and believes that carbonate fuel cell technology offers great potential. The technology’s capability has been demonstrated in the laboratory, and data from those simulations is currently under analysis. Further development will involve a more detailed examination of each component of the system, and optimization of the system as a whole.
The scope of the agreement between ExxonMobil and FuelCell Energy, Inc. will initially focus on better understanding the fundamental science behind carbonate fuel cells and how to increase efficiency in separating and concentrating carbon dioxide from the exhaust of natural gas-fueled power turbines.

In October 2016, FuelCell Energy and ExxonMobil announced the selection of a location to test novel fuel cell carbon capture technology under development by the companies. The James M. Barry Electric Generating Station, a 2.7 gigawatt mixed-use coal and gas-fired power plant operated by Southern Company subsidiary Alabama Power, will host pilot plant tests of the technology, which uses carbonate fuel cells to concentrate and capture carbon dioxide streams from power plants. The tests will demonstrate carbon capture from natural gas-fired power generation under an agreement between Fuel Cell Energy and ExxonMobil announced in May, and from coal-fired power generation under a previously announced agreement between FuelCell Energy and the U.S. Dept. of Energy. This fuel cell carbon capture solution could substantially reduce costs and lead to a more economical pathway toward large-scale carbon capture and storage globally.

**2017 Outlook for Energy: A View to 2040 (see Annex)**

The Outlook for Energy is ExxonMobil’s global view of energy demand and supply through 2040. It uses the data and findings in the book to help guide our long-term investments. It also highlights the dual challenge of ensuring the world has access to affordable and reliable energy supplies while reducing emissions to address the risk of climate change. We share the Outlook with the public to help promote a better understanding of the issues shaping the world’s energy needs. It is important because energy is fundamental to modern life. It is critical to human progress and to improving living standards for billions of people across the globe.

**Competitiveness of the Refining sector (Extract from Exxon webpage)**

The refining industry operates in a global market. Thanks to the easy and relatively cheap transport of refined products, European refineries compete with each other and with their counterparts in Asia, the U.S., the Middle East and elsewhere. European refineries are often constrained in their ability to be globally competitive due to high labour and energy costs in the EU combined with stringent environmental regulations. To maintain and improve the competitiveness of EU refineries,
policymakers should avoid adding to operating costs with regulations that have unintended consequences on the sector. (See in Annex B the role of the refining sector for the energy transition)

**EU Refining Forum (DG ENER in the lead, for GROW: D2 (and C4 and I4 for transport)**

The eighth meeting of the EU Refining Forum will take place on 1 December 2017 in Brussels. For the first time, the Forum will meet at expert level, allowing a more in-depth discussion of specific topics relevant to the refining sector. Participants will exchange views on various issues, including the Clean Energy for All Europeans package and the impact of internal combustion engines on urban air quality. A high-level meeting of the Forum will follow in the first half of 2018.

The EU Refining Forum was established in 2012. The aim of the Forum is to provide an opportunity for the industry, EU countries, Members of the European Parliament, the Commission and other stakeholders to discuss planned and future regulatory proposals with potentially significant impacts on the EU oil refining industry and on the EU's security of supply of petroleum products.

**Advanced biofuels developed by Exxon (extract from Exxon websites)**

ExxonMobil continues to fund and conduct research on advanced biofuels. This work is part of our many investments in new technologies with the transformative potential to increase energy supplies, reduce emissions, and improve operational efficiencies.

ExxonMobil is funding a broad portfolio of biofuels research programs including our ongoing efforts on algae as well as programs on converting alternative, non-food based biomass feedstocks, i.e. cellulosic biomass, to advanced biofuels. They believe that fundamental technology improvements and scientific breakthroughs are still necessary in both biomass optimization and the processing of biomass into fuels. Specifically, scientific breakthroughs are needed to ensure that advanced biofuels can be scaled up economically and produced with the desired environmental benefit of lower life cycle greenhouse gas (GHG) emissions. In this type of breakthrough research, clearly understanding the challenge and breaking it down into manageable questions that can be addressed through science are the first crucial steps towards finding solutions.
Scientists and engineers at universities, government laboratories, and companies are investigating a wide range of feedstocks and processes to develop advanced biofuels. We are working with some of these leading researchers and have designed our research portfolio to progress the science that we feel will be needed to deliver advanced biofuels with environmental benefits.

Their advanced biofuels research portfolio includes joint research collaborations focused on algae-based biofuels with Synthetic Genomics, Inc. (SGI), Colorado School of Mines and Michigan State. We are also exploring a variety of biomass conversion processes that could be used with non-food based feedstocks such as whole cellulosic biomass, algae feedstocks and cellulose-derived sugars. These programs are being carried out currently with Renewable Energy Group (REG) and the University of Wisconsin.