APRIL 2021

ENERGY

INDUSTRY REVIEW

NORD STREAM 2
Is Cold War Winter Coming?

OIL 2021
Analysis and
Forecast to 2026

FIRST JACKET IN THE ROMANIAN BLACK SEA BLOCK
GSP Installed First Production Platform in Ana Block

Iulian Harpa, Managing Partner HiM Public Affairs

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ROMGAZ

S.N.G.N. ROMGAZ S.A.

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Romgaz undertakes geological exploration in order to discover new gas reserves, produces methane by exploiting the reservoirs included in the company portfolio, stores natural gas in the underground deposits, interventions, workover and special operations on wells and technological transport.
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Romgaz is the largest natural gas producer and the main supplier in Romania.

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‘First Fuel’ for a Sustainable Future

Energy efficiency represents more than 40% of the emissions abatement needed by 2040, according to the IEA Sustainable Development Scenario. Maintaining global growth and supporting development in emerging economies implies a sharp rise in consumption habits. Meeting this need requires a transformation of the existing energy system. Energy efficiency is the ‘first fuel’, energy experts claim. A range of new policies are needed to support this change. Economic incentives can make more efficient consumer practices the easy and affordable choice, while regulatory measures combined with outreach and awareness campaigns can progressively eliminate more carbon-intensive options.

IEA Efficient World Scenario shows that currently existing cost-effective technologies are sufficient to double global energy efficiency by 2040. Next-generation solutions, like digitalisation of energy systems and behaviourally informed policy making are opening the door to even further potential for efficiency improvements. To reach climate goals without hindering economic progress, countries need to prioritise transformational energy efficiency strategies across the whole economy. Ambitious targets require a dramatic rethink of the systems and habits that power our economies through innovative policy frameworks, technologies and novel approaches for accelerating progress.

In recent years, energy management systems in buildings have become smarter, integrating external data sources, like weather conditions, traffic patterns, and more. Using artificial intelligence, these advanced systems can forecast energy demand and improve response capabilities. Meeting the goals of the Paris Agreement will require buildings across the globe to improve energy intensity by 30-50% per square metre.

Industry is another notoriously ‘hard-to-abate’ sector, involving capital-intensive, long-lived assets and complex, energy-intensive processes. Many discussions on decarbonising the industrial sector focus on material efficiency and low-carbon technologies and fuels, like carbon capture and green hydrogen.

Lastly, financial incentives can remove barriers to investments and trigger private capital. Governments can increase the supply of finance for efficiency investments by expanding pre-existing mechanisms and public funds for installing low-carbon technologies. Regulations, incentives and information campaigns can bolster energy efficiency and accelerate decarbonisation in the industrial sector.

As IEA concludes: “Energy efficiency is an essential tool for policy makers committing to high-ambition climate goals. The ‘first fuel’ can reduce the overall costs of mitigating carbon emissions while advancing social and economic development, enhancing energy security and quality of life, and creating jobs. Governments can take full advantage of the opportunities presented by next-generation energy efficiency to accelerate progress toward net-zero goals and higher global climate ambition.”

Lavinia Iancu
Publisher

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ACWA Power to Develop USD 1 Bln Gas Power Project in Uzbekistan

ACWA Power, a leading developer, investor and operator of power generation and desalinated water plants in thirteen countries, has announced the successful financial closure for the development, construction and operation of the 1500 MW Sirdarya Combined Cycle Gas-Turbine (CCGT) power plant in Uzbekistan.

A syndicate of seven international lenders will provide USD 750 million senior debt for the USD 1 billion project. The mandated lead entities – including the European Bank for Reconstruction and Development (EBRD), German Investment Corporation (DEG), Standard Chartered, Natixis, Société Générale, the OPEC Fund for International Development, and the Bank of China – helped structure the project finance debt. The commercial banks are providing funding on the back of a Multilateral Investment Guarantee Agency four-point cover.

The project will provide cleaner, more efficient and cost-competitive gas power that can be utilised across industries in Uzbekistan. Upon completion, it is expected to meet 15 percent of power demand in Uzbekistan and comprise eight percent of all installed power capacity.

Air Liquide Supports Construction of Largest Methanol Plant in Africa

Air Liquide Engineering & Construction has signed an agreement with Brass Fertilizer and Petrochemical Company Limited (BFPCL) to support the construction of the largest natural gas to methanol plant in Nigeria.

As part of the agreement, Air Liquide Engineering & Construction will be the technology licensor, bringing its extensive experience in the design and engineering of Methanol plants.

This Methanol plant, to be the largest in Africa, will be located in Odioma, Brass Island, Bayelsa State and will be able to produce up to 10,000 tons of Methanol per day based on Air Liquide Engineering & Construction proprietary process technology for large scale syngas and methanol, Lurgi MegaMethanol™, which efficiently converts natural gas into methanol. The plant is planned to be operational in 2024 and will service local and export markets.

Air Liquide Engineering & Construction is a world leading methanol licensor, with over 50 years-experience in plant design, engineering, procurement and construction offering customers safe, reliable and energy efficient technology solutions.

Aker Carbon Capture and Siemens Energy Team up to Develop Sustainable Power Generation

Aker Carbon Capture and Siemens Energy have signed a memorandum of understanding aimed at developing combined offerings for carbon capture solutions that can be applied to gas turbines and gas-fired power plants.

The parties will explore a technology collaboration to further advance technical optimization within the whole process of power generation and carbon capture combining Aker Carbon Capture's HSE-friendly capture technology with Siemens Energy's market leading portfolio of offerings in the energy sector. Aker Carbon Capture and Siemens Energy will also explore ways to jointly fast-track development of major projects globally. The global collaboration will initially focus on the European market for new and existing low-carbon power generation where a combination of new turbines and carbon capture and storage (CCS) can provide sustainable solutions fit for the 21st century.

Gas-fired power plants contributed 23 percent of global power generation in 2019, according to the International Energy Agency. In Europe, gas use in power generation increased by around 4 percent as countries switched from coal to gas, thereby reducing emissions levels. Applying carbon capture to gas-fired power plants limits the emissions entering the atmosphere and, in many regions, further supports the case for gas power as part of a sustainable energy mix.

Volkswagen and bp Extending Ultra-fast Electric Vehicle Charging Across Europe

Volkswagen and bp announced they intend to work together on extending and speeding up the deployment of ultra-fast electric vehicle (EV) charging facilities at bp retail sites across the UK, Germany and elsewhere in Europe.

Extensive ultra-fast charging networks are seen by both companies as essential to accelerate the adoption of electric vehicles. The companies signed a memorandum of understanding for their collaboration and intend to finalize agreements in coming months. This would bring together two leading global players in mobility to develop a network of ultra-fast chargers at convenient and high-quality locations – bp sites, and Aral sites in Germany.

The partnership should give EV drivers greater confidence in being able to access nearby, reliable, quality charging options. bp estimates approximately 90% of people in the UK and Germany live within a 20-minute drive of a bp or Aral site.

The agreement would also make bp the Volkswagen Group's EV charging partner, with the integration of bp's charging network into VW Group vehicles to make finding and paying for charging fast and simple. The network would also be available for other EV customers as part of the bp pulse network (Aral pulse in Germany), improving access to ultra-fast charging for EV drivers more widely.

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EC to Approve Acquisition of Eaton Hydraulics by Danfoss

The European Commission has approved, under the EU Merger Regulation, the proposed acquisition of Eaton's hydraulics business (Eaton Hydraulics) by Danfoss. The approval is conditional on full compliance with the commitments offered by Danfoss.

"Danfoss and Eaton are both leading players in hydraulic components globally. Manufacturers of agricultural and construction machinery depend on these components for manufacturing innovative and price competitive products. Thanks to the commitments offered by the two companies, these customers will continue benefit from competitive prices and have choice of innovative products," Executive Vice-President Margrethe Vestager, in charge of competition policy, stated.

This decision follows an in-depth investigation of the proposed acquisition which combines the activities of Danfoss and Eaton Hydraulics. Danfoss and Eaton Hydraulics are both leading global manufacturers of hydraulic components used to make hydraulic systems for various kinds of machinery. The purpose of a hydraulic system is to make a machine move, by transferring energy from the point of source, e.g., an engine, to the point of use. The proposed transaction would remove one of the main competitors in this market.

Carbon Price on EU Imports to Raise Global Climate Ambition

To raise global climate ambition and prevent 'carbon leakage', the EU must place a carbon price on certain imports from less climate-ambitious countries, say MEPs.

On March 10, European Parliament adopted a resolution on a WTO-compatible EU carbon border adjustment mechanism (CBAM) with 444 votes for, 70 against and 181 abstentions.

The resolution underlines that the EU's increased ambition on climate change must not lead to 'carbon leakage' as global climate efforts will not benefit if EU production is just moved to non-EU countries that have less ambitious emissions rules.

MEPs therefore support to put a carbon price on certain goods imported from outside the EU, if these countries are not ambitious enough about climate change. This would create a global level playing field as well as an incentive for both EU and non-EU industries to decarbonize in line with the Paris Agreement objectives.

MEPs stress that it should be WTO-compatible and not be misused as a tool to enhance protectionism. It must therefore be designed specifically to meet climate objectives.

H2Teesside, UK's Largest Blue Hydrogen Project

bp announced that it is developing plans for the UK's largest blue hydrogen production facility, targeting 1GW of hydrogen production by 2030. The project would capture and send for storage up to two million tonnes of carbon dioxide (CO_2) per year, equivalent to capturing the emissions from the heating of one million UK households.

The proposed development, H2Teesside, would be a significant step in developing bp's hydrogen business and make a major contribution to the UK Government's target of developing 5GW of hydrogen production by 2030.

With close proximity to North Sea storage sites, pipe corridors and existing operational hydrogen storage and distribution capabilities, the area is uniquely placed for H2Teesside to help lead a low carbon transformation, supporting jobs, regeneration and the revitalisation of the surrounding area. Industries in Teesside account for over 5% of the UK's industrial emissions and the region is home to five of the country's top 25 emitters.

Romgaz Has Submitted a Bid for Taking over ExxonMobil's Black Sea Assets

Romgaz submitted, on the last day of March, a binding bid for the acquisition of 100% of ExxonMobil's interests in Neptun Block, in the Black Sea, the day when the deadline provided in the letter sent by ExxonMobil Upstream Business Development on February 15, 2021 expired.

"The Board of Directors of S.N.G.N. Romgaz SA endorsed on March 30, 2021 the binding offer to acquire all shares (representing 100% of the share capital) issued by ExxonMobil Exploration and Production Romania Limited, company that holds 50% of the rights and obligations under the Concession Agreement for petroleum exploration, development and production in XIX Neptun Deep Block. OMV Petrom S.A. holds the other 50% participating interest, representing rights and obligations under the Concession Agreement for petroleum exploration, development and production in XIX Neptun Deep Block," reads a statement of the company.

Romgaz has been negotiating for several months for taking over Exxon's stake in Neptun Deep project, in the Black Sea, where it has invested so far about USD 536mln during 2012-2016. The Offshore Law would be put up for public debate as soon as the deal with the US company is completed.

If this bid was not submitted within the deadline provided in the agreement, in conditions of provisions favourable for titleholders, Exxon could have greater claims or maybe even drop the sale of its stake. Even under these conditions, the Executive in Bucharest is not satisfied only with the actual takeover of the stake, wanting to see how much influence Romgaz will have in Neptun Deep project, in relation to its future partner, OMV Petrom, which owns a 50% stake in this major Black Sea gas exploitation project. Therefore, Romgaz should reach an agreement with the oil group OMV to control operations in the Romanian offshore sector.

ENGIE Lab CRIGEN and Ansys Accelerate Transition to Carbon-Free Energy

ENGIE is helping companies transition to carbon-free energy by employing Ansys simulation solutions. With Ansys' physics-based digital twin technology, ENGIE Lab CRIGEN is developing an ultra-fast and high-fidelity platform to deliver the quality of 3D CFD results in real-time – reducing companies' costs, environmental impact and time to market.

When industrial equipment is inaccessible to physical sensors due to extreme conditions or cost, it becomes harder to predict maintenance requirements and identify efficiency improvements. These improvements are becoming more critical as companies are under increased pressure to conserve energy, reduce greenhouse gas emissions and lessen their environmental footprint. Through its collaboration with Ansys, ENGIE Lab CRIGEN – the ENGIE Group's corporate center for R&D and high-level expertise – is developing an ultra-fast and high-fidelity simulation-based digital twin to maximize the efficiency and sustainability of industrial equipment to boost product reliability and evaluate new concepts in energy production.

Biggest Oil Discovery Near Fram Field in the North Sea

Equinor and partners Vår Energi (jointly owned by Eni - 69.85%) and by HitecVision - 30.15%), Idemitsu Petroleum and Neptune Energy have made the biggest discovery so far this year on the Norwegian continental shelf (NCS), near Fram field.

Vår Energi AS holds a 25% stake in the licence, with Equinor ASA (which is the Operator) holding 45%, Idemitsu Petroleum Norge AS (15%) and Neptune Energy Norge AS (15%). Preliminary estimates place the size of the discovery between 12 and 19 million standard cubic metres of recoverable oil equivalent, corresponding to 75-120 million barrels of recoverable oil equivalent.

Exploration wells 31/2-22 S and 31/2-22 A in the Blasto prospect of production licences 090, 090 I and 090 E were drilled about 3 kilometres southwest of the Fram field, 11 kilometres northwest of the Troll field and 120 kilometres northwest of Bergen. Based on the quality of the resources and the proximity to existing infrastructure the discoveries can be developed and produced in line with Equinor's climate goals.

Enel and Monsson to Develop 1GW Green Power Capacities in Romania

Enel Green Power, the green energy division of utility group Enel, has signed an agreement for joint development of 1,000MW in wind and solar projects in Romania with Monsson group. The group has activities in 14 states in Europe, Asia, North America and New Zealand, with renewable energy production capacities of 2,100MW. In Romania, the most important project completed by Monssson was the Fântânele-Cogealac park, sold to CEZ.

Monsson has focused on renewable energy and water since 2004, becoming a major player with more than 7000 MW projects in pipeline. Among the success stories, the group mentions more than 2000 MW already constructed (1100 MW Wind and 1000 MW Photovoltaic PV), out of which the most important achievement is the 600 MW largest onshore wind farm in the world, except US.

Enel Green Power Romania is the Enel Group company dedicated to developing and managing energy generation from renewable sources in Italy and throughout the world. It is responsible for all of the Enel Group's activities in the wind, solar, geothermal and run-of-the-river hydroelectric fields. Enel Green Power Romania is Enel Green Power's local subsidiary. It develops electricity generation projects from wind sources in the Banat and Dobrogea regions. Currently, a series of wind power projects are operational in the areas.

Challenging applications and tough environments

Ever since we first struck oil, it has been a vital asset to us. Every day we use hundreds of things that are made from oil or gas. In an industry with challenging applications and tough environments – Safety, reliability and innovation are key. And a global presence for local needs. It is hard to imagine the world without it. We are global – never far away. We believe in individual solutions. Atlas Copco – safe, high quality products that will increase your productivity.

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Building Momentum Toward Industrial Decarbonization

Phelim Kine *is the senior director Asia at the Washington, D.C.–based environmental campaign organization Mighty Earth and leads its heavy industry decarbonization brief*

The international conversation about industrial decarbonization is evolving from fringe environmental pipe dream to urgent industrial imperative. In the countdown to the 26th United Nations' Climate Change Conference of the Parties (COP26) in Glasgow in November, environmental campaigners and policymakers who have long made the case for industrial decarbonization to prevent potentially cataclysmic impact from unmitigated climate change have found a new and unexpected ally: heavy industry titans. Corporations, particularly in the steel sector, are making public commitments to transform their production systems into carbon neutral and/or carbon zero emitters over the next three decades. That's a tall order. The World Steel Institute estimates that the steel sector is responsible for approximately eight percent of total global carbon emissions. That makes corporate pledges to decarbonization encouraging, but still leaves a daunting gap between those intentions and meaningful carbon emission reductions.

Exhibit A of that trend is steel giant ArcelorMittal, one of the world's largest steel producers. ArcelorMittal committed on March 17 to the development and rollout of two low-carbon steel product lines including a "certified green steel" line and a low-carbon recycled steel line, respectively. This initiative will render only modest reductions in ArcelorMittal's carbon emissions. The company's new low-carbon product lines will constitute only a maximum of two percent of ArcelorMittal's total annual steel production by end-2022. That's a minimal contribution to the industrial carbon emission reductions that the United Nations' Intergovernmental Panel on Climate Change (IPCC) has estimated as essential to limit global warning to 1.5°C by 2050. The IPCC warns that failure to meet that target will greatly increase "climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth." But the initiative nevertheless has powerful symbolic value by serving notice to the wider industry of the necessity to respond to government, societal and customer demands for low carbon emission steel.

Other steel firms are likewise publicly recognizing the need for decarbonization of their production systems. Currently, 74 percent of the global steel market falls under a company or nation-wide carbon neutral or net zero emission commitment. Japan's Nippon Steel has set a target of reducing its carbon emissions by 30 percent by

2030 and, earlier this month, announced a research and development initiative to develop new decarbonization technology. Nippon Steel's president, Eiji Hashimoto, has warned that Japanese steel producers who fail to reduce the carbon footprint of the steel production process are at risk of facing "a crisis of survival" from more environmentally conscious competitors.

Similar pledges by South Korean steelmaker POSCO and China's state-owned Baowu Steel reflect a widening sectoral recognition of the intersection of climate action and industrial competitiveness through decarbonization. That leaves Hebei Iron and Steel (HIS) as the sole firm among the world's top five producers to not yet publicly commit to decarbonization. And a growing coalition of private firms and nongovernmental organizations dedicated to accelerating decarbonization of the global heavy industrial sector aims to convince HIS and other major steel producers that carbon neutrality commitments are now a fundamental corporate best practice in the 21st century.

That coalition is coalescing around a new international multistakeholder policy tool dedicated to accelerating and scaling-up the decarbonization of heavy industry to align with a 1.5°C global warming trajectory. The Global Framework Principles for Decarbonizing Heavy Industry ("Framework Principles") launched last month after a drafting process that involved close coordination with industry and policy experts across the globe. These principles constitute the first-ever publicly available global guidance for how to equitably balance economic growth with decarbonization.

The Framework Principles outline the roles governments and private industry can play to ensure the successful decarbonization of heavy industries – including steel, cement and chemicals – through allocation of public financing for emissions reduction plans. The Framework Principles specify investment in low- and zero-carbon technologies as a top government and corporate priority to help phase out fossil fuel use in industrial processes. The Framework Principles are grounded in a recognition that decarbonization efforts include biodiversity and human health protections and a commitment to a just transition to a decarbonized industrial future. The growing number of corporate endorsers include Tata Steel Ltd. and JSW cement of India, China's Jinko Solar and the U.S.-based carbon recycling firm, LanzaTech.

While corporate commitments to carbon neutrality are essential, heavy industry sector decarbonization will require meaningful government involvement through funding backed by supportive policy and regulatory initiatives. Pilot carbon reduction projects by ArcelorMittal, Tata Steel and Swedish steelmaker SSAB have hinged on millions of Euros in government support. That funding is a fraction of what is required to transition the entire global steel sector to carbon neutral status by 2050. POSCO last month underscored the financial challenge of that transition when it revealed that replacement of its nine existing high carbon emission blast furnaces with carbon-neutral facilities will cost the "equivalent to its 30-year operating profit." The United Kingdom has offered a potential model for meeting this challenge through government-corporate decarbonization partnerships by earmarking an initial US$1.4 billion over 15 years to fund such initiatives.

Governments can also play an important role by helping to foster the development of an accepted, universal standard for low-carbon or carbon-zero "green steel." Such standards are needed to ensure that corporate carbon neutrality commitments bridge the gap between rhetoric and reality. The ResponsibleSteel coalition, which groups a diverse array of high carbon emission corporations with nongovernmental organizations including Mighty Earth, has developed standards that extend beyond greenhouse gas emission metrics to include "a wide range of social, safety and environmental issues."

The steel sector's current high carbon emission status quo is clearly neither environmentally nor economically sustainable. That clarity must power the needed international momentum to push the serious, timely and collaborative corporate and policy sector measures essential to avoid the climate repercussions of unmitigated industrial high carbon emissions that threaten to push global warming beyond 1.5C. ■

A Possible Energy Approach for 2030

First and foremost, let's define the 5 main directions, important to be addressed: 1. Decarbonization; 2. Energy efficiency; 3. Energy security; 4. Internal energy market; 5. Research, Innovation and competitiveness.

Decarbonization with the reduction of greenhouse gas emissions for the period 2021-2030 by 33% compared to 2005 is an important commitment of all Member States, for the whole of Europe. It would be advisable that each country, besides the current measures taken, introduce new economic policies in general and sustainability policies in particular.

The sectors responsible for emissions and, therefore, for greenhouse gases absorption measures will be defined in detail in the documentation of EU Regulation No. 842/2018 regarding: transport, composition of private capital in the application of economic measures of large companies, focusing on waste, agriculture, ETS sectors (tertiary entities, i.e. associations, cooperatives, foundations, private entities etc., all with common public purpose for the application in good conditions of general services, waste etc.) or LULUCF (Land Use, Land Use Change and Forestry).

A functional subheading in the development of this point of this article would be, more plainly, 'Circular economy and waste'.

Besides the punctual measures, at both national and European level, there is a need to prepare a strategic general framework leading to specific interventions for the definition of sectors with major impact. In time, they could guarantee consistency and synergy with the programming of the other policies in the parallel economic directions, such as the manufacturing, food, textile and even car construction sectors etc.

Also, in terms of power generation, updating the infrastructural changes related to the punctual scenario named 'phase-out for carbon' in the 2021-2030-time frame.

An extremely important sector is agriculture. The idea of an agreement-program is born for adopting and coagulating measures for the improvement of soil quality, increasing production and the quality of agricultural products, in parallel with the definition of a code of good practices in order to reduce emissions, both carbon and ammonia.

Specialists in agricultural policies, through the common agricultural policy, are waiting for measures: 1. of conditioning direct payments on more stringent environmental requirements; and 2. to oblige Member States to introduce regimes with a positive impact on the climate with a positive impact on the use of certain former agricultural lands for the installation of photovoltaic panels, directly supporting the increase in efficiency, as well as the marketing of the respective energy, on the internal market.

All these measures will complete, together with the general European development measures, a more convincing rural development.

Measures on renewable energy will be completed with the support of construction of new facilities, but also the potentialization of the park, generically speaking, defined by the existence of power generation facilities. The important target is to resume their production at the level of advantageous operation.

Ioan-Corneliu Dinu *is a Scientific Counsellor at Romanian National Committee of the World Energy Council*

Following the implementation of the expected measures, in extenso, what we call singular and collective self-consumption will be promoted. The issue of promoting collective consumption is the use, for a group, of the public power transmission grid. The notion introduced and proposed will be of minor use of the public grid.

As regards the support schemes and instruments for collective self-consumption, the potentialization of obligations of the minimum quota of using renewable sources will be taken into account, extrapolating the general support, i.e. only for new buildings or constructions that are undergoing major restructuring., buildings which in the end will have, as a result of their use, zero harmful emissions, meaning that the generalization of the support from the state for the resilience of energy buildings will be pursued.

Returning to the small renewable power plants restructured and recommissioned, an item part of the 'Energy trilemma' remains that of the safety of the power system for medium and low voltage grids.

For small plants, the measures will be able to focus on simplifying the procedures, from construction to putting in operation (in production), as well as easing the management of these small plants, so for an installed power of less than 20 kW. All these will be possible using the ESP system (Enabled and Simplified Procedure) even up to an even higher installed power, but anyway below 100 kW.

Specialists in photovoltaic resilience insist on promoting new plants on agricultural structures, even the construction of semi-finished products used in agricultural constructions or houses in rural areas so that the assembly of these prefabricated elements can fully implement the architectural part itself, but also provide pre-assembled spaces for the electrical installation and connection of photovoltaic panels.

In this way, the agricultural areas dedicated to crops are not covered with photovoltaic panels. Moreover, there is an insistence on awarding this type of assembly of panels in the version described above.

In all cases, both plants with installed powers of over 1 MW and mini plants built avoiding the removal from the agricultural use of truly agricultural areas will be certified according to common measures that will be defined and approved in due time.

The same rescue, revamping and repowering approaches will be applied to hydropower plants, knowing that the values of the installed power are higher than for photovoltaics.

The plants to produce thermal energy using the so-called thermal renewable sources in the known and refurbished way will also be considered in the same context.

As far as forests are concerned, the actions carried out will take into account the annual cutting proposals, the forestry tests by known methods, but applied more decisively and the issuance of a 'white paper' for the entire forest park of the country.

Regarding activities related to energy efficiency, energy security, natural gas sector, petroleum products sector in the spectrum of the electricity sector itself, of interconnections with the European transmission system, emphasis will be placed on making activities in these national sectors more flexible.

All these relying on what we call innovation and competitiveness, using funds for research in the electricity field, for interventions and measures for technological and industrial development. ■

Underpinning the Transition

EC Prefers Green H2

Hydrogen is enjoying unprecedented momentum, is set to underpin EU's energy transition by 2050 and to support the global effort to implement the Paris Agreement, says the European Commission (EC) in the EU Hydrogen Strategy, released in July 2020.

The EU's executive body commends the use of hydrogen as having the biggest potential to foster the achievement of the EU's climate neutrality objectives, given its multiple uses (as feedstock, fuel, energy carrier or for storage) and its various applications across industry, transport, power generation. Similarly, the International Energy Agency (IEA) states that scaling up the use and application of hydrogen in sectors where it is currently not widespread, such as transport, buildings, and power generation seems to be the way forward in ensuring cross-sectoral decarbonisation.

It is fair to reckon that hydrogen plays an important, if not a fundamental role in humanity's transition towards a cleaner and more secure energy future. While the EU seems intent in placing its long-terms bets on green hydrogen mostly and recommends a gradual transition that favours the use of blue, turquoise and pink hydrogen, the IEA believes that to achieve Paris Climate Agreement goals global blue and turquoise hydrogen production should reach 40 million tons by 2030 from 450000 tons today.

Do you have a favourite colour of hydrogen?

Hydrogen is not an energy source per se, but an energy carrier. Hydrogen cannot be found easily in the nature; it must be produced using various chemical conversion processes and technologies. The specifics of the hydrogen production process and the type of fuel it utilises determine whether hydrogen will be dubbed green, grey, pink, yellow, blue, or turquoise, as shown below.

The most climate friendly type of hydrogen is considered the green hydrogen produced through the electrolysis of water and using electricity from renewable sources. Its GHG emissions are 0 or close to 0. Unsurprisingly, the EU Hydrogen Strategy puts green hydrogen in the spotlight as a priority to reach carbon neutrality by 2050 and for the global effort to implement the Paris Agreement while working towards zero pollution.

Currently, H2 can be extracted from fossil fuels, biomass, water, or a mix of both. However, it is still largely produced from natural gas or coal, accounting for around 6% of the global natural gas use and 2% of global coal. According to the IEA, the production of H2 from fossil fuels is responsible at a global level for CO2 emissions of around 830 million tonnes of CO2 per year, equivalent to the CO2 emissions of UK and Indonesia combined, whereas at EU level it results in the release of 70 to 100 million tonnes CO2.

In addition, the fuel costs are the largest component of hydrogen production and they account for between 45-75% of the production costs. Therefore, green hydrogen is not currently competitive with the fossil-based one (i.e., low gas prices give rise to some of the lowest H2 productions costs). Nonetheless, looking at the future declining costs for renewable electricity, in particular solar PV and wind, the competitiveness of green hydrogen is set to increase. Nowadays, less than 0.1% of global dedicated hydrogen

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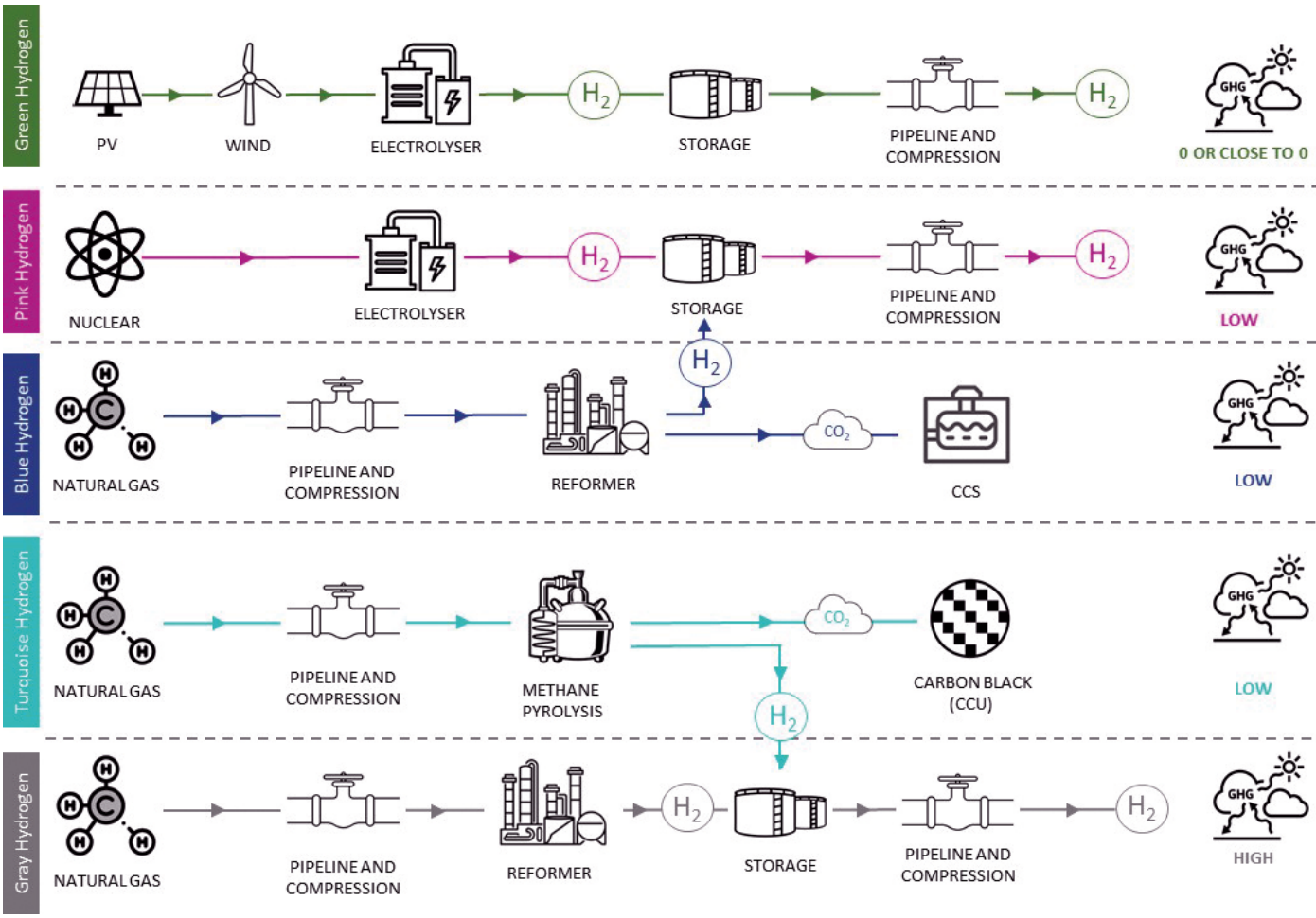

production comes from water electrolysis.

Green hydrogen is at the core of the EU's Hydrogen Strategy. The clear priority for the EU is to develop green hydrogen in three phases:

- First phase (2020-2024) installs at least 6 GW of electrolysers in the EU and produce 1 million tonnes of green hydrogen.
- Second phase (2025-2030) installs at least 40 GW of electrolysers and produce up to 10 million tonnes of green hydrogen.
- Third phase (2030 onwards and towards 2050) green hydrogen to become mature and be deployed at large scale.

Despite this rampant development pace that the EC envisions for electrolysers, low-carbon hydrogen, such as blue hydrogen with CCS, turquoise hydrogen with CCU and electricity hydrogen (regardless of the way in which electricity is produced) as enablers of the energy transition. For this reason, the NGOs have clamoured that the EU Hydrogen Strategy is a gift to oil and gas companies.

The discussions around hydrogen are important and very actual because even though technologies for its production have been developed, the production capacity is low: in the EU total production capacity of electrolysers is below 1 GW a year. A scaling up in production must be balanced by an upscaling of demand. The interplay between supply and demand will define the infrastructure needs for its transportation. Supply must be transported to the demand, either delivered to final users or included in an integrated energy system. Currently, hydrogen can be transported through pipelines, in trucks or ships. Even though the EC has issued a clear roadmap with ambitious goals of carbon neutrality through the deployment of green hydrogen at a large and mature scale by 2050, the regulatory framework has not been issued yet.

A clear, transparent, and dynamic regulatory

framework will allow to assess whether the current conditions applicable to the gas industry may be transposed for hydrogen as well. Particular attention should be paid to the hydrogen infrastructure since this is the backbone of any future hydrogen market.

In its EU Hydrogen Strategy, the EC assesses that for the 1st phase – no need for dedicate hydrogen infrastructure, local decentralized production; second phase – local hydrogen networks would emerge; third phase – repurposing of existing natural gas infrastructure seen as an opportunity for a cost-effective energy transition in combination with newly built hydrogen dedicated infrastructure (limited). For example, it is expected the hydrogen network in Germany and the Netherlands may consist of up to 90% of the repurposed natural gas infrastructure.

Blending of H2 into the natural gas networks

Conversely, when it comes to blending a specific amount of hydrogen into the already existing gas networks, both the EC and the industry see it as enabling the transitional phase and fostering the intake of decentralised green energy production in local networks; however, the EC's belief that blending is less efficient in the long run has spun reactions from the industry which claims that hydrogen admixtures should be properly recognised within the future EU energy regulatory framework. At the same time, the European Federation of Energy Traders (EFET) agrees that blending or co-transportations and the replacement of natural gas with hydrogen allows the gas system to play an ongoing role in a decarbonised framework and.

Gradual transition implies gradual regulation

The Agency for the Cooperation of Energy Regulators (ACER) and Council of European Energy Regulators (CEER) have expressed views on the implementation of the EU Hydrogen Strategy. The regulators welcome the strategy and emphasise the crucial role of gradual, dynamic, and flexible regulation of hydrogen networks in line with market and infrastructure developments, under the supervision of the regulatory authorities and period market monitoring. At the same time, EFET suggests that the EU Gas Network Codes and other existing regulations should be reviewed and adapted to ensure a harmonised regulatory framework for the future gas market in Europe. The regulation of any future hydrogen market shall locate hydrogen at the core of an integrated energy system and incentivise the development and deployment of hydrogen in the hard-to-abate sectors, such as maritime, aviation, transportation, and certain industrial processes. The EU's plan is to achieve this by unlocking large investments in clean hydrogen and CCS technologies from the EU's post-COVID 750 billion EUR recovery package.

Regulating an emerging market is no easy task

The EU is aware that regulating an emerging market beset by various unknowns is no easy task. Utmost attention should be paid to this transition period as a gradual development of the market and dynamic adaptation of the regulatory framework may guarantee the achievement of climate neutrality goal and a decarbonised integrated energy system with green hydrogen and renewable electricity at its centre. But the EC cannot and shall not be left alone in this process. A concerted effort from the member states, industry, civil society, and any other stakeholders is mandatory. That is why, on 26 March, the EC opened a Public Consultation on revising the Gas Directive 2009/73/EC and Gas Regulation 715/2009 as a step for the preparation of legislative proposals for a new hydrogen and gas markets decarbonisation package intended for publication in Q4 2021.

A sudden shift of the market rules coupled with lack in flexibility and dynamism of the regulation may result in failure to decarbonise the gas sector. But what will the EC choose? Will the new gas and hydrogen regulatory frameworks deploy a gradual regulation of the future hydrogen market?

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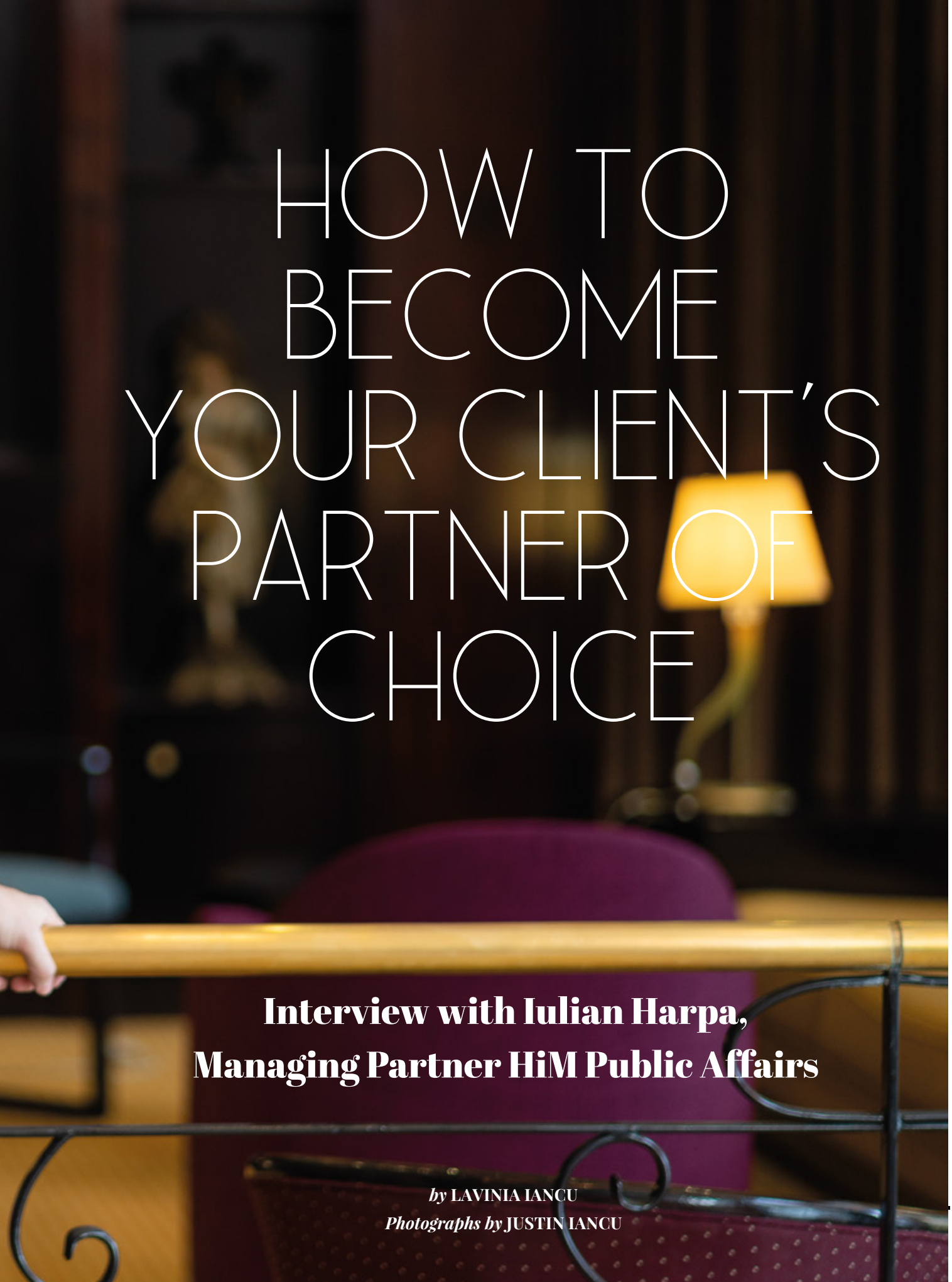


HOW TO BECOME YOUR CLIENT'S PARTNER OF CHOICE

Interview with Iulian Harpa, Managing Partner HiM Public Affairs

by LAVINIA IANCU

Photographs by JUSTIN IANCU

High Innovative Mind (HiM Public Affairs) is a consulting firm in the field of public affairs operating mainly in the energy sector, but not only. The concept was created by Iulian Harpa, Managing Partner, in 2014, and its aim is to build relations and consolidate customer reputation on their way to performance and success.
We are talking with Iulian Harpa about objectives, energy sector evolution in Romania and in the region, as well as about ways to develop the business environment in the following period.

Iulian Harpa has an extensive international experience as manager in financial and audit processes for OMV Petrom and Cameron, US, being responsible for the fulfilment of financial and operational commitments in the energy sector, at global level. Iulian was Non-Executive Director in the Board of Directors of 'Global Finance' Fund and Managing Partner at the Wing Media Energy Consulting Agency. He is a graduate of the Petroleum-Gas University of Ploiesti, with a degree in Commerce and Services. He also holds a Master's degree in Petroleum Business Management, at the Petroleum-Gas University, is certified by ACCA and graduated the Dale Carnegie communication and presentation courses.

How did the HiM project start and what are the main objectives of this activity?

In 2014, we set up the company High Innovative Mind, in order to provide consulting services, exclusively in the energy sector, area in which I was experienced, and I had been carrying out my activity for over 14 years at the time.

Specifically, the HiM Public Affairs concept - with integrated services of strategic communication, social responsibility projects, business representation, attraction of non-reimbursable funds (governmental, European and Norwegian), research & reporting and professional training sessions - started last year, in March 2020. Now, one year from the launch of the HiM project, although it was a period full of challenges in view of the pandemic crisis that has affected everyone's businesses, the results are starting to show and they don't come accidentally, but in the light of teamwork. I must admit that I had the opportunity to know wonderful people who quickly understood the challenge to start building a team and integrated concept, in which the results don't come immediately, and the strategy is a long-term one.

What we want is to constantly grow professionally and therefore afford to represent clients at the highest level, with personalized and quality services. It is not always easy, especially for companies with short-term projects, but that is where our role comes in, for a better communication and sharing together with our partners the expertise accumulated in international commitments helping to implement projects, based on sustainable strategies.

Our main goal is to become, in the medium and long term, the first choice of clients operating in the energy sector - which we consider the most competitive sector of Romania's industry.

After the international experience in the oil and gas industry, with operational and financial audits on all continents, and the various business and intercultural experiences, you chose entrepreneurship. What prompted you to make this decision?

As soon as I returned to Romania, at the end of 2013, from a three-year commitment in the US, and 15 years of activity in the corporate environment, I took up the challenge to start a project in the entrepreneurial area. Being a competitive person, after almost 15 years of operational and financial business analyses - maybe in the most complex business, the oil & gas industry - I set out to use the knowledge gained and try to combine the corporate principles with the entrepreneurial side, thus resulting in a hybrid business solution: planning and strategy on the one hand and communication and human dimension on the other.

International experience has helped me add to the professional portfolio a global understanding of the business environment: the Austrian thoroughness with the American pragmatism and optimism, the culture of Latin countries and of the Middle East, the Asian reliability, the African pace of development and, not least, the German fairness and British commitment.

Although the Romanian business environment is often blamed, after working in over 25 countries with highly difficult commitments from a professional point of view, I can say Romania is an environment in which you can build beautifully if you are persevering and patient. It's not always

easy! Personally, I don't always relate to the domestic expectation in which miracle solutions must be obtained in several months, but luckily, I am in the position of being able to compare, and my choice where to work was clear: Romania.

What influence did the period in which you worked for OMV Petrom have on this choice?

Thank you for the question! I would start by saying that my option of working in the energy sector is especially due to my family, which has worked at Petrom and from which I inherited the loyalty and culture specific to the industry.

In the over 10 years of activity at OMV Petrom I had the opportunity to understand and verify the processes and activities within the divisions of the largest oil & gas company in South-Eastern Europe. I will always remember with pleasure and professional satisfaction the audit engagements performed on offshore platforms, in refineries, in the power plant, in the tank farms and distribution stations.

I would like to mention very clearly that I was one of OMV Petrom employees who benefited from Petrom's privatization. At the beginning of my career, I gained knowledge, principles and professional experience, which helped me a lot and which will be useful during my entire career. In the six years in which I worked for OMV Petrom, after Petrom privatization, I can say that the new organizational culture helped the company become competitive and propose its employees' business principles and conduct.

And yes, any professional experience at OMV Petrom makes you stronger and gives you confidence to perform in the energy sector at a high level of professionalism. In a corporation you acquire essential skills from a professional point of view, and I would mention some of these:

business conduct, time management, planning, teamwork, and, last but not least, professional integrity.

How did you manage to cope with challenges and adaptation from the corporate environment to the entrepreneurial environment?

Long story short, after analysing the business strategy of hundreds of managers, with different business processes, I considered it was time to build a consulting firm in line with the business principles I believed in. Being for 15 years a corporatist and auditing, I must admit that it is not always easy to promote in the Romanian business the principle "don't promise what you can't deliver!".

The level of expectation is to get close as soon as possible with the newly created company to the working standard you were used to operate within a corporation, from every angle: location, working conditions, cash flow security, business infrastructure etc. And here you face the first shock at the beginning of the life as entrepreneur, when you understand you have nothing! When you realize that the workload and stress, periodic evaluations, the preparation of a budget and reports that required reviews in corporations seem like 'caresses' compared to the wild reality of early entrepreneurship. Another challenge for me was to adapt fast to the new perception of the market when you no longer have a title in an important corporation, and you start "knocking at doors" from the perspective of a simple limited liability company.

As a last challenge, I would mention the temptation of going back to a corporation, with the experience gained in entrepreneurship and here I admit there have been some very tempting offers that I have received and which I had to analyse carefully before declining them.

I chose to build as entrepreneur and the challenge was with myself, whether I can actually deliver what I recommended others to implement. I chose to make the professional change from the financial and audit areas to communication and business representation because I knew what, I knew how, and I clearly felt why! There is a huge room for dialogue, there is a need for professional and technical meetings and there is a real need for tailor-made client representation to be able to build together a sustainable business.

How did the energy sector in Romania and at international level evolve lately from your point of view?

The pandemic period has definitely made its mark on the global energy sector and implicitly with visible effects on the Romanian industry.

Although we are in a period filled with challenges, I would mention two directions that have caught my eye in the short and medium term. The first refers to the huge opportunity of accessing non-reimbursable funds allowing a sustainable capital input for efficient and sustainable projects, through programs with European and government funds. For this purpose, I would mention some: Just Transition Fund, Modernization Fund, National Recovery and Resilience Program, Regional Operational Program, Large Infrastructure Operational Program, Digitization Program, Innovation Fund, Horizon Europe 2021-2027.

The second, closely related to the first, refers to Romania's commitments before European bodies that must be objective, adapted to reality and assumed by professionals. Here I would refer, for example, to the share of energy from renewable sources at 30.7% and the reduction of ETS emissions relative to 2005, by 43.9%, both with deadline in 2030. About the goals assumed by Romania for 2050 to the zero-emission target, I like to believe that they were well understood and there are viable solutions to be met.

Starting from here, we cannot talk yet about an updated national strategy to clearly show how we can reach these assumed targets, given that coal production still covers during winter 30% of the national energy production. Also, the European Green Deal imposes a transition to a sustainable economy where gas - with a share of approx. 30% of total energy production - seems to have been accepted as transition fuel. And, because we refer to gas, the potential of Black Sea gas production is estimated as being a major one and it can take Romania in the position of the largest gas producer in the EU.

Specifically, Romania has the opportunity to access the funds made available by the EU through funding mechanisms such as: Just Transition Fund for regions dependent on industries that produce greenhouse gases. In Romania, it's about the following counties: Dolj, Gorj, Hunedoara, Mures, Prahova and Galati. I would also mention the Recovery and Resilience Mechanism, dedicated to relaunching the economies affected by the pandemic, with a budget of EUR 650 billion, of which EUR 30 billion were allocated to Romania through the National Recovery and Resilience Program, with double support for areas: climate and digitization.

Another major opportunity is represented by the Modernization Fund, a mechanism through which the European Commission makes available for the least developed 10 states in the Union non-reimbursable funds for project in the energy sector to support transition to the zero-emission target of the European Union, Romania having a financial allocation of over EUR 6 billion.

As regards the evolution of the energy sector at global level, I don't think on the horizon there is a consistent recovery in the short term and even more, risks of long-lasting negative economic effects being still on the rise: the fluctuating quotations of the oil barrel are a good example for the oil & gas industry. In this regard, I resonate with the statement of IMF Managing Director Kristalina Georgieva, who said in an interview at the end of last year that the post-crisis recovery would be "long, uneven and prone to setbacks".

How would you describe in a few words the business environment in Romania at this point?

A challenging question, which generates a mix of feelings, but the first words that come to mind are: opportunity and development. And, starting from this point, I can continue to answer on an optimistic tone. Although we are going through a difficult period, right in this period being in the third wave of the pandemic, there is an effervescence in the market, which will definitely be felt more extensively, from an economic point of view, starting with the spring of 2022.

The development gap between Romania and the Western European countries is diminishing at an accelerated pace and this can only bring added value reflected in foreign direct investments, know-how and expertise shared with the community management.

Of course, we need to be realistic and take the specific challenges into account. Here I refer to lack of predictability, excessive focus on short-term projects and a gap of entrepreneurial experience, especially due to limited budgets allocated for international certification and the lack of entrepreneurial tradition in Romania.

What is the role of HiM in the business environment? What is the company's strategy of positioning in the local and regional market?

The role of HiM Public Affairs in the business environment is to create strategic relations between important players in the energy market and offer its clients the opportunity to identify viable solutions of business development and promotion, starting from the real business needs. Our goal is to ensure the necessary support for clients, so that they can develop and become leaders in their line of business.

As far as our business strategy is concerned, it is one clear, based on reliability, humble approach and the accumulation of internationally certified competencies. Why? Because they provide us with the guarantee of efficient and effective representation of partners who put their trust in us.

Moreover, we want internationally certified competencies in our portfolio precisely to address international partners operating regionally and globally. For this purpose, HiM strategy refers to consolidation of existing partnerships and gradual expansion of the portfolio.

As I mentioned earlier, our main goal is to become, in the medium and long term, the first choice of our clients and partners.

What programs/projects does the company's agenda include for the future? What major projects have you implemented so far?

We are proud to have managed integrated CSR (Social Responsibility) services, strategic communication and business representation services in the largest project of geological data acquisition carried out onshore in Europe: 1,581 sq km in three counties: Buzau, Ialomita and Braila. It was a huge project, having as beneficiary the US operator Hunt Oil Company of Romania and the strategic partner OMV Petrom. It was a challenge to communicate and develop projects with 39 local communities and municipalities, but we succeeded, and the project was completed a month earlier than planned. I believe the secret of success consisted of communication and partnership developed with the relevant stakeholders before, during and after the completion of the project.

Another important project, which required a major engagement, was the implementation of an ISU working point in the commune of Padina, Buzau County, based on the partnership with the local Mayoralty, Buzau County Council, ISU Buzau and IGSU Bucharest. It is a project that was completed with the support of Secretary of State Raed Arafat, who understood the scale of the project and supported us unconditionally. I would not want to refer to the budget, but operationally speaking the ISU Padina Working Point has allocated 24 professional firefighters and paramedics, it serves 26,000 people 24/7, on a radius of 23,000 km2 and is equipped at the highest technical level, with ambulance and fire truck.

I would also like to mention that HiM Public Affairs was prequalified by EBRD Romania for consulting in the energy sector for two competencies: Energy/Resource Efficiency and Marketing & Strategic Communication. Financed projects are currently underway for companies with Romanian capital in the energy sector and we are proud to support the development of companies in the industry.

Last but not least, I would like to mention the competence in consulting for projects for attracting non-reimbursable funds and here I am not only referring to projects carried out by the relevant ministries, but also to projects managed directly by European bodies: Innovation Fund, Horizon Europe 2021-2027, Just Transition Fund, LIFE Environment and Resource Efficiency Program 2021-2027 etc.

What is in your opinion the most important responsibility of a manager within his own business? How do you measure the success of a company and what should be the main skills of the team?

There are many important responsibilities related to business management and continuity, but I strongly believe that the most important for a manager is to be honest. Beyond any experience and management skills, colleagues feel when you are a fair person, before being a manager. You can influence and manipulate the team with excellent short-term results, but for a sustainable success any company manager must aim to work side by side with the team, be a teammate and therefore be able to inspire.

Another important aspect is to permanently communicate within the team and be prompt in answering requests. It is the duty of any manager to do it and I have recently learned from an article, published on a professional platform, that the most demotivating factor for employees is the lack of prompt answers from management.

Last but not least, in terms of responsibilities, I would refer to the culture of an entity. Beyond any deadline, periods with heavy workload and stress, I believe it is a must to permanently ensure respect in the group, cultivate the sense of humour and not to

forget to discuss at least quarterly one-on-one with each colleague in your team.

The success of a company reflects in reaching the proposed targets and, through a well-structured implementation strategy, all the desired goals will be reached. For HiM Public Affairs, success can be measured by the feedback received from clients, by maintaining and developing long-term partnerships and, finally, by the continuous professional development of each member of the team.

How do you estimate the progress of the business environment in Romania in the following three-five years? What would be its development paths?

Beyond any desire or optimistic estimate of ours, we need to realistically assume the fact that at least this year and the next will be marked by the pandemic. Of course, any good news, of potential quick recovery of the global economy is welcome, but I prefer to a remain a reserved optimist.

As far as our economy is concerned, we are in a position in which we don't massively depend on a single industry like other countries (e.g., tourism or automotive), but a capital injection is needed from the state and here I hope the programs for supporting companies to go through the crisis period will become operational.

If we manage to propose and implement projects with non-reimbursable funds, it will be a great opportunity to reduce the development gap with the other countries in the Community bloc. Romania has a narrow window of opportunity and, at the same time, a historical chance of development in the following five - seven years if it invests in modernization the amount of EUR 80 billion.

Development of industrial infrastructure, of digitization and energy efficiency processes for all branches of the energy sector will allow Romania's access to a single European market on each level of activity. For Romania, membership to the EU and NATO is a strategic factor of stability that will ensure in the long run the development in the right direction, sooner... or later. ■

OIL 2021 Analysis and Forecast to 2026

World oil markets are rebalancing after the Covid 19 crisis spurred an unprecedented collapse in demand in 2020, but they may never return to 'normal'. Oil 2021, the IEA's latest medium-term outlook, explains why.

Rapid changes in behaviour from the pandemic and a stronger drive by governments towards a low-carbon future have caused a dramatic downward shift in expectations for oil demand over the next six years. This is forcing hard decisions on oil-producing countries and companies, which are reluctant to leave resources untapped or to install new capacity that would only sit idle. Could oil demand peak sooner than expected? Or is the world heading into a supply crunch? What will the implications be for the refining industry and trade flows?

Oil 2021 tackles these questions by analysing oil market data, trends in investment and government policies. The report provides a comprehensive outlook for global supply and demand through 2026 and explores some of the challenges and uncertainties that lie ahead.

A new normal for oil markets?

The global economy and oil markets are recovering from the historic collapse in demand caused by the coronavirus (Covid-19) pandemic in 2020. The staggering inventory surplus that built up last year is being worked off and global oil stocks, excluding strategic reserves, will return to pre-pandemic levels in 2021. And yet, there may be no return to 'normal' for the oil market in the post-Covid era.

The pandemic has forced rapid changes in behaviour: from new working-from-home models to cuts in business and leisure air travel. At the same time, more and more governments are focusing on the potential for a sustainable recovery as a way to accelerate momentum towards a low-carbon future. The outlook for oil demand has shifted lower as a result of these trends, raising the prospect of a peak sooner than previously expected if governments follow through with strong policies to hasten the shift to clean energy.

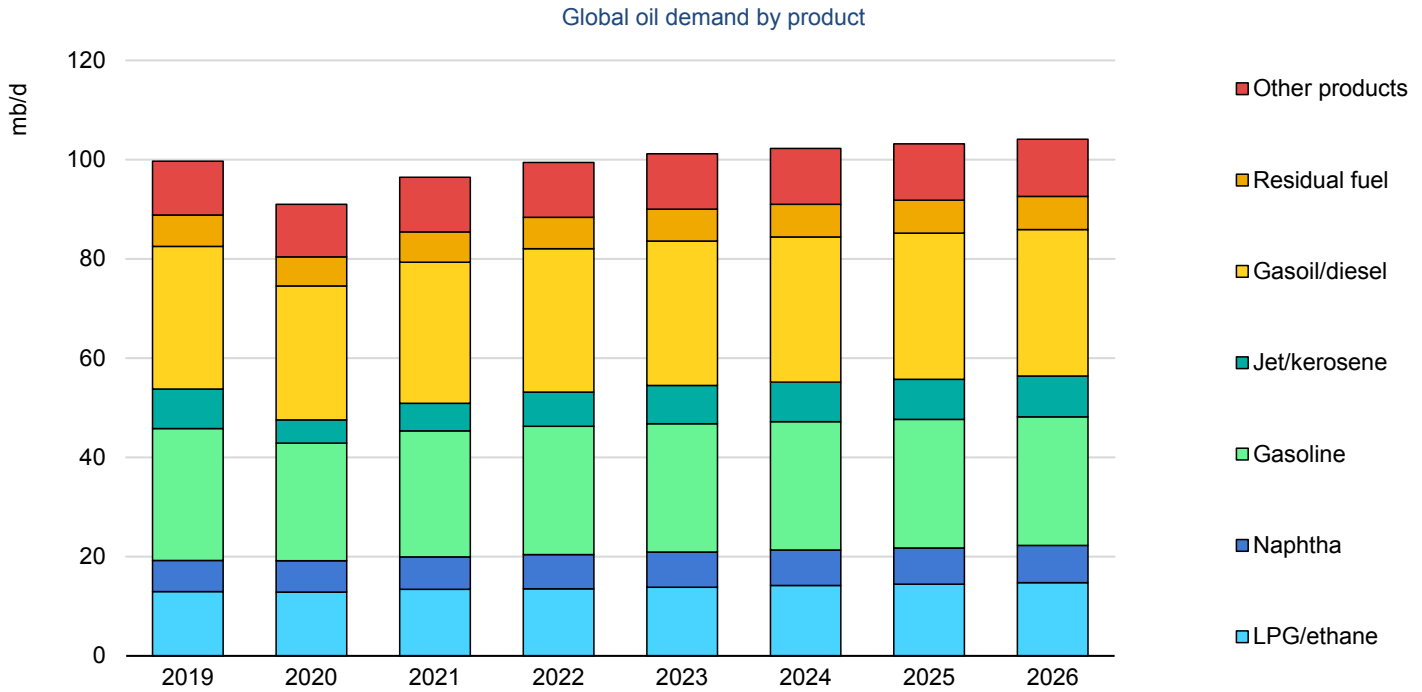
These forces are creating a dilemma for oil-producing countries and companies that are reluctant to leave resources in the ground or build new capacity that could sit idle. But if this leads to a shortfall in investment, it could also have geopolitical implications and heighten the risk of supply shortages later on.

Demand recovery path uneven

Global oil demand, still reeling from the effects of the pandemic, is unlikely to catch up with its pre-Covid trajectory. In 2020, the start of our forecast period, oil demand was nearly 9 mb/d below the level seen in 2019, and it is not expected to return to that level before 2023. In the absence of more rapid policy intervention and behavioural changes, longer-term drivers of growth will continue to push up oil demand. As a result, by 2026, global oil consumption is projected to reach 104.1 mb/d. This would represent an increase of 4.4 mb/d from 2019 levels. Oil demand in 2025 is set to be 2.5 mb/d lower than was forecast a year ago in our Oil 2020 report.

All of this demand growth relative to 2019 is expected to come from emerging and developing economies, underpinned by rising populations and incomes. Asian oil demand will continue to rise strongly, albeit at a slower pace than in the recent past. OECD demand, by contrast, is not forecast to return to pre-crisis levels.

Global oil demand rebounds from 9-year low of 91 mb/d in 2020 to 104 mb/d in 2026



The speed and depth of the recovery is likely to be uneven both geographically and in terms of sectors and products. Gasoline demand is unlikely to return to 2019 levels, as efficiency gains and the shift to electric vehicles eclipse robust mobility growth in the developing world. Aviation fuels, the hardest hit by the crisis, are expected to slowly return to 2019 levels by 2024, but the spread of online meetings could permanently alter business travel trends.

The petrochemical industry remains a pillar of growth over the forecast period. Ethane, LPG and naphtha together account for 70% of the projected increase in oil product demand to 2026.

Spending cuts slow world oil supply growth

The Covid-induced demand shock and a shifting momentum towards investment in clean energy are set to slow the expansion of the world's oil production capacity over our six-year forecast period. At the same time, the historic collapse in demand in 2020 resulted in a record 9 mb/d spare production capacity cushion that would be enough to keep global markets comfortable at least for the next several years.

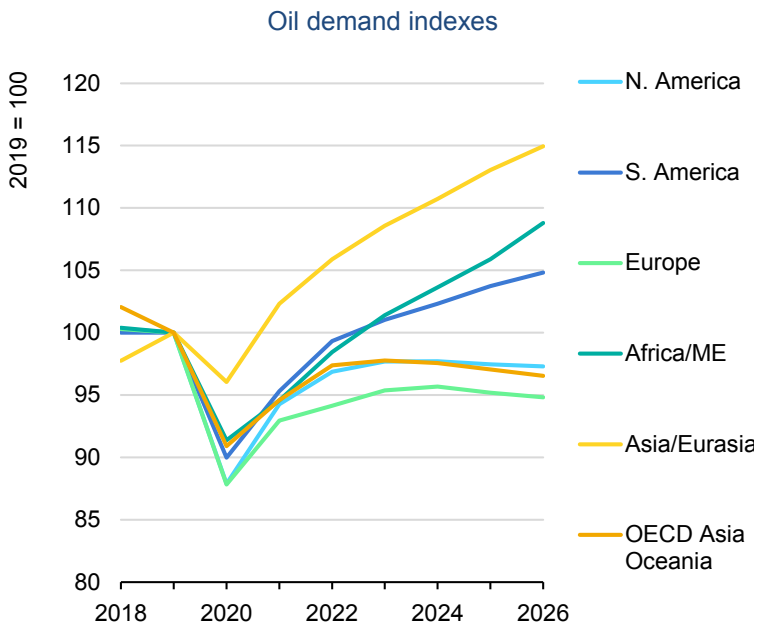
Against this backdrop, it is hardly surprising that upstream investments and expansion plans have been scaled back. In 2020, operators spent one-third less than planned at the start of the year (and 30% less than in 2019). In 2021, total upstream investment is expected to rise only marginally.

Those sharp spending cuts and project delays are already constraining supply growth across the globe, with world oil production capacity now set to increase by 5 mb/d by 2026. In the absence of stronger policy action, global oil production would need to rise 10.2 mb/d by 2026 to meet the expected rebound in demand.

Producers from the Middle East are expected to provide half of the increase, largely from existing shut-in capacity. If Iran remains under sanctions, keeping the world oil market in balance may require Saudi Arabia, Iraq, the UAE and Kuwait – with their surplus capacity – to pump at or near record highs.

That marks a dramatic change from recent years when the United States dominated world supply growth. In the current policy environment, US production growth is set to resume as investment and activity levels pick up in tandem with rising prices. Yet any increase is unlikely to match the lofty levels of the recent past. The outlook for the tight oil industry has been tempered by an apparent shift in the business model towards spending discipline, free cash flow generation, deleveraging and cash returns for investors.

The global market still looks adequately supplied through much of the medium term. But in the absence of fresh upstream investments, the



spare capacity cushion will slowly erode. By 2026, global effective spare production capacity (excluding Iran) could fall to 2.4 mb/d, its lowest level since 2016.

Refining sector in the midst of third rationalisation round

While the upstream sector could see its capacity cushion deflate, the refining sector is struggling with excess capacity. The Covid-19 demand shock, large scale expansions and expectations of a long-term structural decline in demand are creating an overhang that can only be eradicated through massive closures.

A third wave of worldwide refinery rationalisation is currently underway. Global shutdowns of 3.6 mb/d have already been announced, but a total of at least 6 mb/d will be required to allow utilisation rates to return to above 80%.

Operations east of Suez are expected account for all the growth in refining activity to 2026 from 2019 levels. As a result, Asian crude oil imports are projected to surge to nearly 27 mb/d by 2026, requiring record levels of both Middle Eastern crude oil exports and Atlantic Basin production to fill the gap. The centre of gravity for refined products trade is also set to shift to Asia, resulting in the region's oil import dependence rising to 82% by 2026.

Stronger policies can lower demand and hasten peak

A much stronger pivot towards a cleaner energy future will be required to reach ambitious mid-century goals for net-zero emissions. This will involve more concrete government policies and legislative action, as well as major behavioural changes.

Further fuel efficiency improvements, increased teleworking and reduced business travel, much stronger electric vehicle penetration and new policies to curb oil use in the power sector and more recycling will all be needed. Taken together, these actions could reduce oil use by as much as 5.6 mb/d by 2026, which would mean that oil demand never gets back to pre-crisis levels.

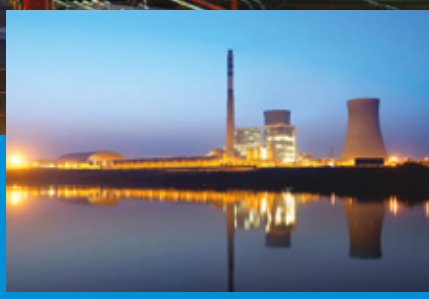
In IEA's base case – which takes into account current industry plans, government policies and existing energy transition initiatives – global oil demand is forecast to rise by 3.5 mb/d between 2019 and 2025. Aligning with the World Energy Outlook's Sustainable Development Scenario – which maps out a trajectory consistent with the climate goals of the Paris Agreement and other sustainable energy objectives – oil demand would have to decline by 3 mb/d over the same period. A pathway to net-zero emissions globally by 2050 would require an even sharper decrease.

Implications for industry

Fast-evolving government plans to accelerate transitions towards a more sustainable future have created a high degree of uncertainty that is testing the oil industry. It is crucial to invest in the upstream sector even during rapid transitions in which it would still take years to shift global transport fleets away from internal combustion engines to electric vehicles and other low-carbon alternatives. Some sectors – such as aviation, shipping and petrochemicals – will continue to rely on oil for some time.

Whatever the transition pathway, the oil and gas industry has an important role to play, and no energy company will be unaffected. Minimising emissions from their core operations, notably methane, is an urgent priority. In addition, there are technologies vital to energy transitions that can be a match for the industry's capabilities, such as carbon capture, low-carbon hydrogen, biofuels and offshore wind. In many cases, these can help decarbonise sectors where emissions are hardest to tackle. A number of oil and gas companies are already scaling up their commitments in these areas.

An effective and orderly transition will be critical – not only to reach international climate targets but also to prevent serious supply disruptions and destabilising price volatility along the way. ■



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First Jacket in the Romanian Black Sea Block Installed by GSP Teams

Photos by Grup Servicii Petroliere

On March 31, Romania's Grup Servicii Petroliere announced the successful installation, 120km off the coast of the Black Sea, of the first fixed production platform in Ana Block. The moment is significant for the history of hydrocarbon exploitation on the Romanian continental shelf of the Black Sea, given that it marks over three decades since, in May 1987, the first oil drilling installation in the region became operational. Today, after 34 years, Romania's GSP, in partnership with developer BSOG, install the first fixed platform that will extract gas from the Romanian continental shelf of the Black Sea.

"We are at a key moment for the Romanian industry, but also for the national energy sector. 34 years had to pass for Romania to find its courage, resources and allies to develop new projects of exploitation in the continental shelf of the Black Sea. This stage of Midia Gas Development project sends at least two messages. First of all, the Romanian industry has, again, the capacity to build big projects. The gas exploitation projects from the Romanian Black Sea shelf are sustainable," said Gabriel Comanescu, president of Grup Servicii Petroliere.

The jacket (basis of the platform) for Ana fixed platform was manufactured at GSP's shipyard in Agigea. The 1,300-ton installation measures 101m high, of which 69m are below sea level. The jacket will sustain the topside of the rig, which is already built in the operational basis of GSP in Agigea and will be transported and installed shortly.

Grup Servicii Petroliere is the main constructor of the first development project for the extraction of new hydrocarbons in the Romanian area of the Black Sea. All stages, from design, manufacturing, transport to the actual installation of the platform are performed, in integrated system, by GSP.

The 1,300-ton metal structure was transported to the installation site in the Ana block by GSP Bigfoot 2. The operation was of high complexity, which employed a large part of the GSP fleet: the largest floating crane in the Black Sea, GSP Neptun, the multifunctional barge GSP Bigfoot 1, with a crew of 160 people and several multifunctional support ships.

About GSP

Grup Servicii Petroliere is the regional leader in the sector of integrated offshore services for the oil and gas industry.

The company operates an extensive and diversified fleet of mobile offshore drilling rigs, multifunctional offshore assistance and supply vessels, marine construction and submarine pipeline installation vessels. The company owns and operates the most powerful floating crane in the Black Sea basin, GSP Neptun, with a capacity of 1800 tons.

GSP teams manufactured, transported, built and installed the largest topside jacket in the Black Sea, at Akcakoca, in Turkey's offshore.

In 18 years of existence, the company has delivered over 65 offshore oil drilling projects worldwide, built and installed hundreds of km of submarine pipelines and managed complex projects, integrated from the design and engineering stage, to manufacturing, logistics, construction, installation and even decommissioning.

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- Prevents expensive and time consuming maintenance of the BOP on surface
- Reduces spill of mud on deck when riser is laid down

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FEATURES & BENEFITS

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- Prevent expensive and time-consuming maintenance of BOP on surface

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Imports from Gazprom Dropping in 2020

Over the years, Romania has had on paper many projects for interconnection to gas pipelines in the region, but things have moved with difficulty. Today, although we rank among the first in the European Union in terms of gas reserves, we still depend on imports.

by **Daniel Lazar**

In 2020, Romania imported from Gazprom a quantity of 962 million cubic meters (mcm) of natural gas, down 3.2% compared to 994mcm in 2019, according to data published by the Russian group. Romania is one of the smallest clients of Gazprom in the region, in conditions in which last year Hungary imported from Gazprom 8.637 billion cubic meters (bcm) of gas, the Republic of Moldova - 3.04bcm, Bulgaria - 2.28bcm and Serbia a quantity of 1.346bcm. The only states in Central and Eastern Europe that have lower gas imports from Gazprom than Romania are Lithuania, Slovenia, Estonia, Bosnia and Herzegovina and Northern Macedonia.

Last year, Gazprom's exports to Europe fell by 12.1%, to 174.97bcm, in conditions in which prices and demand in the energy industry were affected by the coronavirus pandemic. The main European client of Gazprom was Germany, where imports fell by 14.3% in 2020, to 45.8bcm. The following two important markets of Gazprom are Italy and Belarus, in the case of which exports of the Russian group recorded declines by 5.9% and 7.4% respectively. In the case of other European markets, Gazprom's exports recorded mixed evolutions, with high increases in countries such as Slovakia (34.6%), Greece (25.1%) and Denmark (10.5%) and important declines in the acquisitions of countries such as the UK (minus 41.6%), Czech Republic (minus 37.8%), Serbia (minus 37%), Croatia (minus 34.8%), Finland (minus 34.5%) and Hungary (minus 17.9%).

Gazprom, the top global gas producer, ensures a quarter of Europe's natural gas demand. The Russian group supplies Europe with gas through three main routes: the pipelines in Ukraine, the Yamal-Europe route, via Belarus and Poland, and the Nord Stream gas pipeline, which links Russia to Germany, via the Baltic Sea.

Maybe this is precisely why the announcement made in the last decade of February was surprising, announcement according to which the contract for gas transmission through T3 transit pipeline on the territory of Romania to other countries, concluded by Romania's gas TSO Transgaz with Gazprom Export, and valid until December 31, 2023, ceased by agreement of the parties.

Last year, Gazprom's exports to Europe fell by 12.1%, to 174.97bcm, in conditions in which prices and demand in the energy industry were affected by the coronavirus pandemic.

"Transgaz informs that, for the purpose of applying the European regulations on the T2 and T3 gas transmission pipelines, of the conclusion with the adjacent transmission system operators of the interconnection agreements related to the entry/exit points of such pipelines, the legacy contract for gas transmission through the T3 transit pipeline on the territory of Romania to third countries, concluded with Gazprom Export LLC (GPE) and valid until 31.12.2023, was terminated by the mutual consent of the parties," the statement issued by the company mentions.

Basically, the negotiations carried out between the European Commission (DG-ENER), Transgaz and Gazprom Export LLC resulted in an agreement to terminate the legacy contract between Transgaz

and GPE. This Agreement is of particular importance as it creates the prerequisites for the application of the European regulatory framework for gas transmission capacity booking through the T2 and T3 transit pipelines and at the same time it ensures the optimal protection of Transgaz' financial interests arising from the legacy contract for gas transmission through the T3 transit pipeline. The Agreement for the termination of the legacy contract between Transgaz and Gazprom Export LLC creates the necessary framework for the conclusion of the Interconnection Agreements for Isaccea 2, 3 and Negru Voda/Kardam 2, 3 Interconnection Points, ensures the free access of third parties to capacity booking on the T2 and T3 transit pipelines, ensures the collection of the amounts outstanding under the legacy contract and creates the prerequisites for increasing the usage of the gas transmission infrastructure in Romania, the technical operator of the National Transmission System also mentions.

The Trans-Balkan gas pipeline crosses Dobrogea, from north to south, between Isaccea and Negru Voda, this being a system of three transit pipelines through which Gazprom used to carry gas necessary for South-Eastern Europe. It was built during the communist period, with financing from Gazprom, and the Russian giant had the right to use this pipeline exclusively. The contract with Gazprom for the Isaccea-Negru Voda 2 pipeline was initially signed by Romania in 1987, with validity until 2011, but since then it has been successively extended every year, although its provisions violate the EU rules on free competitive access to cross-border interconnections of European gas pipelines, the Russian side not accepting the modification or termination.

The contract for Isaccea-Negru Voda 3 pipeline, which also gave Gazprom a monopoly for the transmission capacity, was signed in 1999 and was to be valid until 2023. Because of contracts between Transgaz and Gazprom, signed based on international agreements concluded between Romania and Russia in 1970, 1986 and 1996, the European Commission triggered in 2012 an infringement procedure against the Romanian state, suspended in the meantime, before Romania being referred to the European Court of Justice. Romania terminated the conventions with Russia in 2011, but, as a result of termination mechanisms stipulated in the texts of conventions, they remained into force.

MOL Started Biofuel Production in the Danube Refinery

Based on several years of research and development, MOL stepped forward in the value chain and became biofuel producer from biofuel user, through the realization of an investment in Danube Refinery. In the new method, bio feedstock is co-processed together with fossil materials. This solution allows to increase the renewable share of fuels and reduce up to 200,000 tons /year CO2 emission without negatively affecting fuel quality.

"MOL Group has been a biofuel user by purchasing more than 500,000 tons of biofuels (bioethanol and biodiesel) for blending. With this investment, we have started to produce sustainable diesel for the first time within MOL Group and we became biofuel producers. The benefit is double, as while we produce more sustainable fuel, we will connect to the circular economy by recycling also waste. In line with our recently updated strategy, "SHAPE TOMORROW" we are planning to produce 100,000+ tons of biofuel by 2030," said Gabriel Szabó, Executive Vice President of MOL Group Downstream.

During co-processing that has been implemented in the Danube Refinery, bio-feedstock is processed together with the fossil material in the production of diesel fuel. Vegetable oils, used cooking oils and animal fats can also be used for this purpose. As a result, the produced gasoil is going to be partly renewable, without any quality changes compared to fully crude-oil based diesel. The main advantage of this method is that biodiesel type of components can be still blended in maximum 7 volume percent in line with the diesel standard, so the process after all is able to further increase the bio-share of the gasoil.

One of the main goals of the European Union and MOL Group is to achieve net-zero CO2 emissions by 2050. Renewable share obligations are continuously increasing in the transport sector, among others. Accordingly, biocomponent content expectations have also increased in MOL Group's fuel markets, which have so far been met mainly by blending bioethanol and biodiesel.

MOL started co-processing as an R&D project in 2012, based on the research results of Pannon University. Types and quality requirements of processable raw materials were determined during these steps and the investment has been launched in 2018. This included the necessary infrastructure development for storing and processing the new biomaterials.

The trial operation of the new process started in March 2020 and has been operating regularly since May. The produced bio-component has significantly higher CO2 saving potential than other type of biofuels produced from the same feedstock. This project means up to 200,000 tons of annual CO2 emission reduction, it's equal like a city of 200.000 inhabitants would use only solar energy for heating. Still the target is to extend the feedstock portfolio in the direction of waste and residues to achieve even better CO2 saving of the product.

One of the cornerstones of MOL Group 2030+ Strategy is to play a key role in shaping the low-carbon circular economy with investments in new businesses such as waste integration and utilization, recycling, carbon capture, utilization and storage (CCUS), advanced biofuels and potentially hydrogen-related opportunities. In the next five years, MOL will spend USD 1bn on new, low-carbon and sustainable projects to become a key player in CEE in the circular economy and to get closer to its net-zero CO2 emitter goal by 2050. MOL aims to transform its Downstream segment into a highly efficient, sustainable, chemicals-focused leading industry player. ■

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- Tank farm construction
- System integration, operating checks and commissioning
- Plant revisions
- Pipeline and bracket corrosion protection
- Insulation
- Scaffolding

Internationalization Projects at the Petroleum-Gas University of Ploiesti

The new leadership of the Petroleum-Gas University of Ploiesti (PGU Ploiesti) pays special attention to international cooperation and promotion of the oil & gas education worldwide, due to uniqueness of specializations at national and even international level, as well as experience gained and proven in time of teachers, researchers, technical experts and high-class specialists within PGU Ploiesti. All these constitute primary objectives of the International Cooperation Department, directions encouraged and supported by the current Rector, PhD Habil. Prof. Eng. Florinel Dinu.

by **Daniel Lazar**

Institutional agreements concluded or updated with over 80 universities and research institutions abroad, over the last five years, are active and represent constructive cooperation, which have brought added value to the current academic life, being capitalized to the maximum by preparing and initiating projects, providing openness to the Ploiesti-based university in the medium and long term. Updating the international relationships existing before the '90s in the oil and gas field has opened new directions of development within the Erasmus+ Program with the non-EU area. For this purpose, expansion of Erasmus+ program to new areas outside the European space comes to support the tradition of previous collaborations, as well as the Erasmus+ policy implemented at university level, which through virtual mobility ensures, even under unfavourable social conditions, academic exchanges, as well as adaptation of countries in the non-EU space to the European requirements of higher education.

Academic networks are a source of knowledge, of disseminating information, of added value through the visibility they can give and, therefore, they must be stimulated. Therefore, PGU Ploiesti has become a link between the two spaces of the oil and gas education - the EU space and the non-EU space. PGU Ploiesti currently holds Erasmus+ Mobility Projects worth EUR 934,771 that will be carried out until 2022, as well as mobilities for students and teachers, worth EUR 327,049, until 2023.

The Faculty of Petroleum and Gas Engineering is involved in research programs within EEA and Norway Grants that are based on environmental studies and exploitation of oil

"In 2021, the activity of internationalization will focus on attracting foreign students for university studies, by participation of the representatives of our university in the relevant educational fairs abroad. These activities, by being carried out online, have overcome several barriers that led to the limitation of participation of future student candidates, who did not have the resources and/or time to participate in such events. Besides this proposed objective, projects based on digitization and components carried out in partnership will continue to be submitted, of the type of green cooperation and mobility."

Rector, PhD Habil. Prof. Eng. Florinel Dinu

and gas fields. Collaboration with partners in Norway has led to the development of new directions of research in the field of renewable energy, in which, in addition to the University of Stavanger, the Norwegian Norce Institute has also been involved.

The project submitted this year within the competition European Universities for an oil career-EUROCA (worth over EUR 300,000) has obtained a good score, even if it was not approved. This has led, also due to involvement of partners in Bulgaria and Greece, to the materialization of a common initial plan, aimed at carrying out a joint Master's Program with the Oil and Gas specialization, to develop new milestones for this large and complex field.

Adaptation of strategies to the current geopolitical and social conditions, as well as their implementation in order to focus education on the student, will be implemented at PGU Ploiesti within an international consortium started within the Erasmus+ competition - Key action 3 - 2020, by preparing and submitting the project named VALIDEX - Experimental testing of higher educational policy intervention opportunities aiming at the implementation or extension of validation practices, and making policy proposals backed up with the pilot policy measure testing results. With universities from Hungary and Slovakia as partners, the value of the project amounts to EUR 600,000.

Another project submitted in the field of international cooperation strategies is 'CONOCO: COping with NO mobility during COrona Virus times: Learning from each other', having as implementation period October 2020 - May 2022.

"In 2021, the activity of internationalization will focus on attracting foreign students for university studies, by participation of the representatives of our university in the relevant educational fairs abroad. These activities, by being carried out online, have overcome several barriers that led to the limitation of participation of future student candidates, who did not have the resources and/or time to participate in such events. Besides this proposed objective, projects based on digitization and components carried out in partnership will continue to be submitted, of the type of green cooperation and mobility. The establishment of a university consortium at national and international level to support the focus of education on the student and the adaptation of university programs to the latest requirements in the labour market and aimed at the professions of the future will be priorities of internationalization in our university," said Rector Florinel Dinu.

Contracts within European programs

Contracts within European programs include: National Rehabilitation and Resilience Program (NRRP); Operational Program Human Capital; Regional Operational Programs; Secondary education projects ROSE – University Grant Scheme (UGS); Agreements for grants from the Institutional Development Fund for state universities.

Accreditations of study programs

Faculty of Petroleum and Gas Engineering

In 2019, three university study programs were accredited within the Faculty of Petroleum and Gas Engineering: Bachelor's program, full-time education Transport, Storage and Distribution of Hydrocarbons and the program for low-frequency education (PGE) Petroleum and Gas Engineering, both in the Petroleum and Gas Engineering field and the Bachelor's program, full-time education, Geology of Petroleum Resources in the Geological Engineering field.

In 2020, all steps necessary were made for submission to the Romanian Agency for Quality Assurance in Higher Education (ARACIS) of the report for periodic evaluation regarding the accreditation of the university study program Petroleum and Gas Engineering, full-time education.

In the first part of 2021 two master's fields enter the periodical evaluation process: Mining, Petroleum and Gas, which includes six programs, namely: Petroleum Extraction, Well Drilling, Hydrocarbon Transport, Storage and Distribution Technology, Reservoir Engineering, Petroleum Industry Management and Petroleum Engineering (program taught exclusively in English). And within the Geological Engineering master's field the Petroleum Geology study program will be subject to accreditation.

Scientific research contracts made in 2020 and/or in progress

- Elaboration of a study substantiating the specific natural gas technological consumptions related to petroleum operations, in order to report them monthly to the National Agency for Mineral Resources (NAMR), for their endorsement - beneficiary OMV Petrom
- Investigation in order to identify the causes and sources of pollution in Vadu area. Identification of potential polluters - beneficiary Rompetrol Rafinare
- Constructive Design - Product Designs with Timken Database Development, Modification, Cancellation and Development - beneficiary Timken Romania
- Research on the determination of the technical characteristics, according to API 4F, of the UW 48-11.00.00.00.1A mast - beneficiary IA Project Apahida
- Study on the defects of the equipment with leaks in the distribution system - beneficiary Distrigaz Sud Retele
- Study substantiating the specific natural gas technological consumptions related to petroleum operations of Amromco Energy, in order to report them monthly to NAMR, for their endorsement - beneficiary Amromco Energy
- Determination of the percentage rate of the value of gross revenues from petroleum operations carried out through petroleum terminals, other than those in state public ownership, in order to pay the royalty to the state budget - beneficiary NAMR
- Increasing the energy efficiency of biogas plants by developing the integrated system: biogas-microalgae-biofuels, within the concept of biorefining (Algal Biogaz Concept Energie) - beneficiary UEFISCDI/ICECHIM
- Hybrid energy efficiency system using geothermal energy applied in the PGU Ploiesti campus, project financed from Norwegian funds and financially supported in partnership with Prahova County Council and PGU (deadline 2022). Thus, the PGU campus will become one of the few in Europe where geothermal energy is used to heat/cool the spaces in amphitheatres, laboratories or classrooms. It is an energy efficient system, which greatly reduces the heating costs during the cold season, but also the costs of cooling the spaces during the summer. The Norwegian funds allocated amount to EUR 1.35 million, with co-financing of EUR 240,000 from the Prahova County Council and EUR 1,700 from PGU.

Service agreements in 2020

- RLC Computation application - beneficiary OMV Petrom Global Solutions
- Studies for evaluating the quality of petroleum products based on specific laboratory tests - beneficiary SGS Romania
- Performance of pipe collapse tests - beneficiary Arcelor Mittal Tubular Products
- Laboratory analyses to determine the oxidation stability of some lubricating oils - beneficiary Terraverde
- Collapse testing - beneficiary Liberty Tubular Products Ostrava, Czech Republic
- Mechanical tests on test-pieces provided by the beneficiary - beneficiary Bauelemente
- Mineralogical research by X-ray diffraction on samples/cores – beneficiary National Oilwell Varco Romania
- Mineralogical research by X-ray diffraction on samples/cores – beneficiary Amromco Energy
- X-ray diffraction analysis on core rock samples - beneficiary OMV Petrom
- Mineralogical research by X-ray diffraction on solid materials – beneficiary Xella Ro
- Mineralogical research by X-ray diffraction on solid materials – beneficiary Ader Agregate

- Tests, determinations and measurements on tubular materials made of high-density steel or polyethylene - beneficiary Fevel Team
- Mineralogical research by X-ray diffraction on samples of solid materials – beneficiary Ecomaster Servicii Ecologice
- Determination of VOC (volatile organic compounds) concentrations in OMV Petrom Brazi tank 575 - beneficiary Petrodesign
- Performing the shock bending test at -40 degrees C - beneficiary Franksthal Romania
- Elaboration of technical documentation for the formulation of liquid fuels - beneficiary Dytiv
- Analysis of thickness and hardness of layers of thermally and chemically treated parts of the beneficiary - beneficiary Uztel
- Analysis of petroleum products - beneficiary Eurototal Comp
- Evaluation of the quality of lubricating oils based on specific test methods - beneficiary Bureau Veritas Control International
- Services of checking the quality of biofuels and bioliquids - beneficiary Certrom
- Mineralogical investigations by X-ray diffraction on samples of building materials – beneficiary Celco
- High Collapse Testing - beneficiary Liberty Ostrava, Czech Republic

Projects on teaching and scientific activities carried out in 2020

In the spring of 2020, at the initiative of teachers of PGU Ploiesti technical faculties, the Technical Bulletin of PGU was transformed into a journal named Romanian Journal of Petroleum & Gas Technology, aiming to index it in as many International Databases as possible, thus increasing the visibility of the research activity of the university teachers.

PGU Ploiesti Publishing House is classified in category C, in the Philology Domain, and in the Technical Sciences Domain it is classified in the B+, category according to the methodologies of classification of the National Council for Scientific Research (CNCS) in 2020. This is a tool for the elaboration, publication and dissemination of courses, monographs, doctoral theses or scientific papers written by teachers from the five faculties of the university, by renowned researchers, students, master's and doctoral students.

The Faculty of Letters and Sciences within PGU Ploiesti rises to academic quality standards through studies published by its teachers and researchers in the Journal of Educational Sciences and Psychology (JESP), the only Romanian journal of education sciences and psychology indexed in prestigious international databases like Thomson Reuters – ESCI, Web of Science, Directory of Open Access Journals (DOAJ), European Reference Index for the Humanities and Social Sciences (ERIH Plus), Index Copernicus, EBSCO, Proquest, Scipio, and in the journal Word and Text – A Journal of Literary Studies and Linguistics, classified - in 2020, at the last CNCS evaluation - in category A.

The award is granted to a small number of academic journals in Romania, which demonstrates its scientific quality and outstanding international visibility. It is also indexed internationally in Index Copernicus, EBSCO, Scipio, Ulrich Periodicals Directory, MLA (Modern Language Association) International - Bibliography, Scopus, ERIH Plus, DOAJ (Directory), CEEOL, Clarivate Analytics –Emerging Sources Citation Index.

The Faculty of Economic Sciences publishes annually the Economic Insights – Trends and Challenges magazine, which is valued as an international academic publication, of high scientific quality, being indexed in prestigious international databases such as EconLit, Directory of Open Access Journals (DOAJ), EBSCO, CABELL'S Directories, Ulrich's and Index Copernicus.

Proposals of projects in 2021

At PGU Ploiesti level, Grant Agreements Institutional Development Fund intended for state universities (IDF) in 2020 were directed to the six areas, as follows: Increasing social equity, with a view to social inclusion and increasing access to higher education, linking the educational supply with the demand of the labour market (including those related to career counselling and guidance); Internationalization of higher education in Romania; Ensuring the proper functioning of university botanical gardens, teaching stations, practice bases and other infrastructures for supporting teaching activities (similar to practice bases) within universities; Supporting the activities of student entrepreneurial societies (SAS); Improving the quality of the teaching activity, including respect for deontology and academic ethics; Supporting research excellence in universities;

It is worth mentioning a Research Contract concluded in 2021 by the Faculty IPG+IME, with the topic 'Determination of the percentage rate of the value of gross revenues achieved from petroleum operations of transport through transmission systems, other than the national petroleum transmission system, as well as from petroleum operations performed through the petroleum terminals, other than those in the public ownership of the state, for payment to the state budget of the petroleum royalty' – beneficiary NAMR. ■

PGU Ploiesti Team Became European Champion at PetroBowl

The team of the Petroleum-Gas University of Ploiesti (PGU Ploiesti) became the European Champion of 2021 following the PetroBowl competition, which took place in the period March 16-17, an inter-university competition between Student Chapters with flashcards on the technical and non-technical aspects of the oil and gas industry.

by **Daniel Lazar**

In this European stage, 15 of the most renowned relevant Universities participated, from Scotland, France, Austria, Germany, Italy, Great Britain, Croatia, Denmark, Norway and Romania.

On their way to the final, the students representing PGU Ploiesti competed with students from the Polytechnic University of Milan, the Norwegian University of Science and Technology, the Higher Petroleum School of France and the Stavanger University of Norway in the final stage.

PGU Ploiesti will participate in the international stage that will take place between September 21-23 in Dubai, where the best 32 teams in the world will compete for a place as honourable as possible in the world hierarchy.

The team of champion students consisted of the following: Andrei Blanaru, master student at the Faculty of Mechanical and Electrical Engineering, specialization in the Engineering of Optimal Operation of Petroleum Equipment; Umberto Beli, master student at the Faculty of Petroleum and Gas Engineering, specialization in Well Drilling; Eduard Mihoc, master student at the Faculty of Petroleum and Gas Engineering, Reservoir Engineering specialization; Andrei Baican, master student at the Faculty of Petroleum and Gas Engineering, specialization in Reservoir Engineering and Well Drilling; David Musca (captain), third year student at the Faculty of Petroleum and Gas Engineering, specialization in Oil and Gas Engineering.

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Energy Storage and H2 Technologies in Romania

Energy is a commodity that in principle cannot be stored, being produced in close correlation with consumption. The explosive development of generation from renewable energy sources (wind and solar in particular) and the objectives of the COP 21 Agreement for fighting climate change concluded in Paris in December 2015 have imposed an intensification of research to find new solutions of storage technologies able to take over the great volatility of generation from renewable energy sources.

by **Calin Radu Vilt, Scientific Counsellor at the National Committee for World Energy Council**

They have caused many changes in the management of safe operation of all energy systems at global level.

Besides the conventional pumped storage, which has been promoted for over 50 years, the hydrogen technology has become particularly attractive. 4.0 digital revolution has created an important global technological emulation, strongly developing the energy sector.

According to international studies, about eight storage technologies have been researched and analysed, to solve these particularly complex issues faced by the energy sector at global level.

At the G20 meeting of the most developed countries, in Osaka, in June 2019, the International Energy Agency (IEA), from Paris, presented a report based on which G20 decided that hydrogen technology be developed and replace fossil fuels in heavy transport by 2050, allocating important financial resources in order to perfect the yields and significantly decrease the costs of producing hydrogen fuel cells.

Financing and subsidies will be used to develop new industrial capacities, to support these particularly ambitious targets. They will radically change global economy, all heavy road transport, with trucks and buses, rail and naval transport following move to these new hydrogen powered technologies.

Hydrogen production is made through several technologies, that by electrolysis which results in green ecological hydrogen being privileged, whose use in fuel cells produces energy and water, thus fulfilling some circular economy goals, imposed by international agreements, but especially the decarbonization targets envisaged by the COP 21 Paris Agreement to limit climate change.

Energy produced by volatile wind and solar sources is envisaged for the small to medium quantities and nuclear production capacities are considered for large quantities.

The impact of these decisions is huge in the field of transport and car construction, but especially in the energy sector.

Decision-makers have established that energy transition to zero emission in 2050 would be

extremely fast and hydrogen necessary in transport would be produced in energy systems, resulting in huge generation needs, which are not scientifically estimated with accuracy. This is because they must be correlated with the possibilities of industrial capacities of machine building, which will manufacture the new generations of trucks, buses and ships powered by hydrogen fuel cells and with the storage and distribution infrastructure of this new energy carrier.

The European Commission's Communication of July 8, 2020 on the action plan for the development of hydrogen technologies is a huge step forward, opening a new technological era over the 4.0 Digital Revolution.

In June 2020, Germany and France made public their strategies on the development of this new technological concept with hydrogen.

Hydrogen is already used in injection in natural gas mains, to reduce emissions and increase the calorific value, in higher concentrations combustion temperatures increasing by up to 200 degrees, which has caused problems in adapting materials.

There are heating system applications that work with hydrogen.

In the first stage, these new plants have been developed in remote areas, where it is more difficult for other fuels to reach.

The hydrogen technology comes with a spectacular and extremely flexible solution between energy and gas for storage and flattening the production/consumption curves, for both electricity and gas, where storage and pressurization in the national gas transmission systems have a great flexibility over a 24-hour cycle.

Romania has a great experience in the research of hydrogen technologies within the Govora National Institute of Scientific Research, where about eight years ago a dedicated laboratory was built and where two models of hybrid vehicles with fuel cells were made, which have been working with excellent results for over six years.

Ramnicu Valcea National Institute for Research and Development for Cryogenic and Isotopic Technologies (ICSI), together with the Association for Hydrogen Energy in Romania (H2Romania), with the Polytechnic University of Bucharest, the Petroleum-Gas University of Ploiesti and RNC-WEC (National Committee for World Energy Council), with the support of the Department of Sustainable Development of the Government, have laid the foundations of the new national entity dedicated to hydrogen - the Romanian Hub for Hydrogen and New Energy Technologies. It aims to interdisciplinary correlate the development of these industries, as a cross-sectoral concept, and of industrial-scale pilot projects to validate research and technology in practice.

The technological concept was developed by an interdisciplinary team, trained by Professor Emeritus Eng. Mircea Eremia, PhD, Professor Eng. Niculae Napoleon Antonescu, PhD, Professor Eng. Mihail Minescu, PhD, Professor Eng. Florinel Dinu, PhD, Professor Physicist Mihai Varlam, PhD, Reader Chemical Eng. Researcher Ioan Iordache, PhD, Reader Eng. Lucian Toma, PhD, Reader Eng. Mihai Sanduleac, PhD, Eng. Iulian Iancu, PhD, and Eng. Calin Vilt, RNC-WEC scientific counsellor.

Both own resources and EU funds will be used to implement this concept, in the European Union approx. EUR 40 billion being budgeted for the period 2021-2026 for all Member States. ■

Horizon Europe's First Strategic Plan 2021-2024

On March 15, the European Commission adopted the first strategic plan for Horizon Europe, the new EU research and innovation programme worth EUR 95.5 billion in current prices. The strategic plan is a novelty in Horizon Europe and sets the strategic orientations for the targeting of investments in the programme's first four years. It ensures that EU research and innovation actions contribute to EU priorities, including a climate-neutral and green Europe, a Europe fit for the digital age, and an economy that works for people.

"This Plan provides a frame for top quality, excellence-based research and innovation to be delivered with the Horizon Europe Work Programme. With this strategic orientation we ensure that research and innovation investments can contribute to a recovery process based on the twin green and digital transition, resilience and open strategic autonomy," Margrethe Vestager, Executive Vice-President for a Europe fit for the Digital Age, said.

"The strategic plan's orientations will ensure that our common EU policy priorities benefit from new knowledge, ideas and innovation. This new approach is another way to make sure that the research and innovation funded by the EU will address the challenges faced by Europeans," Mariya Gabriel, Commissioner for Innovation, Research, Culture, Education and Youth, added.

An ambitious plan for an ambitious programme

The strategic plan sets out four strategic orientations for research and innovation investments under Horizon Europe for the next four years:

- Promoting an open strategic autonomy by leading the development of key digital, enabling and emerging technologies, sectors and value chains;
- Restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources;
- Making Europe the first digitally enabled circular, climate-neutral and sustainable economy;
- Creating a more resilient, inclusive and democratic European society.

International cooperation underpins all four orientations, as it is essential for tackling many global challenges.

The strategic plan also identifies the European co-funded, and co-programmed partnerships and the EU missions to be supported though Horizon Europe. The partnerships will cover critical areas such as energy, transport, biodiversity, health, food and circularity, and will complement the ten Institutionalized European Partnerships proposed by the Commission in February. EU missions will address global challenges that affect our daily lives by setting ambitious and inspirational but achievable goals like fighting cancer, adapting to climate change, protecting our oceans, making cities greener and ensuring soil health and food. Employing a large portfolio of instruments across diverse disciplines and policy areas, the EU missions will tackle complex issues through research projects, policy measures or even legislative initiatives.

The plan's orientations also address several horizontal issues, such as gender. The integration of the gender dimension will be a requirement by default in research and innovation content across the whole programme unless it is specified that sex or gender may not be relevant for the topic at stake.

Next steps

The priorities set out in Horizon Europe's strategic plan will be implemented through the Horizon Europe work programme. It sets out funding opportunities for research and innovation activities through thematic calls for proposals and topics. The first calls for proposals will be launched in the spring of 2021 and will be presented at the European Research and Innovation Days on 23-24 June. ■

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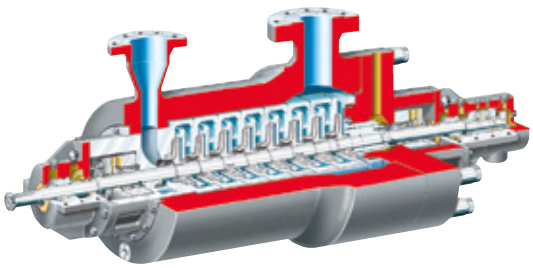


WIK Pump - according to API 610 (BB5) Standard

Battery Recycling in Romania According to EU Rules: Mission Impossible?

Batteries are negative value waste. The cost of recycling is much higher than the value of by-products obtained. And yet it should be pointed out that a used battery, dumped randomly, together with household waste and reaching the dump can pollute 1 cubic meter of soil for a period of up to 100 years (according to Brussels Institute for European Environmental Policy).

by **Rona Rita David**

The new regulation of the European Union (EU) on batteries and battery waste obliges Romania, like the other EU member states, to reach a collection/recycling percentage of waste batteries and accumulators of 65% by 2025. Opinions are divided on the possibility of reaching this target. The representatives of the Ministry of Economy, Entrepreneurship and Tourism (MEAT) pointed out, during the Environmental Committee meeting in the Senate, that this is a 'courageous' target for Romania.

"We cannot sit idly by meditating on the idea that 65% is a too bold target. Batteries dumped randomly are a great threat to the environment. The situation must be resolved. It takes political will to impose a legislation that encourages the recycling of batteries, as well as accountability of all those involved: citizens, administrative territorial units, recyclers etc. Most citizens don't have yet the reflex of taking the batteries back to the store. Old mobile phones are often kept unnecessarily in drawers, small appliances are thrown in the trash, while they can have a second life, either by recycling devices that have come to the end of their life or by reusing equipment that is still working. The idea is to facilitate and motivate the collection of batteries and permanently inform consumers," highlighted the Chair of the Environmental Committee, Aurel Oprinoiu.

MEAT proposals for improving the collection and recycling of batteries

The Ministry of Economy, Entrepreneurship and Tourism has presented several proposals to improve the process of collection and recycling of batteries. While batteries in some applications may be suitable for removal by the end-user, not all batteries in all applications can be easily removed. Concerns related to safety and use of internal rechargeable batteries may mean that for certain batteries in some specific applications it

Collection of portable batteries and accumulators, 2009–2018

(tonnes)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU-27 (1)	*50 000*	*55 000*	*60 000*	*64 000*	*64 000*	*68 000*	*74 000*	*82 000*	*83 000*	*88 000*
Belgium	2 525	2 232	2 229	2 273	2 298	2 343	2 438	3 153	2 813	2 935
Bulgaria	13	54	108	261	247	303	322	362	387	402
Czechia	409	525	855	1 010	1 114	1 195	1 407	2 082	1 890	1 921
Denmark	1 405	1 393	1 589	1 511	1 403	1 544	1 591	1 686	1 987	1 979
Germany	16 555	16 953	17 728	18 157	18 599	19 142	19 678	20 524	21 037	23 569
Estonia	:	:	72	123	293	107	173	127	156	161
Ireland	212	283	613	574	616	678	773	1 129	1 328	1 227
Greece	:	:	:	:	:	:	567	632	571	553
Spain	1 919	3 320	3 626	3 961	3 697	3 876	4 710	4 511	4 670	4 592
France	10 442	10 791	11 621	11 776	11 366	11 989	12 296	13 678	13 981	14 400
Croatia	:	:	:	:	76	72	98	337 (b)	476 (b)	525 (b)
Italy	4 670	6 188	7 446	8 050	8 429	9 585	10 105	9 495	9 488	:
Cyprus (2)	*6*	25	33	31	39	41	55	57	64	:
Latvia	223	113	127	129	133	147	130	169	225	232
Lithuania	193	212	213	253	276	248	309	375	347	:
Luxembourg	111	116	133	128	117	121	106	114	109	140
Hungary	408	434	451	527	520	607	746	922	990	1 069
Malta	:	:	18	20	39	21	35	23	23	26
Netherlands	3 122	3 385	3 321	3 298	3 157	3 261	3 430	3 944	4 000	4 309
Austria	1 705	1 647	1 738	1 909	1 976	2 097	2 299	2 188	2 117	2 270
Poland	:	1 775	2 230	2 933	3 170	3 710	6474 (b)	9 615	8 311	10 706
Portugal	497	476	411	448	486	489	527	711	732	669
Romania	12	35	159	312	:	779	506	766	1 407	:
Slovenia	:	:	257	273	228	210	247	268	271	:
Slovakia (3)	:	:	422	592	468	617	*482*	478	1 104 (b)	813 (b)
Finland	1 039	877	968	920	1 127	1 252	1 293	1 306	1 370	1 466
Sweden	1 420	2 383	3 028	3 585	3 620	3 381	3 532	2 931	3 475	3 192
United Kingdom	:	4 430	7 980	10 908	12 187	13 167	15 238	17 233	17 427	17 632
Iceland	:	:	:	:	:	:	:	:	:	:
Liechtenstein	5	7	8	10	6	5	6	7	17	19
Norway	:	380	454	664	815	879	650	1 777	1 059	1 170

(:) Data not available

(b) Break in time series

(1) Rounded estimates

(2) 2009 data estimated

(3) 2015 data estimated

Source: Eurostat (online data code: env_waspb)

eurostat

is more appropriate to be replaced at the professional service centres. For producers, consumer safety is an absolute priority, and an incorrect handling may lead to significant harm caused by electric shocks or even fire.

As regards Article 56, it provides that batteries that are collected while still incorporated into end-of-life electrical waste/machinery must be removed from the devices in accordance with the requirements of the ELV/WEEE Directive.

MEAT considers that the provisions of the WEEE Directive and/or the European standard EN 50625-1 should be amended in such a way that all batteries are removed from any WEEE and collected separately, before WEEE treatment, provided that this process can ensure the separation of batteries in a separate flow and that they remain intact. The only exception could be for batteries intended to ensure a continuity of electricity supply for reasons of safety, performance, medical or data integrity. On the other hand, the integrity of batteries must be maintained during the removal process and quantified targets should be set for WEEE dismantlers to remove them from WEEE categories 5 (small equipment) and 6 (small IT and telecommunications equipment). Articles 49 to 50 provide that distributors/manufacturers of industrial, automotive and electric vehicle batteries are to be required to take over these batteries free of charge and without the user's obligation to purchase a new battery.

"Given the long life of electric vehicles, of industrial and automotive batteries, as well as the high cost of collection and recycling, the takeover obligation for those types of batteries, irrespective of the brand/manufacturer of the battery in question, is not realistic. Several times, the proposal provides

that distributors, collection points, WEEE recyclers have the opportunity to hand over the collected waste to waste operators. For portable batteries, we propose to have the obligation of handing over to manufacturers or to OTRs (authorized economic operators) or at least a mandatory and free-of-charge reporting of waste operators," MEAT representatives say.

POM batteries: 45% collection target for 2023

The target collection concept in relation to the volume placed on the market, as it is defined, is not appropriate for battery waste. In most cases, there is no correlation between the quantities of batteries recently introduced in the market (POM) and battery waste actually available for collection. Most batteries are not available for collection within three years from the date when they were placed on the market. Therefore, the POM-based targets could be unachievable, as they would be greater than the real quantities available for collection. Consequently, a collection target may only be adequate if it is linked to the quantities of battery waste available for collection. For this purpose, the Report of the impact Evaluation Committee pointed to the need to update the current methodology of calculation of collection rates and highlighted that the results will present the waste flow in a more reliable manner to clarify the mass flows and allow operators to better plan their activities.

"We propose that, from the entry into force of the Regulation, the Member States report to the European Commission the quantity of battery waste available for collection, estimated at 65% of the average of battery quantity first placed on the market in that Member State during the three previous years. The Commission would then need to adopt, by December 31, 2023, a delegate act in accordance with Article 73 to supplement the current Regulation by setting the methodology of calculation of the quantity of batteries available for collection. Waiting for the calculation methodology for batteries available for collection to be prepared, Eucobat proposes a more realistic target, of 45% depending on POM batteries for 2023. If the regulation were to include a collection target depending on POM batteries, it should consider the batteries placed on the market during the three previous years (X-3 - X-2 - X-1), and not the collection year plus two previous years (X-2 - X-l - X). Otherwise, the target for the year of operation would be known only at the end of this year.

50%, an ambitious target

"Using recycled materials in new batteries should be regulated by setting quotas, as in this way one can limit both the recycling technology and the chemical treatment technology. Recycling or recovery of certain materials or metals must be determined by the action of the free market (the value of and demand for secondary raw materials, the recycling technologies used are not controlled by car manufacturers). Also, recycled materials can be used in manufacturing new batteries. Recyclers can guarantee that the recycled materials have precisely the same properties and the same quality as the original materials. A recycling process that allows to reach a high general target is not, in general, compatible with a high recycling target for certain materials. The recycling target does not seem realistic for certain types of batteries, for example for lithium, primary batteries, for which even 50% is a very ambitious target," MEAT believes.

MEAT points out that given the long life of batteries in electrified vehicles and the high cost of collection and recycling, each manufacturer should, when it placed a battery on the market, provide a financial guarantee to prevent the costs of managing waste coming from the orphan products. Manufacturers of portable batteries or OTRs must report to the competent national authority for each calendar year within 4 months from the end of the reporting year for which the data is collected. "Given the significant quantity of data collected, controlled and compiled, it is not possible to submit such report within 4 months from the end of the reporting year. We propose that this period be extended to at least 6 months," MEAT representatives claim.

As regards the battery passport, the Ministry believes that it is essential that organizations for taking over the responsibility of manufacturers have access to information on battery passport and be able to change the content, if necessary, and the information on the label of batteries should include its weight. Also, it proposes that any new requirement resulting in changes in design of products include a transition period of at least 24 months between the effective date of the regulation and the application of the respective requirement.

The President of the NBRS (National Battery Recycling System), Elena Gaspar, also talks about the too high standard of the European collection target of 65% by 2025: "In the context in which the collection target will also relate to quantities placed on the market, reaching a 65% target by 2025 is at least ambitious. In this context, NBRS, as Eucobat member, supports reporting the collection targets to the quantities available for collection. According to studies conducted by Möbius (EoL study - AfC study), only 65% of the weight of POM batteries during a certain year is available for collection".

The analysis of samples collected in the six

Sales of portable batteries and accumulators, 2009–2018

(tonnes)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU-27 (1)	*162 000*	*176 000*	*173 000*	*173 000*	*169 000*	*172 000*	*177 000*	*177 000*	*188 000*	*191 000*
Belgium	4 061	4 381	4 401	4 259	4 398	4 222	4 566	4 585	4 786	4 920
Bulgaria	520	1 052	624	602	677	730	760	750	815	690
Czechia	2 638	3 281	3 393	3 716	3 672	4 000	3 965	4 047	4 064	4 048
Denmark	3 613	3 062	3 347	3 704	3 132	3 637	3 762	3 945	3 691	4 303
Germany	37 298	42 531	43 334	43 549	42 441	43 979	43 902	45 511	50 643	52 159
Estonia	406	411	475	525	403	417	464	479	541	617
Ireland	2 017	2 181	2 096	1 951	1 913	2 378	2 703	1 968	2 991	2 336
Greece	:	:	:	:	:	:	1 657	1 599	1 692	1 646
Spain	12 090	13 023	11 331	10 514	10 662	10 815	12 669	11 915	12 017	12 774
France	29 921	32 914	33 458	33 458	32 227	31 330	31 383	29 491	31 275	31 246
Croatia	:	:	332	407	394	347	266	395	568	674
Italy	27 843	30 313	29 507	29 407	27 939	26 944	28 440	25 197	25 268	:
Cyprus (2)	*180*	280	272	237	226	189	206	211	233	:
Latvia	289	412	478	483	516	553	509	628	490	512
Lithuania	734	831	708	782	795	686	700	748	799	:
Luxembourg (2)	*214*	159	183	185	192	171	172	196	201	209
Hungary	2 087	1 858	1 798	1 046	1 192	1 726	1 804	1 683	2 357	2 795
Malta	:	108	87	104	89	103	74	75	68	81
Netherlands	7 672	7 824	7 971	7 322	6 786	7 687	8 031	8 830	9 187	9 578
Austria	3 272	3 642	3 614	3 717	3 892	4 087	4 547	4 708	4 746	5 449
Poland	:	9 866	9 771	10 599	11 264	11 799	12 304	12 813	13 426	13 338
Portugal	3 630	1 317	1 381	1 615	1 727	1 807	1 547	1 778	2 241	2 456
Romania	2 079	3 447	2 696	2 740	:	2 730	2 646	2 340	3 625	:
Slovenia	915	1 053	670	722	720	719	663	872	790	:
Slovakia (3)	*900*	*950*	*980*	*1 000*	*950*	842	*939*	1 236	1 460	1 534
Finland	2 569	2 814	2 763	2 752	2 703	2 651	2 864	3 026	3 180	3 460
Sweden	5 168	6 197	5 708	5 641	5 602	6 046	5 812	7 634	6 904	6 833
United Kingdom	45 754	43 489	39 813	36 637	36 890	36 943	38 986	38 659	39 668	38 895
Iceland	:	:	:	:	:	:	:	:	:	:
Liechtenstein	:	:	:	:	:	:	:	:	:	:
Norway	:	1 940	1 980	2 015	2 025	1 965	1 965	2 230	3 599	3 122

(:) Data not available

(1) Rounded estimates

(2) 2009 data estimated

(3) 2009-2013 and 2015 data estimated

Source: Eurostat (online data code: env_waspb)

eurostat

countries in which the study was conducted shows that the life cycle of a battery is much higher than three years. In conclusion, if the quantities of batteries and accumulators placed on the market vary from one year to the next and their life cycle is on average 5.2 years, the method of calculation of collection targets relative to the average of quantities placed on the market in three years is not the most adequate.

As a member of the Pan-European Association of national collection schemes for batteries - Eucobat, the National Battery Recycling System Association, together with six other European organizations, participated in a comprehensive study assessing the impact of the battery life cycle on the quantities of used batteries generated and, consequently, on collection performance.

To have a clearer picture of the situation regarding the quantities available for collection, Eucobat conducted this study together with Möbius during 2016-2017. The study was conducted in 6 countries of the European Union (Belgium, Spain, Romania, France, Germany and the Netherlands) and focused on finding answers to two questions:

1. Is the manner in which the collection target is calculated appropriate given the length of the battery life cycle?

2. Is the collection target appropriate in case the weight of batteries put on market changes?

In order to answer these questions, a sample of discarded batteries per chemical family was selected in each country and their 'age' was recorded. In total, about 154,000 discarded batteries were analysed and registered individually so as to obtain representative samples for all chemical families. The results of this analysis show

that the average battery age is approximately 5.2 years. Thus, for alkaline batteries the average lifespan is 3.9 years, while for Nickel - Cadmium is 12.2 years.

Following this study, the results of which were published at the end of 2017, Eucobat has prepared a position paper presenting a new way of calculating the quantities of waste batteries and accumulators available for collection. This position was also presented by the European Commission since the early phase of review of the Directive.

Basically, the target collection concept in relation to the volume placed on the market, as it is defined in the proposal, is not appropriate for battery waste. In most cases, there is no correlation between the quantities of batteries recently introduced in the market (POM) and battery waste actually available for collection. Indeed, most batteries are not available for collection within three years from the date when they were placed on the market.

Therefore, the POM-based targets could be unachievable, as they would be greater than the real quantities available for collection.

"As a result of sustained efforts of Eucobat, the European Commission includes the possibility to introduce the principle of the target depending on batteries available for collection, but the timetable for studying and preparing it is not acceptable (2030), which is also highlighted in the position papers sent by Eucobat members to the European Commission. Therefore, EC initiative to review the Directive is necessary and adapted to the new direction given by the Green Deal," concluded NBRS President.

For a better understanding of the dangerous nature of lead emissions in nature, as well as the importance of collecting and recycling discarded batteries, it is important to know that lead is a dangerous and toxic metal; a discarded battery pollutes 1 m^3 of earth for 100 years; the flow of acid contained in the battery electrolyte causes pollution of soil, groundwater and surface water; uncontrolled use of discarded batteries causes lead dust in the air; the absorption of lead in the human body causes diseases, including lead poisoning.

Half of the EU Member States will not be able to meet their targets

Currently, according to the European and national legislation, the minimum collection rate that must be reached by manufacturers is 45% of the average quantities placed on the market in the last three years. According to a study by EPBA (European Portable Batteries Association), at least half of the EU Member States will not be able to meet their targets.

European experts claim that for Europe battery production is a strategic imperative for both transition to clean energy and competitiveness of the automotive sector.

In 2019, USR MP Cristina Pruna requested in an open letter Romania's integration into the 'Battery Alliance', an initiative meant to prevent the EU's dependence on the main competitors in this industry. Unfortunately, at the moment, in Romania, the only batteries that are produced are the classic ones for cars.

The 'Battery Alliance' was launched in 2017 in order to create a competitive production chain focused on sustainable batteries. It is projected that by 2025, the EU could capture around EUR 250 billion in the battery market.

More than half of portable batteries placed on the market in the EU are not collected

The evaluation study of the Directive published by the European Commission in October 2018 reveals that the collection target (collection rate of 45%) for portable batteries was met in 2016 by 14 Member States, including a country with an unusually high rate registered (Croatia with 100% !!!). The remaining 13 Member States did not meet the target or did not report. Consultants point out that a collection rate of 45%, which is not yet met by all Member States, means that more than half of the portable batteries placed on the market in the EU are not collected. However, the European countries with the highest collection rate stand out: Belgium, Luxembourg, the Netherlands, Germany.

Three years without accurate data on battery collection/recycling in Romania

According to the European and national legislation, the minimum collection rate that must be reached by manufacturers is 45% of the average quantities placed on the market in the last three years. For example, for 2021, the collection rate is related to the quantities placed on the market in 2019, 2020 and 2021.

In the Report on the State of the Environment drawn up annually by the National Agency for Environmental Protection (ANPM), the official data on battery collection have not been presented/updated since 2017, when the average collection rate was 20%.

The recycling system for batteries is characterized by the lowest revenues compared to the highest costs.

In Romania there are several recyclers for lead

acid batteries and only one recycler for alkaline and Zn Carbon batteries. For other chemicals, for example for Li Ion, there are no recyclers in Romania. For these, the profile organizations in Romania have contracts with recyclers from Germany, France and Switzerland.

What happens with batteries after collection?

Discarded batteries are initially stored at the collector, then at the recycler. Those recycled abroad are transported by carriers with an international ADR hazardous waste transport authorization.

After collection and transport, used batteries and accumulators go through a rigorous sorting process depending on the electrochemical properties. The quality of the sorting process guarantees efficient recycling. The mechanical treatment of batteries consists of their crushing, magnetic separation, separation by sieving and subsequently qualitative separation of particles. Depending on the chemical composition, batteries can be recycled by: pyrometallurgy, hydrometallurgy, distillation or fusion. Recycling results in ferrous fraction, non-ferrous fraction, black mass, paper and plastic. With the right technology, up to 99% of a lead-acid battery can be recycled.

Categories of batteries defined in the European Commission proposal

The new Regulation changes the definitions of portable batteries, and introduces a category for batteries of electric vehicles, regardless of the type of these vehicles, as follows:

1. Automotive battery: any battery used only for automotive starter, lighting or ignition power
2. Electric vehicle battery: any battery specifically designed to provide traction to hybrid and electric vehicles for road transport
3. Portable battery: any battery that is sealed; weighs below 5 kg; is not designed for industrial purposes; and is neither an electric vehicle battery nor an automotive battery
4. Industrial battery: any battery designed for industrial uses and any other battery excluding portable batteries, electric vehicle batteries and automotive batteries.

First Office Building in Romania to Become Zero Waste

Zero Waste Europe has granted for the first time in Romania the Zero Waste pre-certification to an office building - Amera Tower in Cluj-Napoca, which has gone through a complex process that included independent monitoring, waste reduction and waste prevention measures, reorganization and optimization of separate collection, environmental policies and training for occupants.

by **Daniel Lazar**

Following these measures, it managed to increase the separate collection rate from 6.47% to 77% in only six months. Pre-certification is the first step for obtaining the Zero Waste Building certification, provided by Zero Waste Europe, which involves fulfilling strict key environmental, social and circular economy objectives.

Certification is a model of good practice at European and national level and was conceived to eliminate greenwashing (false concern for the environment of companies, without implementing measures with real impact). It provides guidance in choosing and implementing solutions leading to reaching the final targets of reduction by at least 90% of waste that reaches the landfill and zero incineration. In the long run, implementation of measures can improve the quality of life of occupants and preserve non-renewable natural resources.

Waste generation prevented at the source

Prevention measures included a process of replacement of PET water and refillable cans with dispensers with filters connected to the water network, disposal of plastic cups, coffee capsules and single use plastic accessories (pallets, cup lids). Disposable capsule espresso machines have been replaced by bean-to-cup coffee machines. The resulting coffee grounds began to be collected in biowaste containers and subsequently used in compost. So did the wooden pallets that replaced the disposable plastic ones. In addition, the coffee machines in the hallways have been reprogrammed for reusable containers, namely own cup, completely eliminating disposable plastic cups and significantly reducing paper cups.

Advanced collection system on 12 fractions

Amera Tower collects separately on 12 fractions, instead of five fractions as the legislation requires: PET, foil and other plastics, metal, polystyrene, tetra pack, paper/cardboard, glass, used oil, electrical waste, printer toners, biowaste and residual/mixed waste. All existing collection containers have been rearranged and properly labelled with stickers. The humidity of biowaste is reduced by over 20%, and the unpleasant odour is reduced by means of aerated containers that have been installed in the dining areas. To increase the degree of separate collection, dedicated containers have been installed for collecting paper and cardboard, glass, tetra pack, plastic, metal and clean polystyrene. In addition, bathroom paper towels are collected and partially added to the compost, and the rest are handed over to an insulation manufacturer who turns them into cellulose insulation for buildings. Following these measures, the degree of recycling reached 83%.

Constant monitoring of generated waste

In addition to the internal infrastructure of separate collection, the building management has also reorganized the external collection platform.

Dedicated bins for recyclables have been supplemented, and the number of those for residual/mixed waste has been significantly reduced. A scale has been installed, which is used weekly to measure, record and monitor the amount of waste generated. Concern about waste prevention and reduction has been doubled by the identification of a recycler to take over more problematic fractions. Thus, the tetra pack, clean polystyrene and non-recyclable plastics are picked up by RDE Harghita, as a recycler, which turns them into garden furniture.

Rapid amortization of the investment

Investment in optimization of separate collection, implementation of prevention measures in the building and consulting are amortized within seven months. The cost with waste management per employee was reduced by 61.5% compared to the cost before the beginning of the certification process. "Investment in optimization of collection was minimum, only several thousand RON; it's rather about change of attitude, of mindset. We have proven that you don't have to spend a lot of money to create a truly sustainable working environment," said Amera director, Adam Ambrus.

What is Zero Waste certification

The Zero Waste Building certification system is an international, independent evaluation and certification standard, based on the Zero Waste International Alliance method developed by Zero Waste Europe in collaboration with Zero Waste Romania. The certification system is managed by Mission Zero Waste Academy (MiZA), an organization established by Zero Waste Europe to develop and manage a variety of certification systems and related programs, at international level.

Building certification addresses essential zero waste targets - environmental, social and circular economy, with a large-scale impact on a building, and requires independent third-party recognition that the Zero Waste target has been achieved, namely reducing waste reaching the landfill by at least 90%, zero incineration and disposal in kind. ■

National Recovery and Resilience Plan

Great Opportunity or Big Disappointment?

Romanian Government has sent to Brussels the National Recovery and Resilience Plan (NRRP) and will officially start negotiations with the European Commission on May 1, 2021. Discussions with the representatives of the European forum have taken place informally, on components, during the period of drafting the document. According to the new NRRP, the Government requests an allocation of EUR 41.14bn, i.e., almost EUR 11bn more than the initial allocation. However, this huge amount seems unrealistic, given that NRRP is designed for a short term, until 2026, as a support for the quick recovery of economies in the Community space affected by the health crisis and the related economic one. Consequently, all contracts must be assigned before December 31, 2023 and all projects must be completed by December 31, 2026.

by **Adrian Stoica**

NRRP is built on six pillars: green transition, digital transformation, smart growth, social and territorial cohesion, health and resilience, and policies for the next generation, children and youth. As per European regulations, measures included in the NRRP will contribute to green transition, including biodiversity, or addressing challenges generated by this transition, and provide for an amount of at least 37% of the total allocation of the recovery and resilience plan. At the same time, measures included in the NRRP must comply with the principle of „not significantly harming" the environment in the context of Article 17 of Regulation (EU) 2020/852. Also, NRRP measures must provide for an amount intended for digital expenses accounting for at least 20% of the established allocation.

How much money can Romania receive?

Romania has ideas rather than projects already prepared. This will definitely be a great disadvantage, and given the sluggishness with which things move, from here to losing funds there's only a step.

Romanian experience with European funds is not very pleasant. But this is not because of Brussels, but because of authorities. Romania has received EUR 54.43bn from the European Commission during 2017-2019, which means an annual average of EUR 4.18bn per year. Currently, in less than six years and for some projects that are not even written, Government wants to convince us that it will attract EUR 41bn.

In fact, a big question mark is raised by the amount advanced by the Government itself, as the amount of EUR 41bn does not match the figures of the European Commission.

In February, the European Commission published in the Official Journal of the European Union the regulation for establishing the Recovery and Resilience Facility, which shows that

Romania will receive for funding projects to be declared eligible only EUR 14,248,020,000. Besides the amount allocated to each state, NRRP also provides them with loans for cases where the value of eligible projects exceeds the ceiling. The maximum amount of support in the form of loan granted to each Member State cannot exceed however 6.8% of the gross national income (GNI) related to 2019 in current prices, with the possibility to increase it in exceptional circumstances. This makes the loans to amount to around EUR 14bn.

EUR 1.3bn for renewable energy and energy efficiency

In the segment of renewable energy and energy efficiency, Romania hopes to obtain funding for projects worth EUR 1.3bn, and other EUR 600mln would be attracted to finance projects related to the development of infrastructure of gas blended with hydrogen and other green gasses. The NRRP also provides:

- Updating the primary and secondary legislation to include the new and future EU Directives and Regulations (EU Regulation 943/2019 and EU Directive 944/2019, Fit for 55 Package);
- Updating the INECP according to recommendations of the European Commission and increasing the target for the reduction of greenhouse gas emissions to 55% by 2030;
- Eliminating barriers in the way of project bankability - allowing directly negotiated bilateral agreements (Power Purchase Agreements - PPAs);
- Decarbonization of power production, by restructuring the major energy producers that use solid fossil fuels (C.E.O./C.E.H.), ensuring the use of RES and as a transition natural gas together with other alternative fuels, e.g., hydrogen;
- Reforms for the integration of batteries in the energy system allowing the capitalization on benefits brought by them to a greater extent (system services, demand response etc.);
- Consolidation of the legal framework in order to facilitate investments, ensuring a sustainable decarbonization of the energy sector;
- Investments in the installation of electrolysers and anaerobic digesters;
- Promoting projects that are below the limit of financial profitability;
- Financing schemes for the installation of RES-E and decentralized renewable gases, including to improve access to energy in disadvantaged communities;
- Implementing investments in the field of solar power, in using hydrogen and in high efficiency cogeneration;
- Implementing smart energy systems;
- Reform of the industrial sector, of small and medium enterprises and/or large enterprises by increasing the energy efficiency indicator;
- Supporting innovation by financing new technologies, digitization of green capacity, demonstrative projects with impact in increasing energy efficiency and reducing greenhouse gases;
- Acquisition of digital platforms for centralization of consumption data/reduction of consumption/monitoring of indicators for each individual equipment at the level of operators and/or of activity branches/digitization and remote data transfer;
- Investments for the new energy industry in Jiu Valley and Gorj.

"The National Recovery and ResiliencePlans hould also finance the development, at least, of a power production project in offshore wind power plants in the Black Sea, considering the importance granted by the European Union to this type of renewable energy, the potential of the country and the fact that this type of energy still needs subsidies."

Razvan Nicolescu, President of the Association for Clean Energy and Combating Climate Change

Investments in Transelectrica's lines, omitted from the NRRP

The Association for Clean Energy and Combating Climate Change criticizes the National Recovery and Resilience Plan as in the form presented by the Government the document does not provide for any investment in Transelectrica's lines.

The Association considers that the priority project for the decarbonization of the power production sector is strengthening high-voltage lines of Transelectrica to integrate more clean energy, as well as the transparency of the existing interconnection capacity.

According to Razvan Nicolescu, President of the Association, the National Recovery and Resilience Plan should also finance the development, at least, of a power production project in offshore wind power plants in the Black Sea, considering the importance granted by the European Union to this type of renewable energy, the potential of the country and the fact that this type of energy still needs subsidies.

On the other hand, in terms of electrolysers to produce hydrogen and batteries for electricity storage, they are considered a priority for both the EU and Romania. The development of national production capacities is expected, which can be done by involvement of the private environment, using the existing administrative instrument of state aid schemes. This instrument will also ensure the attraction of own financing sources and, at the same time, the integrity and transparency of money allocation based on competitive criteria related to the percentage of co-financing.

The Association believes that the National Recovery and Resilience Plan should not finance cogeneration plants that produce emissions, but only cogeneration plants that use renewable energy as a primary source of energy. At the same time, the Association rejects the concept of financing with European money for solutions that „are less polluting". The Association for Clean Energy and Combating Climate Change considers them a waste of public money and supports financing only for energy projects that do not pollute at all and which actually need non-reimbursable funds.

Regarding the railway transport sector, the Association considers a priority the quick installation of smart meters for all trains running in Romania, liberalization of the electricity supply market by reforming the elimination of the illegal monopoly of CFR Electrificare that "the National Regulatory Authority for Energy tolerates in a deep contempt for the provisions of European legislation and for the interests of consumers who do not benefit from lower prices from the coordination of train traffic with the evolution of the electricity consumption curve".

Importance of Nuclear Power in the Energy Mix

Romania, together with other six Member States of the European Union, supports in a joint position paper addressed to the European Commission, the importance of nuclear power in the current and future energy mix of the Union and the further development of strategic investment projects in this field.

The letter signed by Romania's Prime Minister Florin Citu and the Prime-Ministers of Hungary, Czech Republic, Poland, Slovakia, Slovenia and the President of France, Emmanuel Macron, was submitted to European Commission President Ursula von der Leyen, Executive Vice-President Frans Timmermans, Commissioner for Financial Stability, Financial Services and Capital Markets Union, Mairead McGuinness, and Commissioner for Energy Kadri Simson.

The joint letter is a call on decision-makers to ensure a fair framework for the development of nuclear power in the EU, ensuring the possibility to access sustainable development funds within nuclear projects, given the role of nuclear power in reaching the decarbonization targets of the European Union and in ensuring energy security at European level. Nuclear power currently accounts for approximately 50% of total low-carbon energy produced at EU level, 1.1 million jobs and an annual turnover of EUR 103 billion. The signatories of the letter request the European Commission to ensure that EU plans in the field of climate change include all low-carbon sources, in accordance with the principle of technological neutrality, a right guaranteed under the Treaty on the Functioning of the European Union (TFEU).

The leaders of the 7 European states highlight the fact that "all available zero-emission or low-carbon sources that contribute to reducing CO2 emissions, which at the same time substantially contribute to achieving climate goals, should not only be recognized but also actively supported within the EU".

The signatories also express their concerns on the fact that "development of nuclear power is challenged by certain Member States despite the contribution of this energy source to the fight against climate change and synergies, untapped yet, between nuclear technologies and renewable energy. Given that nuclear power is a baseload production source, it allows an ensured development for intermittent renewable sources. Nuclear power is also looming as a source of production in efficient conditions of clear hydrogen at a reduced price and can also contribute to sectoral integration. Nuclear industry ensures a significant number of quality jobs, an important element in post-COVID economic relaunch plans".

The joint letter also supports the right of Member States to choose their energy mix (Article 194 of the TFEU), right which is currently strongly affected by the EU tendencies of promoting and supporting in a discriminatory manner renewable energy sources in relation to other technologies with low carbon emissions that have proven their undeniable role in combating climate change, such as nuclear power. The signatory leaders also claim that decommissioning of existing nuclear power plants without ensuring a development framework for new nuclear projects will lead over time to the loss of a significant number of jobs at EU level.

For Romania, nuclear power is a strategic option for reaching the national targets in the field of energy and climate change, having an important role in ensuring energy security and decarbonization of the electricity production sector, being supported by an infrastructure that covers the entire nuclear fuel cycle.

In Romania, nuclear power holds a 18% share in total electricity production, ensuring 11,000 jobs in production, research, engineering, works, production of equipment, innovation, education, a figure that could grow to 19,000 in the context of starting new nuclear projects. Currently, Romania is carrying out a major investment project, the retrofitting of Unit 1 of Cernavoda NPP, which will lead to the extension of its life by another 30 years, after 2028, in the same conditions of safety and with increased economic efficiency. Also, expanding the production capacity from nuclear sources is vital for ensuring Romania's energy needs, especially after shutting down production at the capacities based on solid fossil fuels. ■

KAESER COMPRESOARE®

Operator Model
SIGMA AIR UTILITY

With the SIGMA AIR UTILITY operator model, you will secure a reliable supply of compressed air tailored to your needs – practically at the push of a button: You simply give Kaeser a few square metres of floor space, and they will take care of the rest. Instead of investing in a complete compressed air station, all you pay for is the compressed air you actually use.

Here's how Kaeser's SIGMA AIR UTILITY operator model works:

Kaeser will analyse your compressed air needs and draw up an individual concept – based on what is required.

Next, they will build, install and operate the compressed air system.

Kaeser Teleservice, the logistics centre and their extensive global service network ensure that compressed air is available at all times.

With the SIGMA AIR UTILITY operator model, you pay a fixed basic price that covers an agreed quantity of compressed air. When larger amounts are needed, a fixed contractual price applies for the additional quantities used.

All prices remain in effect for the entire duration of the contract, which means no price increases.

Key advantages

• No compressed air worries

Kaeser offers everything from a single expert source: from the analysis of your compressed air needs to the machines and service. That lets you and your personnel concentrate fully on your core tasks.

• From fixed costs to variable costs

Investments in a compressed air system are no longer needed. Your employees will have time for other tasks. That means: You have more liquidity, are saved from tapping into your working capital and have greater flexibility in deploying your personnel.

• A system scaled to your needs

A competitive market brings ups and downs. Are you cutting back your output, or perhaps stepping it up? Are you relocating your operations? With SIGMA AIR UTILITY you can remain flexible. Kaeser will adjust your compressed air supply to your needs.

• Automatic long-term savings

Kaeser always takes care of operation, support and optimisation of your compressed air supply system, ensuring your system is always state-of-the-art, in terms of both technology and energy efficiency. The goal: Keeping your life-cycle costs as low as possible.

• Kaeser solutions are the perfect fit

Looking to optimise your system performance, plan a new system or temporarily need more compressed air due to a large order? Then you've come to the right place!

The SIGMA AIR UTILITY operator model in detail

Variable costs, no fixed costs

It's no coincidence that the shift from fixed to variable costs is one of the most important management challenges:

It serves to preserve liquidity in the event of a sharp drop in turnover in an economic downturn. This is one way of ensuring that the company remains viable even when times are hard.

By maintaining a high equity quota, you will improve your financial ratings, which will help to keep borrowing costs low.

Your one-stop-shop

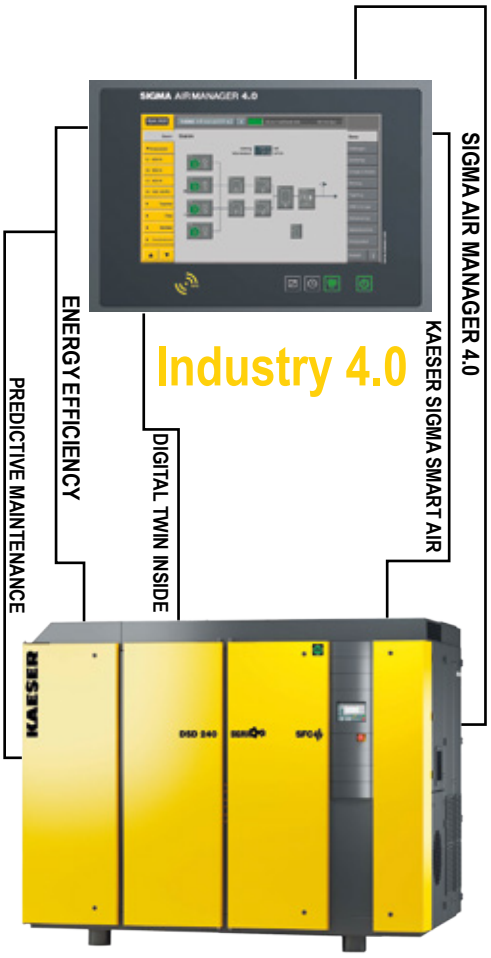
A comprehensive service package

Compressed air is too important to production to risk leaving its supply to anyone other than proven specialists with extensive expertise. KAESER KOMPRESSOREN's service bundle includes everything you need – and it all fits together perfectly:

KAESER COMPRESOARE®

Image: KAESER KOMPRESSOREN SE

Ready for Industry 4.0



Kaeser delivers a compressed air supply precisely aligned with requirements, both in terms of quantity and quality – as assessed by their compressed air specialists.

As a compressor manufacturer and compressed air system provider, Kaeser produces the hardware – compressors, compressed air treatment systems and state-of-the-art compressed air management systems – at globally recognised 'Made in Germany' quality standards.

Your SIGMA AIR UTILITY compressed air supply is operated and managed by Kaeser. They design, manufacture, install and maintain all components and optimise your system as a whole. Not only that: Kaeser naturally also takes responsibility for ensuring that your compressed air supply system operates safely and complies with all applicable standards and regulations at all times.

And finally, the Kaeser Teleservice and their extensive international logistics and service network ensure that downtime – for example due to long waiting periods for spare parts – is a thing of the past.

With Kaeser, contractually agreed compressed air supply – in terms of quality, quantity, and pressure – will be available at all times.

Taylor-made: Modular system solutions

From compressors and air treatment components to the electronic controls: all of your compressed air supply components are precisely matched.

The fine-tuned modular structure is made possible by the extensive range of products and accessories that Kaeser can offer as a leading compressed air system provider.

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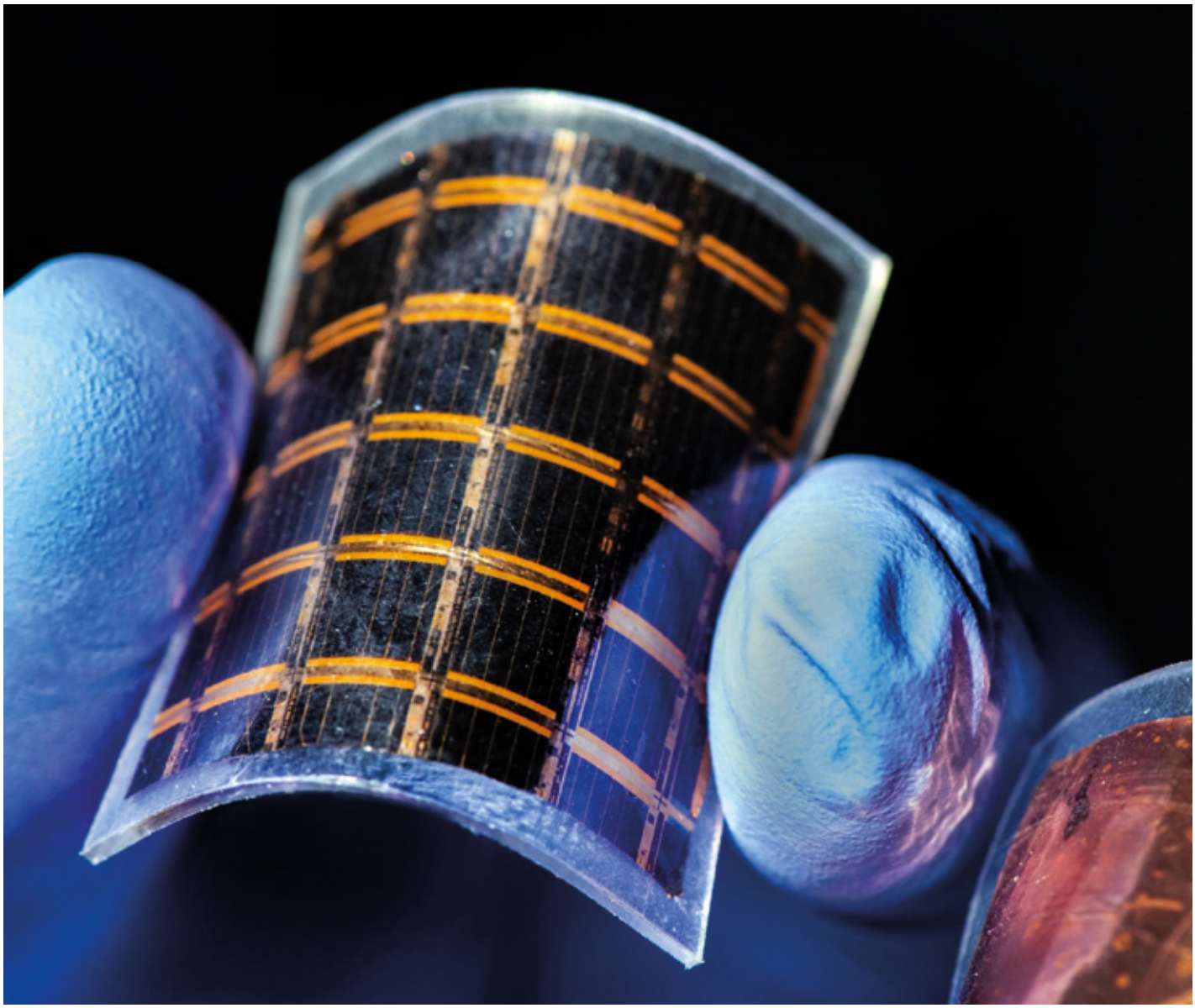
Renewable Energy and New Perspectives for Photovoltaic Cells



In the future, photovoltaic cells could be 'worn' over clothes, placed on cars or even on beach umbrellas. These are just some of the possible developments from a study published in Nature Communications by researchers at the Physics Department of the Politecnico di Milano, working with colleagues at the University of Erlangen-Nuremberg and Imperial College London.

The research includes among its authors the Institute of Photonics and Nanotechnology (IFN-CNR) researcher Franco V. A. Camargo and Professor Giulio Cerullo. It focused on photovoltaic cells made using flexible organic technology. Today's most popular photovoltaic cells, based on silicone technology, are rigid and require a sophisticated and expensive infrastructure to manufacture them and have high disposal costs.

An alternative to replace silicon in the future is 'plastic' solar cells, in which a mixture of two organic semiconductors, one electron donor and an electron acceptor, absorbs light energy and converts it into electrical energy. Using organic molecules brings several advantages, such as simpler technology, reduced production and disposal costs, mechanical flexibility, and access to organic materials' chemical diversity. However, organic materials have more complex physics than crystalline inorganic materials (such as silicone), particularly for charge transfer processes at donor-acceptor interfaces, which cause efficiency losses.

After four years of work, the researchers succeeded in creating solar cells with new materials in which losses due to interface states are minimised. By studying these materials with ultra-short laser pulses, they identified the physical reasons behind this exceptional performance, presenting a general optimisation model valid for other material combinations.

Future photovoltaic cells made from organic technology will be a cheaper source of energy with less environmental impact. They can be incorporated into various everyday objects such as windows, cars, or even clothes and coats because of their mechanical flexibility.

The study falls within the scope of renewable energy, as one of the critical challenges for humanity's future is the development of clean and renewable sources of energy. The Earth's primary energy source is sunlight, which provides more than 100 times more energy daily than humanity needs, making photovoltaic technologies among the most promising for the future.

With its climate and few clouds, Italy has one of the most considerable photovoltaic potentials in Europe, comparable to that of non-desert tropical countries.

Politecnico di Milano is a scientific-technological university which trains engineers, architects and industrial designers.

The University has always focused on the quality and innovation of its teaching and research, developing a fruitful relationship with business and productive world by means of experimental research and technological transfer.

Research has always been linked to didactics and it is a priority commitment which has allowed Politecnico Milano to achieve high quality results at an international level as to join the university to the business world. Research constitutes a parallel path to that formed by cooperation and alliances with the industrial system.

Knowing the world in which you are going to work is a vital requirement for training students. By referring back to the needs of the industrial world and public administration, research is facilitated in following new paths and dealing with the need for constant and rapid innovation. The alliance with the industrial world, in many cases favoured by Fondazione Politecnico and by consortiums to which Politecnico belong, allows the university to follow the vocation of the territories in which it operates and to be a stimulus for their development.

The challenge which is being met today projects this tradition which is strongly rooted in the territory beyond the borders of the country, in a relationship which is developing first of all at the European level with the objective of contributing to the creation of a single professional training market. Politecnico takes part in several research, sites and training projects collaborating with the most qualified European universities. Politecnico's contribution is increasingly being extended to other countries: from North America to Southeast Asia to Eastern Europe. Today the drive to internationalization sees Politecnico Milano taking part into the European and world network of leading technical universities and it offers several courses beside many which are entirely taught in English.

Politecnico di Milano is partner of the following outstanding international networks: IDEA League, Alliance4Tech, UNITECH International Society, T.I.M.E. (Industrial Managers in Engineering), MEDes, Magalhães Association, Pegasus, Global Engineering Education Exchange (E3), Athens, QTEM Quantitative Techniques for Economics and Management. ■

ArcelorMittal's Low-carbon Steel Initiative

The global steel production sector made an important symbolic move toward tackling its massive carbon emission problem with ArcelorMittal's unveiling its low-carbon steel initiative, Mighty Earth shows.

ArcelorMittal, one of the world's largest steel producers, committed on March 17 to the development and rollout of two branded low-carbon steel product lines including a 'certified green steel' line and a low-carbon recycled steel line, respectively. The World Steel Institute estimates that the steel sector is responsible for approximately eight percent of total global carbon dioxide emissions.

"ArcelorMittal's low-carbon steel initiative marks a small step toward a wider steel-sector recognition of the urgency of transitioning production systems toward carbon neutral emission systems," said Phelim Kine, Senior Director Asia at Mighty Earth. "ArcelorMittal has sent a clear signal that steel production's current high carbon emission status quo is both environmentally and economically unsustainable, but more dramatic carbon reductions by the steel sector are necessary to align with a 1.5°C global warming trajectory."

This low-carbon steel initiative will render only modest reductions in ArcelorMittal's carbon emissions. The company's new low-carbon product lines will constitute only a maximum of two percent of ArcelorMittal's total annual steel production by end-2022. ArcelorMittal plans to expand that production to a target of ten percent of its total steel products by 2025-2030. That's a fraction of the industrial carbon emission reductions that the United Nations' Intergovernmental Panel on Climate Change (IPCC) has estimated as essential to limit global warning to 1.5°C by 2050. The IPCC warns that failure to meet that target will greatly increase "climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth." Company officials explicitly linked the development of the product lines to government, societal and customer demands for low carbon emission steel.

ArcelorMittal also announced the creation of a new 'Innovation Fund' aimed to seed the development of new technology and companies dedicated to reducing heavy industry carbon emissions. The company's Chief Executive Officer, Aditya Mittal, emphasized the fund's annual USD 100 million budget was only a fraction of what was needed to transform the steel sector to a low-carbon future and declared "We need partners" to accelerate such efforts. That admission is an implicit recognition of the need for deep investment by both governments and the private sector to effect the needed production chain overhauls across the heavy industry sector in order to align it with a 1.5°C global warming trajectory.

ArcelorMittal's initiative dovetails with the

objectives of a new international multistakeholder policy tool pioneered by Mighty Earth and The Climate Group dedicated to accelerating and scale-up the decarbonization of heavy industry to align with a 1.5°C global warming trajectory. That tool, the Global Framework Principles for Decarbonizing Heavy Industry ('Framework Principles'), launched last month after a drafting process that involved close coordination with industry and policy experts across the globe. Those principles constitute the first-ever publicly available global guidance for how to equitably balance economic growth with decarbonization.

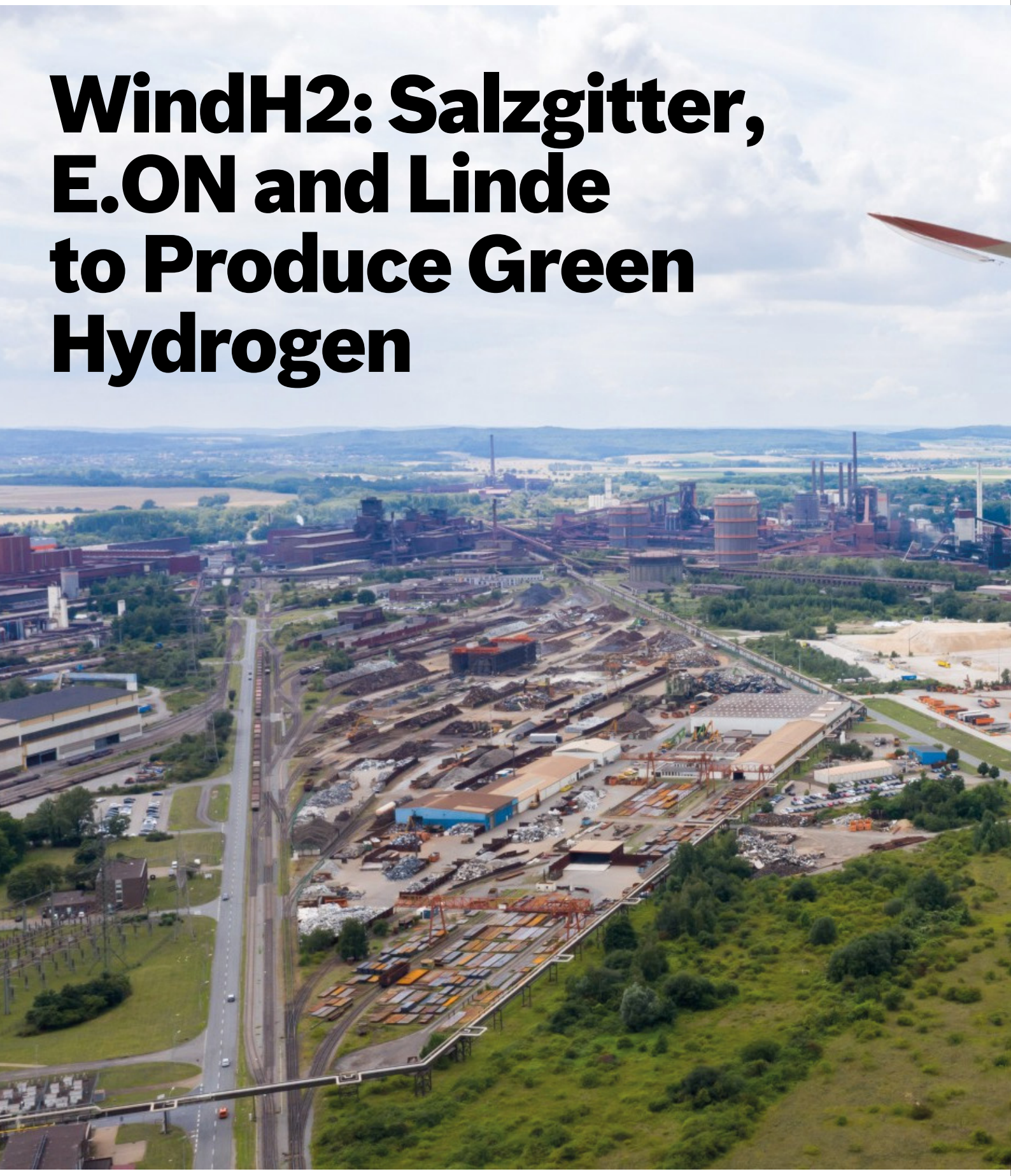
The Framework Principles outline the role of governments and private industry to ensure the successful decarbonization of heavy industries including steel, cement and chemicals through allocation of public financing for emissions reduction plans. The Framework Principles also specify investment in low- and zero-carbon technologies as a top government and corporate priority to help phase out fossil fuel use in industrial processes. The growing number of heavy industry corporate endorsers including Tata Steel Ltd. and JSW Cement reflect how corporations are seizing the initiative on industrial decarbonization.

"ArcelorMittal's initiative should place urgent decarbonization at the top of the heavy industry sector's priorities and catalyze private sector and government action to provide the necessary funding as well as the policy and regulatory environment necessary to fast-track that process," Kine said. "Avoiding the climate repercussions of unmitigated industrial high carbon emissions requires serious, timely and collaborative corporate and policy sector measures to keep our planet from heating beyond 1.5C."

About Mighty Earth

Mighty Earth is a global campaign organization that works to protect the environment. They focus on big issues: conserving threatened landscapes like tropical rainforests, protecting oceans, and solving climate change. In the fall of 2018, Mighty Earth launched a global campaign calling on Nucor and other global steel leaders to commit to clean energy and carbon neutrality. The campaign released two groundbreaking reports: Cold Steel, Hot Climate and Construction Destruction. Both reports focused on advances the steel and construction industries must undertake right away to solve the climate crisis and specifically outlined ways for Nucor to lead the market in low carbon steel making by committing to clean electricity. ■

WindH2: Salzgitter, E.ON and Linde to Produce Green Hydrogen



With the commissioning of the 'Wind Hydrogen Salzgitter – WindH2' sector coupling project, the only one of its kind in Germany, green hydrogen will in future be produced on the site of the Salzgitter steelworks using electricity from wind energy.

The three project partners Salzgitter, E.ON subsidiary Avacon and Linde have taken an important and unprecedented step towards decarbonizing the steel industry.

WindH2 is a central component of the SALCOS® - Salzgitter Low CO2 Steelmaking technology project developed by Salzgitter AG. SALCOS describes the most efficient and timely way to reduce CO2 emissions, and in the long term even to achieve almost CO2-free steel production. Hydrogen generated from renewable sources will replace the carbon previously required for iron ore smelting. The three blast furnaces currently in operation will have to be gradually replaced by a combination of direct reduction plants and electric arc furnaces. Such a transformation of steel production could reduce CO2 emissions by around 95 percent by 2050.

The newly constructed facilities were presented to the public on March 11, in Salzgitter. Among those present at the opening were State Secretary Andreas Feicht, Federal Ministry for Economic Affairs and Energy; Dr. Bernd Althusmann, Lower Saxony Minister for Economic Affairs, Labor, Transport and Digital Affairs; Olaf Lies, Lower Saxony Minister for the Environment, Energy, Building and Climate Protection; Dr. Johannes Teyssen, CEO of E.ON SE; Marten Bunnemann, CEO of Avacon AG, and Prof. Dr.-Ing. Heinz Jörg Fuhrmann, CEO of Salzgitter AG.

"The 'Windwasserstoff Salzgitter - WindH2' project was supported by the Federal Ministry for Economic Affairs and Energy with 1.1 million euros from the federal funding for energy efficiency in the economy. With the sector coupling of wind energy and hydrogen production, the project implements one of the objectives of the German government's National Hydrogen Strategy: The use of climate-friendly hydrogen produced from renewable energies is a key element for decarbonization in industry," Federal Ministry for Economic Affairs and Energy stated.

"What many thought was a wild vision of the future a few years ago is happening here: the gradual decarbonization of steel production. Climate protection in the energy and industrial sector is much more than just electricity from renewable sources. This is about securing highly skilled jobs and further developing our industrial base. As the cost of CO2 rises, green steel will also become increasingly economical. The world is therefore watching with interest to see what is being created here. The pioneering work done here has every chance of becoming a 'Made in Germany' export hit," Olaf Lies, Lower Saxony Minister for the Environment, Energy, Building and Climate Protection, underlined.

Prof. Dr.-Ing. Heinz Jörg Fuhrmann, Chairman of the Executive Board of Salzgitter AG added: "We are proud to be pioneers in the industrial use of green hydrogen in the steel industry. As demonstrated by our SALCOS project, we are technologically capable of achieving significant CO2 reductions using hydrogen. The 'Wind Hydrogen Salzgitter- WindH2' sector coupling, which is unique in Germany to date, is a significant building block on the way to climate-friendly steel production."

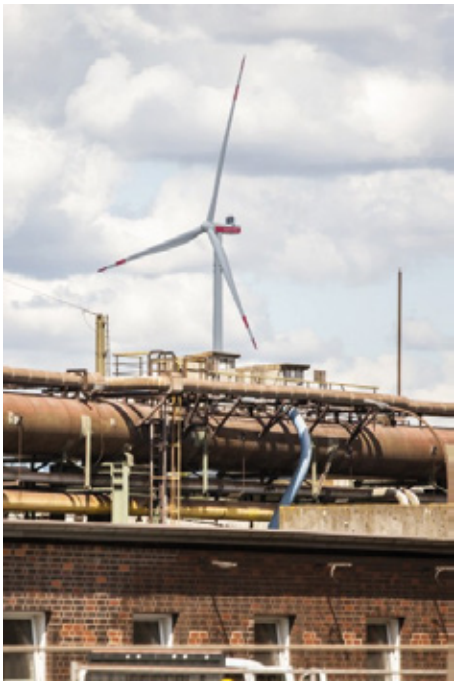
Avacon operates seven newly constructed wind turbines with a total capacity of 30 megawatts on the Salzgitter AG site. Salzgitter Flachstahl GmbH has installed two Siemens 1.25-megawatt PEM electrolysis units centrally on the plant site, which will generate around 450 cubic meters of high-purity hydrogen per hour. Hydrogen is already used in steel production for annealing processes and in the hot-dip galvanizing lines. Industrial gas producer Linde currently supplies the gas by truck and will continue to ensure a continuous supply of hydrogen in the future. All the plants are currently in trial operation. With WindH2, the partners want to gain know-how and experience with the on-site production of wind power and hydrogen, as well as their integration into the complex procedures and processes of an integrated steelworks.

The costs for the entire project amount to around 50 million euros. The construction of the electrolysis plant was funded by KfW.

Instead of having hydrogen delivered as is the case now, in future Salzgitter AG intends to produce its own hydrogen on site.

"Green gases have what it takes to become the 'staple' of the energy transition and make a significant contribution to decarbonizing industry mobility and heat. The jointly implemented project symbolizes a milestone on the way to virtually CO2-free steel production and shows that intelligent sector coupling can replace fossil fuels," Dr. Johannes Teyssen, CEO of E.ON SE, mentioned.

"In view of the climate targets, the decarbonization of steel production with the aid of green hydrogen is a milestone for the German steel industry. I am pleased that Lower Saxony, through Salzgitter AG, is pioneering this development nationwide and is launching a promising project with WindH2. With its pioneering work, Salzgitter is providing the blueprint for future climate-friendly production technologies at the German industrial site and at the same time securing qualified jobs in Lower Saxony," Dr. Bernd Althusmann, Lower Saxony's Minister



Seven wind turbines, together generating about 30 megawatts of power, provide more than enough green energy for the PEM electrolysis plant.

The thinly rolled steel strips are introduced into the galvanising system. A protective gas mixture of nitrogen and hydrogen ensures that the material does not react with the oxygen before it is dipped into the 450 degrees hot zinc bath. The hydrogen for this is to come from the "Salzgitter Clean Hydrogen" project in future.

Existing pipelines can be used to transport the hydrogen from the PEM plant to the neighbouring galvanising plant.

for Economic Affairs, Labor, Transport and Digital Affairs, pointed out.

"With the wind farm on the industrial site of Salzgitter AG, we are supplying renewable electricity for the production of green hydrogen. This is used directly within the production processes and replaces fossil fuels. The entry into the hydrogen economy is emerging in regional stand-alone solutions, such as in Salzgitter, which are increasingly being combined to form an overall system. We will continue to drive this process forward together with our partners in politics, science and industry," Marten Bunnemann, CEO of Avacon AG, said.

About the project

The aim of the 'Salzgitter Hydrogen' sector-interconnection project is to generate hydrogen in Salzgitter through electrolysis and electricity from wind power. These activities are intended to put down the foundation for harnessing larger volumes of hydrogen in the future to reduce direct CO2 emissions in the production of steel. Avacon builded seven wind turbines with an output of 30 megawatts on the premises of the Salzgitter Group, three of which are located on the grounds of the steel mill. Industrial gas supplier Linde ensures the steady supply of hydrogen. Within the context of this project, the partners are aiming to build up know-how for the environmentally compatible production of hydrogen, as well as for gaining experience with the on-site production of hydrogen and its incorporation into an integrated steel mill with its complex production processes. Hydrogen delivered by Linde is already used today in the annealing processes that are part of producing steel. In addition, the use of hydrogen in mills opens up potential for significantly reducing the CO2 emissions generated from steel production processes in the future.

With a view to achieving this goal, Salzgitter AG conceived the SALCOS® (Salzgitter Low CO2 Steelmaking) project that maps a realistic path toward the gradual reduction of CO2 and, in the long term, steel production that is virtually free of CO2. As part of this project, hydrogen generated from renewable energies is to replace the carbon so far required for the smelting of iron ore.

Salzgitter Flachstahl is endeavoring to gain operational experience through this project in the area of generating "hydrogen from renewable energies" that is so important for SALCOS®. Subsequently, this experience could be drawn on for the implementation on an industrial scale. Although the framework conditions prevailing today do not permit the commercial operation of a direct combination of wind energy generation and electrolysis operations without government funding, the three partners are determined to develop and advance this technology that is so significant for the future and for climate protection. ■

Prospects for the Global Mining Industry in 2021

Exploration and drilling activity in the global mining market had been on a growth path in 2019 and the early part of 2020, before the impact of the Covid pandemic significantly reduced activity in Q2. As a result, the number of drilling projects in Q2 fell by 21% compared with Q1 levels. Since then, drilling activity has recovered well in the second half of the year, and Q4 2020 levels were the highest quarterly levels since 2018.

The Parker Bay Company monitors deliveries of surface mining equipment to the global mining market on a quarterly basis. Their latest update for Q4 2020 shows an increase in shipments for the first time since the first quarter of 2019. Deliveries of machines in Q4 showed a 35% increase on Q3 levels to reach an annual total of just over 2,600 units. However, after declining in the first three quarters of the year, this left shipments in 2020 nearly a third below 2019 levels.

Australasia (principally Australia and Indonesia) was the largest region for deliveries in 2020, but still suffered a 20% decline in shipments year-on-year.

Deliveries of equipment to mines in Latin America showed the strongest growth in 2020, recording a 4% increase on 2019 levels. In contrast, shipments to North American mines showed a 40% decline in 2020.

Parker Bay run a mining equipment database which includes eight different types of surface mining equipment. Their latest assessment of the active machine population suggests more than 80,000 pieces of equipment are active in the global mining market. This includes mining trucks (over 48,000 machines) and crawler and wheeled dozers (over 14,000 machines) as the two most popular machine types.

In 2020, shipments of wheeled loaders showed the most resilience, declining by only 4% on 2019 levels. In contrast, mining trucks saw deliveries fall by 37% year-on-year.

Prospects for the global mining industry in 2021 seem reasonable, based on the latest consensus forecasts for base metals prices from leading industry analysts.

Most commodities are forecast to show increases in 2021, albeit iron ore is expected to experience long term reductions in price levels.

As with other industries, uncertainty regarding the pace of recovery from the covid pandemic may inhibit growth in 2021, and significant levels of recovery may not be seen until the following year.

The global mining market is expected to grow from USD 1641.67 billion in 2020 to USD 1845.55 billion in 2021 at a compound annual growth rate (CAGR) of 12.4%, according to the 'Mining Global Market Report 2021: COVID-19 Impact and Recovery to 2030' from ResearchAndMarkets.com.

The growth is mainly due to the companies rearranging their operations and recovering from the COVID-19 impact, which had earlier led to restrictive containment measures involving social distancing, remote working, and the closure of commercial activities that resulted in operational challenges. The market is expected to reach USD 2427.85 billion in 2025 at a CAGR of 7%.

The mining market consists of sales of minerals, metals, and other valuable materials such as sand and gravel, coal and stone extracted from the earth crust by entities (organizations, sole traders, and partnerships) that undertake the process of extraction. The mining market is segmented into mining services; general minerals; stones; copper, nickel, lead, and zinc; metal ore and coal, lignite, and anthracite.

Source: CECE Annual Economic Report 2021

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European Construction Equipment Industry Stable and Resilient in 2020

CECE's Annual Economic Report shows that in 2020 the European Construction Equipment Industry suffered less than expected and looks at 2021 with a positive mindset. The CECE Business Climate Index shows optimism with a visible upward trend.

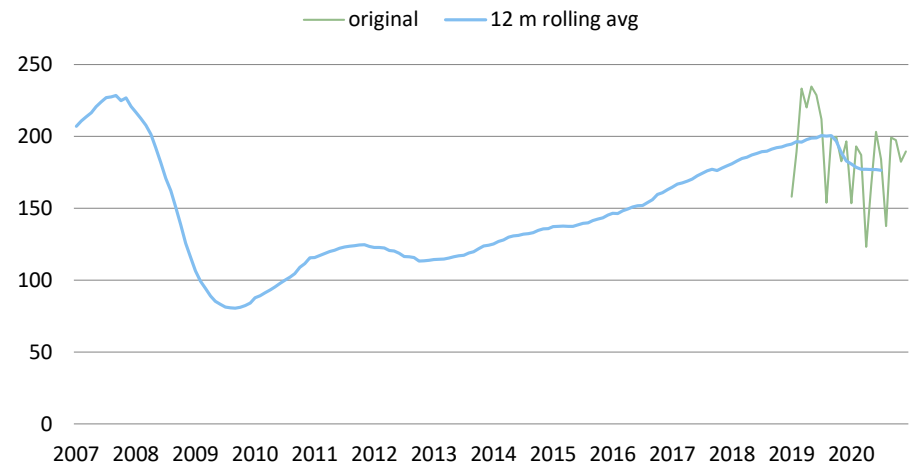
Sales on the European construction equipment market went down by 6.4% in 2020. This seemingly modest drop is due to the performance of high-volume light and compact equipment, whose sales were almost unaffected at -3%. In contrast, heavy construction machinery suffered a 19% fall in sales, in what emerged as a challenging year. Indeed, less expensive machines were sold at almost normal levels during the pandemic, while investment in more capital-intensive equipment suffered from the economic uncertainty. These economic figures are the result of a combination of anticipated cyclical downturn after years of growth and a slowdown in business activity due to the Covid pandemic. Unlike earlier years, earthmoving equipment, road equipment, concrete equipment, and the tower cranes business experienced similar market patterns, despite the impact of stronger sales of light equipment.

Presenting the report, CECE President Niklas Nillroth focused on the positive aspects of last year's results and this year's expected outcome. "As we all know, 2020 was the most unexpected and unpredictable of years. From an economic point of view, it represented a year of disruptions with certainties and forecasts crumbling before our eyes. However, as you will see in our report, the construction and industrial sectors in Europe have shown a great amount of resilience and capability to rebound quickly, limiting the damages of the first semester.

The foreseeable boost in construction and infrastructure activities from the European Recovery Plan represents another reason to remain optimistic for the near future."

2020 began in line with expectations, with a 5% market decline in the first quarter – a cyclical downturn that had been anticipated. However, in the second quarter, lockdowns across Europe began to take their toll and pushed the market to 28% below the levels of the previous year. The decline in sales in Q2 also reflected the impact of the comparison with the quarter in 2019 when the bauma exhibition was held, and the usual short-term boost in sales from it. With relaxation of lockdown measures in Q3, sales reached similar levels as 2019 and were flat year-on-year. The last quarter of the year saw the expected improvement in demand, and sales in Europe went up by 9%. This also reflected the benefit of business postponed in the first half of the year materializing in Q4.

From a geographical perspective, market sales in most countries reflected the impact of the pandemic and the lockdowns, but there were a few exceptions. Most notably, the Italian market reached the same level of sales as 2019, and the Turkish market recovered from its 2019 crash.



Monthly construction equipment sales in Europe (index 2010=100)

Outlook 2021

While the short-term macroeconomic outlook remains uncertain, with further risks from the spread of Covid variants, the business climate within the European equipment industry remains positive. After months of improvement, the business climate index in CECE's Business Barometer survey is significantly higher in March 2021 than at the outbreak of the pandemic in spring 2020. A significant majority of manufacturers expects business to grow in the first half of the year, and the level of satisfaction with current business has also improved significantly. In addition, the order intake for European manufacturers has been growing year-on-year since December 2020 and, sales on the European market are also on a clear growth path. This is consistent with the improvement in equipment sales seen in Q4 2020.

A forecast of 5% growth in the European equipment market is a realistic assessment of prospects for 2021. However, against a background of continued uncertainty and high absolute levels of sales, even a flat market in 2021 would not be a disappointment. The world market is also likely to show moderate growth in 2021, but the volatility of the Chinese market and its significant influence on the overall outcome means that it is difficult to quote reliable figures for overall global growth levels. In the medium term, the construction equipment industry faces many substantial risks. One of them are higher debts in many countries that will become a problem, as public infrastructure investments will suffer when austerity measures must be put in place.

The CECE Annual Economic Report contains sections on the macro economic situation, the performance of the construction sector, the main markets, and main segments of the European construction equipment industry. The report also includes information from the national CECE member associations, shedding more light on regional developments in the European construction equipment sector.

Construction industry

After an unprecedented decline in March and April, construction output in Europe showed a dynamic increase from May onwards. As a result, by November 2020 output had reached 97.5% of the pre-crisis level in February. It is expected that for the full year 2020, construction output in Europe will have seen an 8% decline. For 2021, the forecast is for growth of more than 4%, to be followed by 3.4% in 2022, and 2.4% in 2023.

The construction sector has felt a significant impact from the pandemic, but the consequences have been different across the countries in Europe. The construction sector had already been weak in Finland and fairly stagnant in Portugal and Norway.

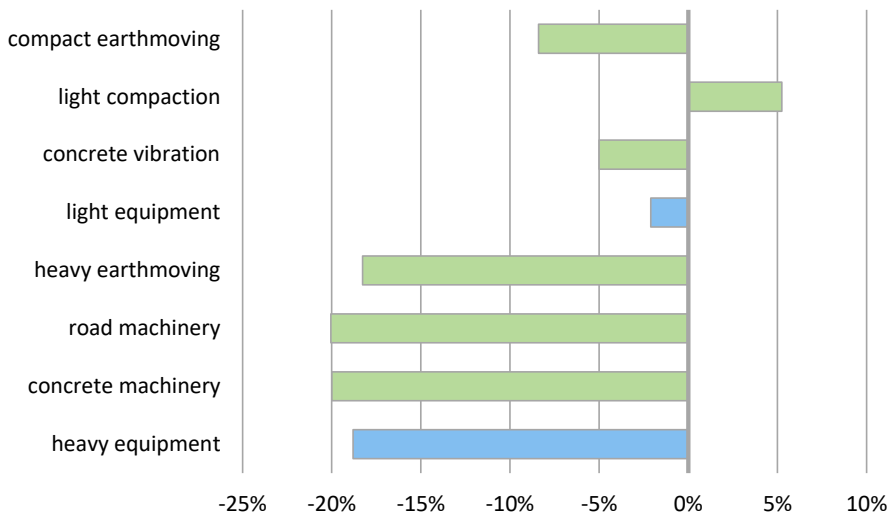
However, in contrast, the United Kingdom suffered a significant fall in activity during the year resulting in a 12.5% decline in output in 2020. This was the first annual fall in output since 2012 when it fell by 7.2%, and was the largest decline since 2009, when it fell by a record 13.2%. The fall in activity in 2020 was a result of both a decline in new work (-15.2%), as well as repair and maintenance (-7.5%). Other major construction markets like France and Spain, which shut down their economies for several weeks, were also heavily affected. Spanish construction output fell sharply in 2020, recording a fall of 18.2% in Q4 2020.

The lockdown measures imposed by the government in November and the subsequent slowdown in economic activity significantly reduced output in the country's construction industry in Q4 2020. In France, the restrictions introduced later in the year had less impact on the construction sector than the measures implemented in the spring, with the sector showing a 15% reduction in output for the whole year.

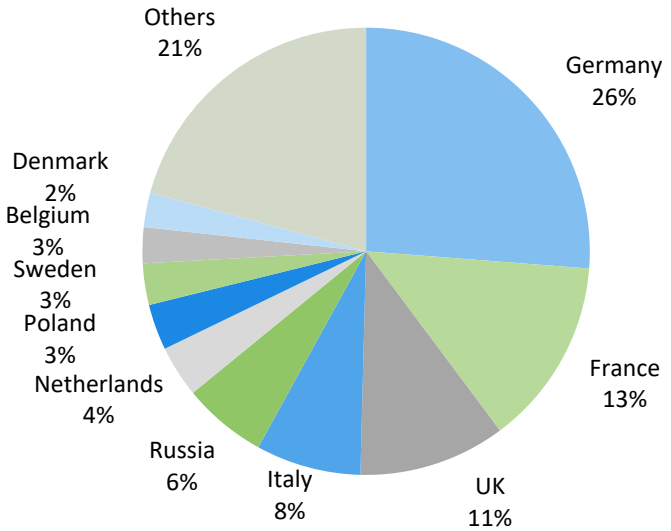
Two-thirds of this decline was a result of the measures reduced during the first lockdown in the spring.

The German market has held up well during the pandemic due partly to the approach by public authorities to implement more limited measures to reduce economic activity, particularly in the construction industry.

However, the pandemic continues to hold back demand for construction



2020 sales development of light and heavy equipment



Shares of construction equipment sales in European countries, 2020

work and construction companies have become more pessimistic about business prospects for the coming year due to its impact on businesses, households and local authorities.

The impact of the pandemic on the construction sector is expected to persist during 2021.

Finally, the impact of Covid'19 can clearly be seen on the construction market in Italy. In April 2020, output fell by 51.5% on a month-on-month basis, following a significant fall of 36.4% reported in March.

In the three months to April 2020, the index for construction output showed a decline of 33.2% compared with the previous three months, and year-on-year the index plummeted by 66.7%. Since the summer, construction activity has partially recovered, but has not been strong enough to compensate for the losses incurred earlier in the year. Over the first eleven months of 2020, the index for construction output showed a fall of 8.6%.

Looking across the different market segments in Europe, the civil engineering sector is likely to be the least affected by the impact of coronavirus. Expenditure on infrastructure facilities fell by only3.8% in 2020 and is expected to grow by 5.2% this year. In contrast, the building construction sector is seeing bigger reductions in activity. The non-residential construction sector saw a decline of 9.2% in 2020 and will be followed by moderate growth of 2.5% in 2021.

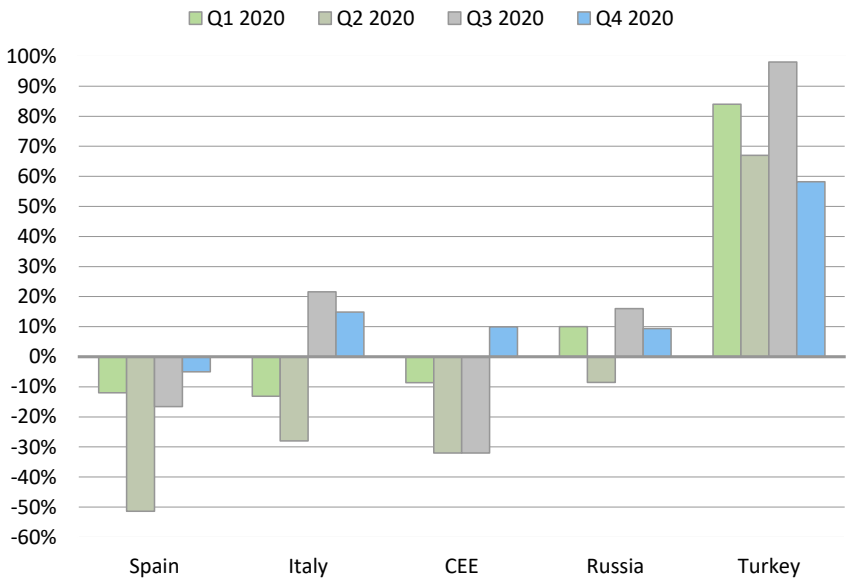
The residential sector saw a significant fall of 8.6% in 2020, but the market is expected to regain significant momentum in 2021, with forecast growth of 4.7%. Due to government restrictions and legal uncertainties during the spring last year, many renovation projects were delayed, including some for many weeks. As a result, repair and maintenance activity fell by 7.3% in 2020.

2021 and future years

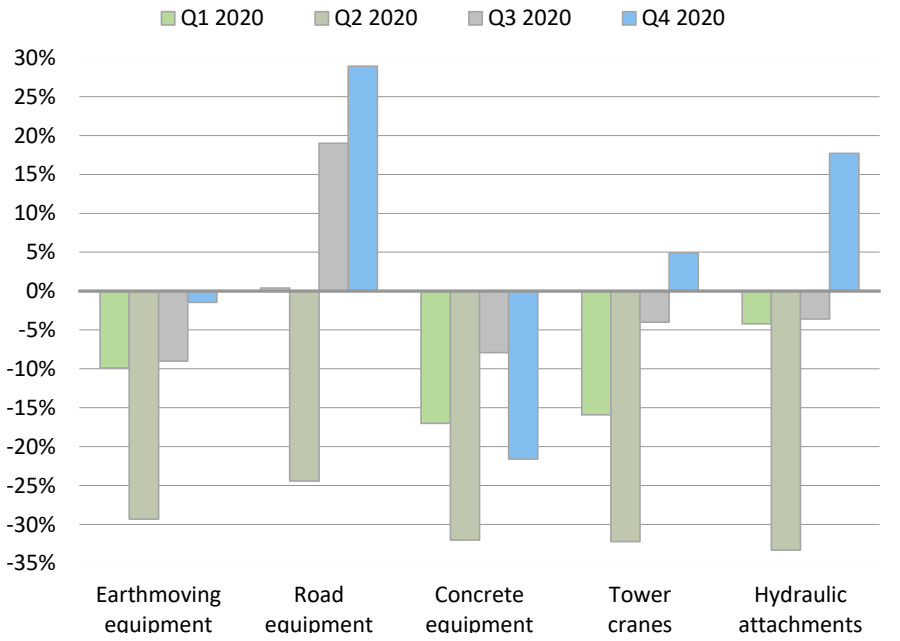
According to the latest Eurozone Construction Purchasing Managers (PMI) IHS Markit Index, construction companies in the eurozone reported a continued decline in activity in December.

Demand for new construction projects remains subdued, and companies downsized at a slightly faster pace than reported in the previous month's survey.

Concerns over the long-term impact that the pandemic will have on the construction sector, as well as the lack of new projects in the public and private



Construction equipment sales in major European markets compared to previous year in %



Product groups: construction equipment sales in Europe compared to previous year in %

sectors resulted in manufactures reporting a more pessimistic outlook for the euro area for a fifth consecutive month.

Looking at the major countries, France and Germany continued to report further declines in construction activity, with France signalling the largest drop since May.

In contrast, Italian companies reported marginal growth in activity for the first time since September. Looking ahead, a strong recovery is expected for the Spanish construction industry in 2021 with growth of 7.4% anticipated. Growth prospects in France are even more positive, with output expected to increase by around 10% this year. In the UK, and in many other European countries, a strong housing sector is expected to be significant in helping to weather the COVID-19 storm.

However, new retail, hotel and office construction will continue to see reduced activity for many months.

Overall, prospects for the construction industry are quite dependent on how well government relief/stimulus programmes work to support activity. However, beyond the impact of the pandemic, it is expected that underlying factors generating demand in the medium term will continue.

This includes demand for housing in urban regions, renovation within the energy sector and modernization of infrastructure.

According to Euroconstruct, the European construction market is not expected to fully recover before 2023, with expected growth of 4.1% in 2021, 3.4% in 2022 and 2.4% in 2023. The civil engineering sector is expected to grow by 5.2% in 2021, while non-residential construction should experience more modest growth of 2.5%.

For residential construction, the market is expected to show significant momentum in 2021 with expected growth of 4.7%.

All of this suggests that by 2023, it is unlikely that output in the construction industry will have returned to 2019 levels.

CECE is the recognized organization representing and promoting the European construction equipment and related industries, co-ordinating the views of National Associations and their members by influencing the European/National Institutions and other organizations worldwide to achieve a fair competitive environment via harmonized standards and regulations. ■

RTLS Technology Essential for Industrial Digitalization

Wipelot, one of the leading providers of Real-time location systems (RTLS), explain why RTLS technology is essential for industrial digitalization. The company confirms that RTLS is a fast-growing area which allow companies to gain access to these benefits and more.

There is a host of benefits that businesses can leverage from knowing exactly where their assets and personnel are located at all times. Some of these benefits are pretty obvious, such as not having to waste time looking for inventory or spending money replacing it if it can't be found. But there are also many value added benefits that maybe not so instantly apparent, for example keeping employees safe.

What is RTLS Technology

How RTLS operates is fairly easy to understand. RTLS use RFID readers situated around the premises to gather a variety of measurements wirelessly from a RFID tag. The captured information is sent to a central device for processing. An algorithm is then used to determine the location of the tag with centimetre-level precision.

Different wireless protocols can also be used for RTLS installations. The protocol used depends on the requirements of the application. Ultra-wideband (UWB), WiFi and Bluetooth communications have been used by different RTLS suppliers. Wipelot mainly focusses on UWB in its systems as the technology avoids the crowded 2.4GHz frequency band and provides the best combination of accuracy and security.

Applications and benefits

Every business can become more efficient just by knowing the location of inventory, equipment and staff, but advanced RTLS can be used to do much more than providing precise locations. The wireless networks used to deliver the location measurements to the reader have enough spare bandwidth to deliver other measurements that are usually provided by sensors within the tag. If required, control signals can then be sent back over the communications network to perform actions, such as activating alarms.

RTLS can also be used in other ways to enhance the safety of the workforce. For example, in some RFID tags intended for personnel, Wipelot integrates fall sensors that can alert the company to an injured member of staff. Software can easily be programmed to designate areas as safe and unsafe, for example, to allow humans to safely work beside robots. When the operator moves into a space designated for robots, an alarm will sound. Distances can also be specified between tags. This ability has been used successfully by businesses during the current COVID-19 outbreak to impose proper social distancing. Alarms will sound if two members of staff get closer than the company's preventative rules allow.

In a manufacturing environment, RTLS can track products as they move through the line to provide the traceability necessary for quality control to improve customer confidence. The tags can also monitor the production environment and equipment as part of an Industry 4.0 installation.

Complete package

Having become the dominant RTLS provider in the Turkish domestic market, Wipelot is now looking further afield. Rifat Ok, Wipelot CEO said,

"We are now making a major push to bring the benefits of RTLS technology to international markets. RTLS offers a faster way to recoup an initial investment than almost any other initiative that I know, and that is only counting defined financial benefits. There are many more intangible benefits, such as safeguarding staff and providing a more reliable service and better-quality products to customers which can't be measured so easily."

Rifat Ok, Wipelot CEO

"We are now making a major push to bring the benefits of RTLS technology to international markets." He then expanded further on the benefits by explaining, "RTLS offers a faster way to recoup an initial investment than almost any other initiative that I know, and that is only counting defined financial benefits. There are many more intangible benefits, such as safeguarding staff and providing a more reliable service and better-quality products to customers which can't be measured so easily."

RTLS can be used in any size of company and in any type of business that has stock or staff. Current Wipelot customers include manufacturers, utilities, airports, mines and automotive businesses, from smaller companies to the largest multinationals, such as Mondi, P&G, Bosch, ABB and Unilever. The company offers a wide selection of products that suit any application, including WIPELOT RTLS location tracking solutions and the WIPELOT ISG work safety family of products.

WIPELOT Industrial IoT & RTLS systems

WIPELOT product family offers economical, practical wireless solutions in the concept of automation and location tracking, work safety and data measurement and analysis.

By the virtue of WIPELOT OTX Automation solutions instantly ambient temperature, humidity, gas, light etc., values may be measured and evaluated.

WIPELOT RTLS Location Tracking solutions in indoor or special locations accurately tracking personnel and/or equipment locations make assessments and carry out seasonal analysis.

WIPELOT ISG in the context of work safety enables instantly to be aware of the circumstances of individuals obliged to work under risky and dangerous environments and providing interference time periods creating industrial solutions.

WIPELOT product family from health to tourism, from safety to industry over widespread of branches produces valuable outcomes and creates positive gains in business processes.

WIPELOT IoT product range

Wipelot RTLS geolocation solutions are tracking, analysis and evaluation systems designed to track the real-time location of personnel and equipment in indoor spaces, open/underground mining sites, construction sites, aprons and similar specialized areas.

Wipelot ISG offers solutions that monitor in real-time the situation of employees working in hazardous environments such as mines and shipyards with a high occupational health and safety risk and reduce emergency response times through location-based alerts.

Wipelot SafeZone is a geofence system that issues a warning to the user when the safe distance between forklift trucks, heavy construction equipment, workers or other sundry paraphernalia is exceeded to prevent crashes.

Wipelot OTX wireless measuring solutions are a warning system that instantly measures and evaluates data such as temperature, humidity, gas, light, production and consumption meter readings. It is used to prevent risky situations in working environments and achieve high savings by optimizing energy consumption.

EU to Miss Key Climate Targets Unless Clean Technology Innovation Is Scaled

Newly published research from Cleantech Group, the global authority on clean technology innovation, with the support of Breakthrough Energy, found the EU's venture capital investment into cleantech from 2011-2020 grew by a remarkable 7.5x to more than EUR 5 billion in 2020.

But research also discovered progress is concentrated on early-stage development and lacks scale-up investment and policy support. The EU attracted 23% of global cleantech seed-stage funding in 2020, but only 7% of global cleantech growth equity funding (compared to 54% for North America). The EU risks missing key climate targets by failing to scale clean technologies and letting promising innovators scale in North America and Asia instead.

Cleantech for Europe is a new initiative launched by Cleantech Group, with the support of Breakthrough Energy, to help the EU lead the global clean transformation through targeted research and recommendations on EU cleantech investment and policy. The initiative connects EU policy makers to entrepreneurs and investors.

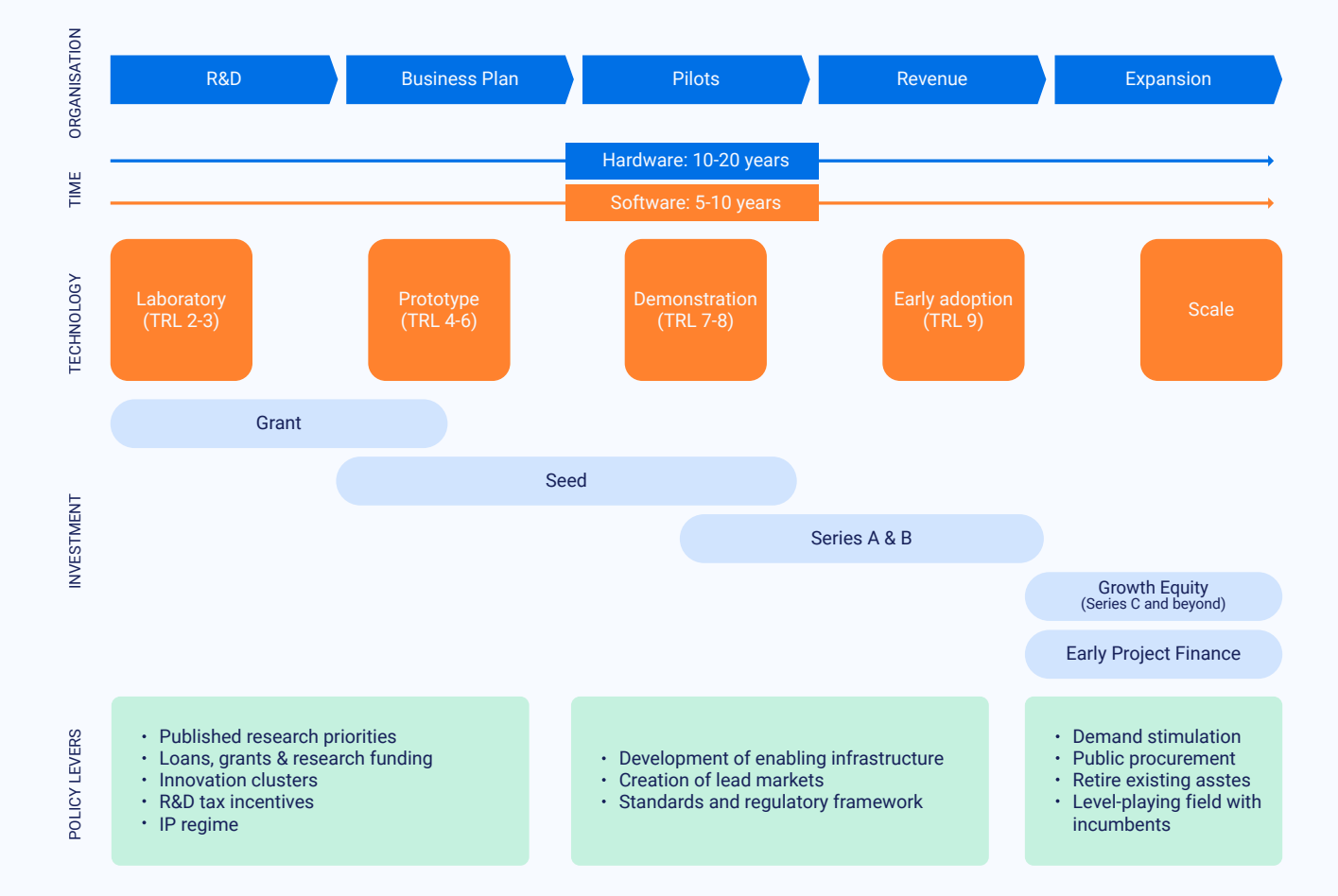
Its first position paper, published on March 23, Making Fit for 55 a green demand shock to scale EU cleantech, analyses the EU cleantech landscape. It advocates for leveraging the EU's upcoming Fit for 55 regulatory package to create leadership in five key innovation sectors: green hydrogen, green steel, low-carbon construction materials, sustainable aviation and soil carbon. The paper makes the case for a green demand shock that would pull EU innovators to continental scale and maximize climate impact.

"The EU's climate future is at a crossroads. Deploying mature technologies such as solar and wind can only take us halfway. To lead the race to net zero, and gain a competitive advantage for decades, the EU needs a green demand shock to scale early-stage clean technologies," said Jules Besnainou, Director, Cleantech Group.

"With the forthcoming 'Fit for 55' package, the EU will update almost all of its energy and climate legislation, changing the policy framework for a long time to come. With investment cycles averaging 25 years, what happens in 2050 is essentially being decided today. The stakes couldn't be higher as only a new generation of clean technologies can lead Europe towards climate neutrality. That is why this study sheds light on persistent challenges in the European innovation ecosystem that urgently need to be addressed – from lack of growth equity and weak demand signals for green products to poor exit routes for successful entrepreneurs" said Ann Mettler, Vice President, Europe, Breakthrough Energy.

Deploying mature technologies like solar and wind is crucial but will not be enough. We need to scale up the next generation of cleantech to decarbonise sectors such as steel, cement and aviation. This is harder, and demands that leaders take bold action now.

The EU already has at its disposal a large and high-quality supply of cleantech innovation waiting to be scaled across all sectors of the economy. Amounts invested have grown by a factor of 7.5x over the last



Innovation takes time and requires policy support to thrive
Source: Cleantech Group analysis

decade, driven by extraordinary progress in seed funding for early stage cleantech innovation.

Yet while great at building young companies, the EU is severely lacking scale-up capital and support – meaning that these companies cannot reach the demonstration or commercialisation stages of their technologies. EU cleantech scale-ups only attract 6.9% of global cleantech growth capital (compared to 32% for Asia, 54% for North America, and 4.8% for the UK alone). This situation is preventing the EU from reaping the climate and competitiveness benefits of our innovation and condemning promising ventures to move to North America or Asia to reach scale.

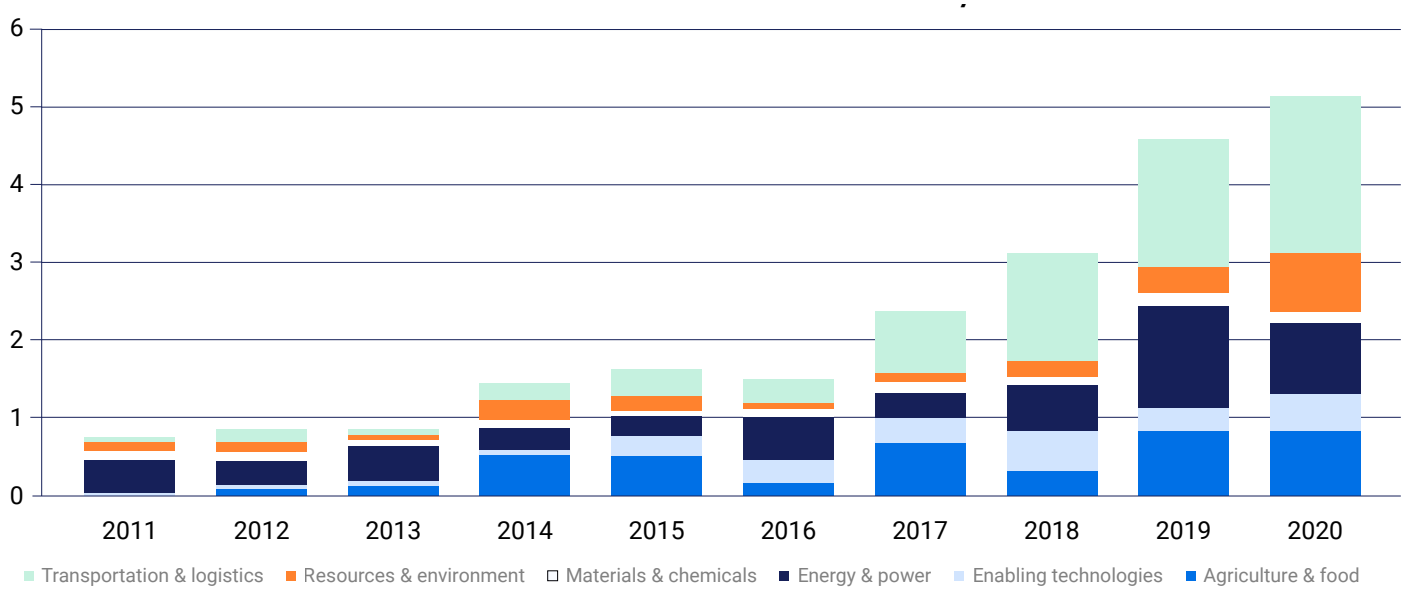
This lack of scale-up capital is a consequence of a demand-side challenge for EU cleantech innovation: there are not enough EU-wide demand signals for adoption of green products and solutions. Markets are fragmented with divergent regulation in key sectors like energy.

Fit for 55 regulatory package

'Fit for 55 package' was first announced in September 2020, with the goal of raising the 2030 target for greenhouse gas emission reductions to 55% of 1990 levels, up from 40% previously. Analysis carried out during 2020 concluded that the previous 40% reduction target for 2030 would not put the EU on a trajectory to net zero by 2050. It also showed that the current policy framework was insufficient to meet a 55% reduction target.

To create the legislation which will facilitate the

EU Cleantech Venture and Growth investments by sector, 2011-2020



Source: Cleantech Group

55% target, a comprehensive review of climate policy across twelve regulations, directives and other instruments will take place during 2021 and 2022. The package will review important EU policies and push for deeper decarbonisation across all sectors of the EU economy, including energy, buildings, transport, heavy industry and agriculture. This is a unique opportunity to set the EU on a course to climate neutrality and competitiveness.

Innovation is critical to reach this ambitious target. The IEA estimates that almost 50% of the emissions reductions needed to get on a path to net zero by 2050 may come from technologies that are not on the market yet, and are still at the research, demonstration, or pilot phase.

This means that accelerating the pace of deployment of mature technologies is necessary, but not sufficient, to achieve climate targets. The EU should continue to create the conditions for large deployment of mature technologies such as wind and solar power, which will provide significant decarbonisation by replacing fossil fuel generation. But it should also focus on the technologies which will deliver the second half of decarbonisation objectives. These technologies are already demonstrated at a small scale but need to be scaled up now to have a material impact by 2030. They include long-duration energy storage, green hydrogen production and storage, the use of hydrogen in heavy industry, low-carbon fuels for transport, and carbon capture.

As we scale these technologies up, their cost will decrease, making it easier to deploy them at continental scale.

The EU has understood the value of early-stage innovation bets, as evidenced by the recent increase of the Horizon Europe budget, despite the UK's departure. By focusing Fit for 55 on the scale-up of demonstrated technologies, the EU can create the conditions for these bets to pay off in this decade.

Cleantech Innovation takes time and support to grow

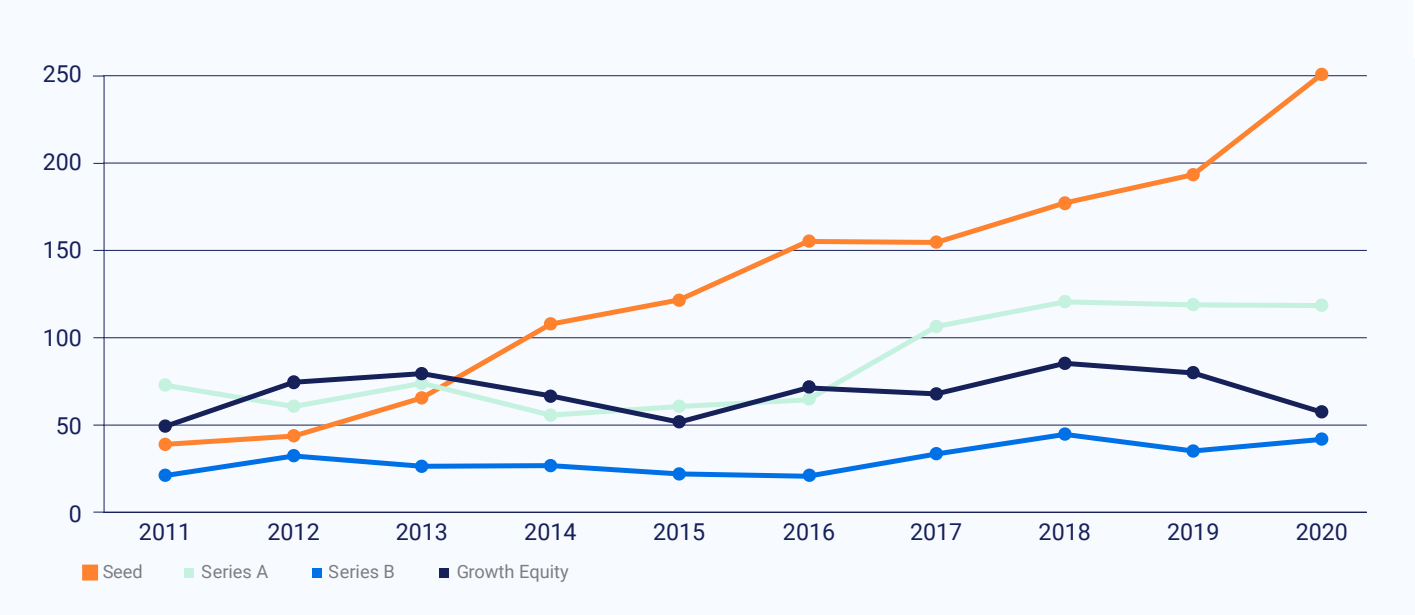
Before a new technology is ready to make a significant impact on decarbonisation, it must go through several development stages, from research & development to scale-up.

This innovation cycle is important to keep in mind when making policy decisions, as the most effective support mechanisms will be different according to the level of maturity of each innovation.

A strong innovation support ecosystem increases both likelihood of successful commercialisation and speed to market.

The IEA calculates a minimum lead time of ten years for clean technologies to get from laboratory or small prototype stage to commercialisation. Innovations that require a large capital expenditure may take longer because

EU27 Cleantech deal volume by stage - 2011-2020



Source: Cleantech Group

of the difficulty of raising the required investment, while products with low capital expenditure – especially those that can be mass-produced –are typically quicker to commercialise. New business model demonstrations for technologies which are approaching maturity can take five years before the market gains enough confidence to adopt the innovation. Only then can a new innovation start to make an impactful contribution to decarbonisation.

Once cleantech innovations have proved technical viability, the following policy levers can create the right market conditions to scale them up:

- Demand stimulation: creating lead markets for green products, sending signals of phase-out of polluting alternatives, leveraging public procurement
- Level-playing field with incumbents: no subsidies for polluting industries, adequate pricing of negative environmental externalities
- Clear targets for transition, and sub-targets by carbon intensity of products
- Harmonised standards and measurement methodologies across the region
- Development of enabling infrastructure
- Mechanisms for retiring existing assets, especially in industries where investment cycles are long
- Financial mechanisms to support scale-up: blended finance, increased allocation of public funds to scale-up capital, redirection of institutional capital with incentives

About Cleantech Group

Cleantech Group provides research, consulting and events to catalyse opportunities for sustainable growth powered by innovation. They bring clients access to the trends, companies and people shaping the future and the customized advice and support businesses need to engage external innovation. Industries are undergoing definitive transitions toward a more digitized, de-carbonized and resource-efficient industrial future. At every stage from initial strategy to final deals, Cleantech Group services bring corporate change makers, investors, governments and stakeholders from across the ecosystem, the support they need to thrive in this fast-arriving and uncertain future.

The company was established in 2002 and is headquartered in San Francisco with people based in London, Paris and Boston.

About Breakthrough Energy

Founded by Bill Gates, Breakthrough Energy is dedicated to helping humanity avoid a climate disaster. Through investment vehicles, philanthropic programs, policy advocacy, and other activities, they are committed to scaling the technologies we need to reach net-zero emissions by 2050. ■

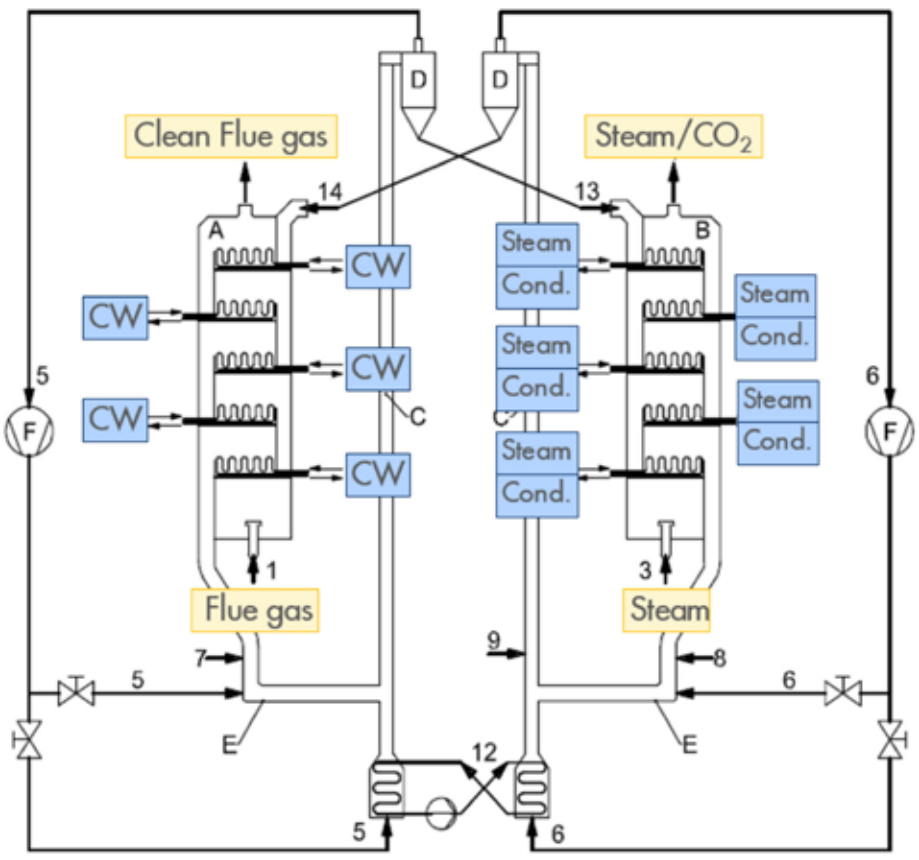
Bilfinger and Shell to Cooperate in TulipGreenCO2 Demonstration Project

Industrial services provider Bilfinger and Shell have signed a letter of intent to jointly design, build, operate and maintain a demonstration plant for the new and innovative Solid Sorbent post combustion CO2 capture technology. The aim of the TulipGreenCO2 project is to demonstrate the Solid Sorbent Technology at semi-commercial scale and to show the technology's cost effectiveness and favourable environmental performance. This is the last upscaling step before deployment of the technology at full commercial scale.

"We are looking forward to collaborating with Shell on the TulipGreenCO2 project," says Juergen Liedl, Executive President Region Belgium & the Netherlands at Bilfinger. "Energy transition and CO2 reduction are important topics for Bilfinger and with our expertise in this field we can with Shell further scale up their technology."

The Solid Sorbent Technology can capture CO2 from a broad range of post combustion flue gas applications. This game changing technology promises a high CO2 capture performance, with a 25% reduction in capture costs and

Continuous temperature swing process with Stacked Fluidized Beds for CO2 adsorption and desorption.



negligible emissions compared with other state-of-the-art CO2 capture technologies.

Dr.ir. Rob Littel, General Manager for CO2 abatement technology at Shell Global Solutions, emphasizes the potential of the project's innovative approach: "Capturing, storing and utilizing CO2 is an essential measure which will help the world to meet its ambitious target of mitigating climate change while providing more and cleaner energy." CCUS technology can capture CO2 from existing power infrastructure and heavy, energy-intensive industries like cement and steel.

CO2 capture to commence in the course of 2024

The TulipGreenCO2 project is planned to have a CO2 capture capacity of 150 tonnes per day and be located at the sustainable energy power plant BMC Moerdijk in the Netherlands. Subject to future investment decisions, and according to the current state of planning, the capture of CO2 will commence in the course of 2024. The TulipGreenCO2 project is a unique endeavour in Europe as the biogenic CO2 is planned to be subsequently sent to permanent offshore storage and/or reuse applications.

Incorporating the full Bioenergy Carbon Capture Utilization and Storage (BECCUS) value chain contributes to the acceleration of negative emissions which is an important element in achieving the Paris agreement.

As Engineering and Project partner Bilfinger will focus on the delivery of the demonstration project with the future objective to further develop and deploy this technology. Shell will bring deep expertise of the Solid Sorbent Technology and essential knowledge to scale up the technology before deployment.

Schlumberger and Microsoft to Bring Open, Enterprise-Scale Data Management to the Energy Industry

On March 29, Schlumberger and Microsoft announced an expanded strategic partnership to accelerate new technologies for the energy industry. The first offering, the Schlumberger Enterprise Data Management Solution for the OSDU Data Platform—a new industry standard for energy data—is available today. Energy companies will now benefit from an OSDU-compliant solution, and the ability to seamlessly connect to the DELFI cognitive E&P environment from Schlumberger. The Enterprise Data Management Solution is ready for global customers to deploy on Microsoft Azure, Schlumberger's preferred global public cloud platform for OSDU-compatible solutions.

The companies' mutual contributions to the first commercial release of the OSDU Data Platform establish the foundation of the Schlumberger Enterprise Data Management Solution. Through this partnership they will enhance the Enterprise Data Management Solution, tighten integration with OSDU and develop new scalable data ingestion capabilities, unified AI templates and domain services. These new joint solutions will be built using industry focused cloud, data and AI innovations and domain expertise from Microsoft and Schlumberger. The companies will work together to bring these new products to market, including sales, service and support.

"Introducing a global cloud-based data solution, built by Schlumberger and Microsoft, means the energy industry can fully embrace their digital transformation with confidence. By working together, we have opened access to data and AI, unlocking significant potential for productivity increases and performance gains across all domains," comments Hinda Gharbi, executive vice president Services and Equipment, Schlumberger. "These new possibilities and opportunities have become a reality today; our joint solution is available for deployment on Azure across the globe. Our industry can now quicken the pace of innovation to accelerate the digital future of energy."

"Our expanded partnership with Schlumberger underscores the vision we share to help the energy industry's digital transformation," said Scott Guthrie, executive vice president, Cloud + AI, Microsoft. "By harnessing AI technologies, companies can simplify their data to gain valuable insights and streamline workflows. Built on Azure, and open

and interoperable by design, these new solutions and platforms will enable every customer and partner in the energy industry to compete and thrive."

The Enterprise Data Management Solution includes all the tools you need to run and manage your OSDU Data Platform, simplifying the entire data management process in one go: automated ingestion; quality control; data governance; data discovery; streaming, sharing and consumption.

By connecting directly to domain applications, the new data environment creates a seamless experience for the users, allowing them to focus on driving the business, not on data logistics.

With this solution your OSDU Data Platform integrates seamlessly to your applications in the DELFI cognitive E&P environment. This means you can instantly connect data to domain and data-driven workflows to take full advantage of leading AI and physics-based solutions in the DELFI environment.

About Schlumberger

Schlumberger is a technology company that partners with customers to access energy. Their team, representing over 160 nationalities, are providing leading digital solutions and deploying innovative technologies to enable performance and sustainability for the global energy industry. With expertise in more than 120 countries, the company collaborates to create technology that unlocks access to energy for the benefit of all.

About Microsoft

Microsoft enables digital transformation for the era of an intelligent cloud and an intelligent edge. Its mission is to empower every person and every organization on the planet to achieve more. ■

Cold War Winds

by Evgenios Zogopoulos

Cold winds seem to be blowing globally, potentially introducing the start of a new era of Cold War. Nord Stream, being one of the most important regional energy projects in Europe could not remain unaffected; and this new Cold War era might mean the project will remain frozen. Times are changing and it seems that the new U.S. administration is trying, maybe a but abruptly (or not), to reaffirm its global supremacy and establish itself as a key-stakeholder in every global or regional table possible. A stakeholder with a weighing input and decision-making power. Apparently, other emerging global powers like China and Russia have a different view on this and they seem to be very willing to enforce their point of view and protect their stakes and interests, from battlefields to energy projects like Nord Stream 2.

for Nord Stream 2

PIONEERING SPIRIT INSTALLING THE PIPELINE IN SWEDISH WATERS

Pioneering Spirit, the world's largest heavy lift and pipelay vessel, shown here at work in the Swedish Exclusive Economic Zone. The smaller vessel to the left is among the fleet of supply vessels that make deliveries to the floating factory on a round-the-clock schedule.

New foreign U.S. policy: setting things straight (?)

During his 2020 campaign president Joe Biden presented Russia as an 'opponent' and China as a 'competitor.' This contract might indicate America's will to examine and treat Russia and China separately, as their combined strengths could pose a serious challenge globally. Divorcing policy toward one country from policy toward the other not only distorts policy China has been building tremendous momentum on every single aspect imaginable, from technological to industrial and from economic to military, they keep moving from strength to strength. It almost seems inevitable that they will soon challenge the U.S. supremacy, at least on their side of the world. Russia, on the other hand, has been a more vocal and active challenger, with impressive geopolitical victories in Ukraine, Syria and even in the States with its alleged cyber-meddling with the U.S. elections. Overall, it seems that the U.S. might feel the need to "set things straight" now more than ever and their recent foreign affairs policy indicates exactly that.

Joe Biden is setting a clear direction moving away from Donald Trump's approach and his admiration for strongmen like Vladimir Putin and his potentially reconciliatory motives. Although the U.S. administrations has recently agreed to extend the arms control deal with Russia, they are adopting an increasingly aggressive stance on Russia. Biden, during a recent interview characterized Putin as 'killer'; taking a step back, he might have said that in the sense of Putin being a very serious, "not joking around" leader - and not in the sense of him actually killing people - but still, this kind of language is highly unusual on such levels. At the same time, U.S. intelligence agencies released reports suggesting

Commissioning equipment at the Russian landfall

Construction of the pipeline at the Russian landfall has been completed. With both lines laid, equipment such as this ball valve is now being commissioned.

© Nord Stream 2 / Axel Schmidt.

The German Landfall in Lubmin, July 2020

The pipeline inspection gauge (PIG) receiving station for the Nord Stream 2 Pipeline has been operational since the end of 2019. All necessary preparations for commissioning have been completed.

© Nord Stream 2 / Axel Schmidt.

Russian efforts to interfere again in the last elections, against Joe Biden's candidacy. This course of events led eventually to Russia recalling their ambassador to the U.S., while reminding the U.S. about the massacres against Native Americans and the nuclear bombings of Japan.

Meanwhile in Russia, Vladimir Putin, when asked about Biden's comment (during celebrations of Crimea's annexation) he replied with something along the lines of "it-takes-one-to-know-one," when it comes to 'killers.' He also said he would reply to Biden's remarks with: "I would tell him: 'Be well.' I wish him health, and I say that without any irony or joking." President Putin also noted that his country will still cooperate with the U.S. where they see it fit, adding that "a lot of honest and decent people in the U.S. want to have peace and friendship with Russia. I know that the U.S. and its leadership is generally inclined to have certain relations with us, but only on issues that are of interest to the U.S. and on its conditions. But we know how to defend our own interests, and we will work with them only in the areas we are interested in and on conditions we see as beneficial to ourselves. And they will have to reckon with it." He also challenged Joe Biden to an open, live discussion: "Last time, President Biden initiated a call and now I would like to offer President Biden to continue our discussions. It would be in the interest of both the Russian and U.S. people and other countries, bearing in mind that we bear a special responsibility for global security as the largest nuclear powers." The challenge was not accepted. Other Russian officials and lawmakers were far less diplomatic in their responses.

White House press representative, Jen Psaki, mentioned that Joe Biden would "continue to look to cooperate on efforts to stem Iran's nuclear program and, more

broadly, nuclear non-proliferation." She also pushed back on questions suggesting that those comments were not helpful: "President Biden has known President Putin for a long time. They've both been on the global stage for a long time, worked through many iterations of a relationship between the United States and Russia. And he believes we can continue to do that. The president believes that one of the greatest attributes of the United States is our honest self-reflection and our constant striving for progress, and there's always more work to do," she said.

The Biden comments about the Russian President is definitely not the only issue right now. The U.S. also had a high-level meeting with China in Alaskan territory. U.S. Secretary of State, Antony Blinken, expressed his "deep concern" about China's behaviour and speech during a tour of Asia and condemned Beijing for breaking rules that keep at bay "a more violent world". During the Alaskan convention, the Chinese representative pretty much said that the U.S. is in no position to address China with "such a tone" and Chinese diplomat Yang Jiechi shared his thoughts: "Well, I think we thought too well of the U.S."

It seems increasingly urgent for the US to define their new global policy and decide what they want the world to look like in the decades to come. The situation seems definitely multi-polar nowadays, contrary to the Cold War era, and maybe the U.S. need to consider that. Maybe Russia seems to be an "old time classic" story, but China is emerging and there seems to be nothing that can stop it. Separating U.S. policy toward the two other global players or focusing exclusively on Russia or China seems not very smart in a multi-polar world and especially since the new U.S. administration is setting a totally different course to that of Trump's. There is also the imminent danger of pushing the two powers together and the risks of a U.S.-Russia and China cold war will be a real handicap. Their political systems, general attitude towards liberties, their leaders, the already existing economical synergies and the multiple parallels in their foreign policy agendas create a natural basis for what they describe as a marriage of convenience (and who knows, maybe 'love' at some point). We are already observing this alliance being formed and the symptoms will be all over soon; they can both support proxies against the U.S., perform joined military exercises and overall oppose everything U.S.-backed and having to do with American standards. As they draw closer economically, technologically, militarily and diplomatically, and their cooperation in each of these spheres crosses new thresholds, their combined weight in East Asia and across Central Eurasia swells the challenge far beyond that posed by either alone.

Of course, these tectonic changes in the global world order will invertedly affect energy related matters and even the global effort for a 'greener' world, along with other institutions. The International Monetary Fund, World Bank, and World Trade Organization will be less effective if divided into competing factions. Ports, pipelines, regional conflicts showcase how Russia and China have been slowly pushing the U.S. back and contesting its supremacy.

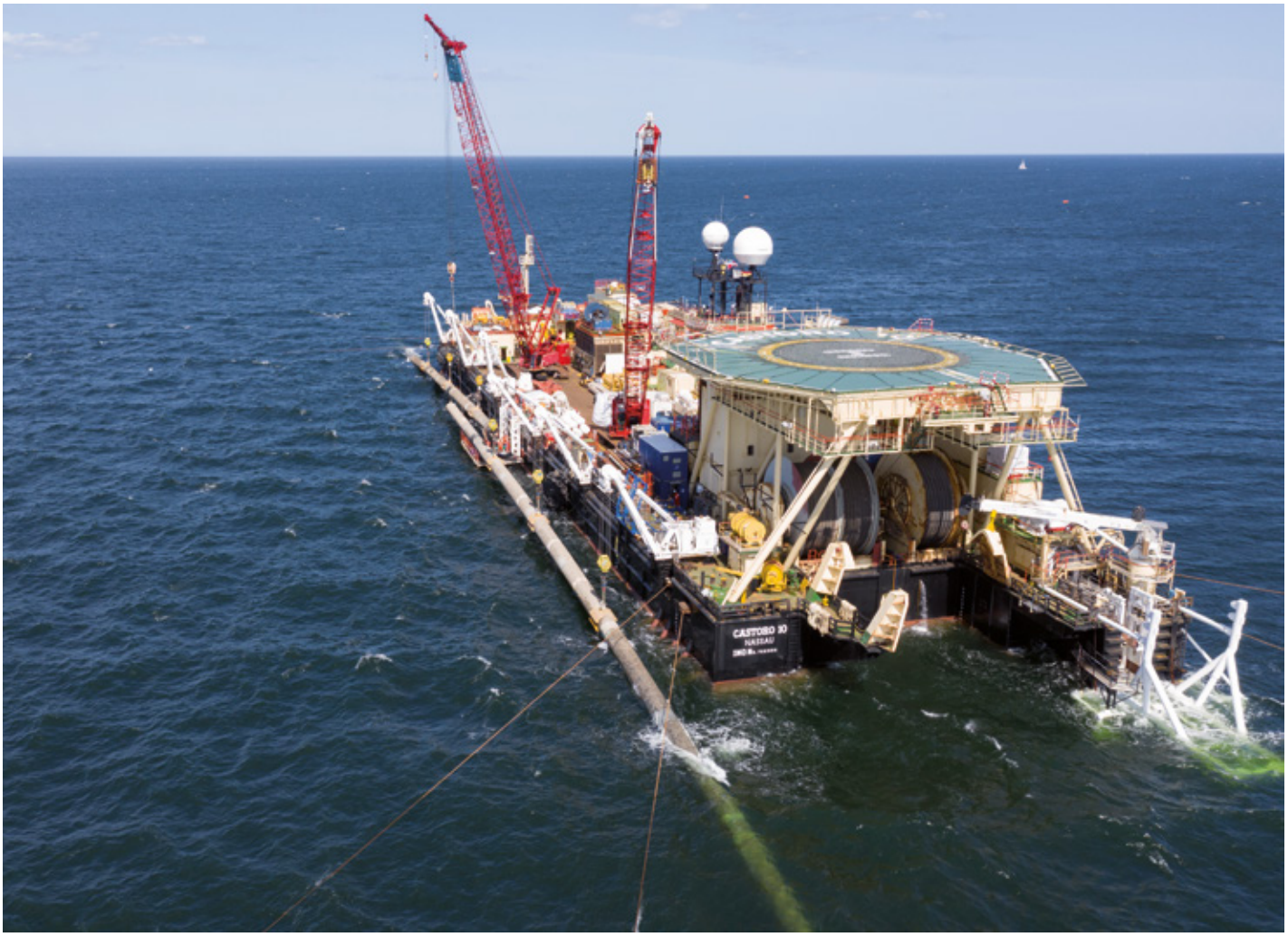
The Russian issue

U.S.-Russian diplomatic relations are today at the worst since the 80s. Moscow's alleged interference in Trump's presidential election along with the alleged new attempts to impact the 2020 election campaign have made Russia an unprecedent and extremely awkward issue in a way that it has not been since the 1950s. The annexation of Crimea and launch of an alleged war in Eastern Ukraine (it was the "little green men" after all, not Russia), definitely did not help. Russia's dominant performance in Syria and its ongoing support for Bashar al-Assad in the brutal civil war was also a powerful statement, that Russia is not kidding around. Trump made significant effort to improve relations with Russia, even against the advice of his staff, which pursued sanctions and an aggressive stance. Nevertheless, the relations between these two global players are largely adversarial, despite their moral responsibility (as nuclear powers) to pursue collaboration on proliferation of weapons, terrorism, climate change, space exploration and obviously dealing with the pandemic.

When the Soviet Union collapsed, many in Western world assumed that once the Russians had thrown off the shackles of Soviet communism, they would want to join the West and abide by Western standards. The U.S willingly rush to send political and economic advisors to promote capitalism, democracy and US philosophies. It wasn't that easy though; during the 1990s, a time of chaos covered Russia as a black cloud, allowing oligarchs (with enough muscle power) to grab what they could and enrich themselves impoverishing many. Meanwhile, in terms of foreign policy, Russia was 'humiliated' having to accept an agenda dictated by the United States ignoring its legitimate interests.

Under president Vladimir Putin, Russia has gained immense power back, as a centralized, almost authoritarian state and has also returned on the global stage as a player, competing with the United States for influence. Although it is far weaker than the U.S. both on an economic and maybe a military level, it has proven capable to intervene around the globe and enforce its interests, creating new spheres of influence. Today, Russia defines its security perimeter not as the borders of the Russian Federation, but as the borders of the former Soviet Union. Even if there have been periods of times during which collaboration between Russia and U.S. was harmonic, relations began to sour again when Vladimir Putin was convinced that Hillary Clinton had been supporting the demonstrators who had protested his return to power. The next year, he gave asylum to Edward Snowden, the famous whistle-blower that exposed NSA and CIA for violations of privacy rights against Americans. Barack Obama demanded that Russia turns

Connecting pipe sections above water



Two overlapping pipe ends of a pipe string have to be raised and cut on a pipelay ship before they can be welded together.

© Nord Stream 2 / Axel Schmidt.

Snowden in, and he was refused, cancelling a meeting with Vladimir Putin afterwards.

Things started taking a serious downturn in 2014 when the pro-Russia Ukrainian President Yanukovych fled to Russia and was replaced by a pro-West administration; the riots were presumably initiated and supported by Western agents. Shortly after, troops bearing no insignias (thus the "little green men" joke) invaded Crimea and annexed it on behalf of Russia; we can assume with a fair amount of confidence that those soldiers without Russian insignias were probably Russian (they also spoke Russian by the way). The peninsula had been part of Ukraine since 1954 and this was a clear unprovoked act of war; nevertheless, Russia itself had its own special bond to Crimea and most citizens of the region seemed to be supporting this "return to the motherland". During the next few months, Russian-backed militias and other Ukrainian paramilitary groups (again wearing no insignia) started engaging in fierce battles and other atrocities in the Donbas region of Eastern Ukraine; a war that is still raging and only waiting for an excuse to escalate with dozens of thousands of dead and missing. This was a really unprecedent shakedown in recent history.

Russia's involvement and subsequent domination in the Syrian civil war in 2015, in support of Bashar al-Assad, has also created tensions with the United States, which was supporting groups opposed to

Assad (it is still not very clear who exactly those groups were, but we can guess). After the U.S.'s withdrawal from the country, Russian troops occupied their U.S. bases and supported Assad's brutal assault on Idlib Province, which has produced a million refugees. They also regulated pretty much everything going on in the country, including keeping Turkey's aggression in check.

The last and most decisive blow to U.S.-Russia relations was Russia's alleged cyber interference in the 2016 U.S. presidential election campaign. A famous Russian troll factory in St. Petersburg seems to have worked meticulously weaponizing social media to raise tensions and increase the political polarization that existed in U.S. society. Russia presumably tried it again in the recent elections but 'failed' (?).

Even if the above storyline might seem like an oversimplification of events, it does bring us to today, with Joe Biden's 'killer' comments, which he does not regret. He also went on and added that he "knows Putin" and he would "pay a price" if it is true that Russia tried to affect his election negatively. The Russian ambassador is still recalled from Washington and no steps have been taken to improve relations. The 2010 START (Strategic Arms Reduction Treaty) did expire senior U.S. officials claim that this deterioration of bilateral relations does not help prevent another nuclear arms race. Still, with matters such as Eastern Ukraine and Turkey (with the famous S-400 case) the two superpowers seem more than eager to spiral into a collision trajectory once again. This cannot but complicate global energy related projects, such as Nord Stream 2.

Connecting the pipeline with landfall facilities

Pipe segments are welded together and pulled by a high-performance winch through water-filled trenches to connect the offshore Nord Stream 2 Pipeline with the Russian landfall facilities.

© Nord Stream 2 / Axel Schmidt.

Nord Stream 2

The completion of one of the probably most controversial projects in the history of Energy cannot come out unscraped from this conflict. The gas pipeline Nord Stream 2 has been delayed for over a year and final completion is increasingly at risk after the U.S. imposed sanctions on involved companies and threatened further steps and warned all involved parts to halt actions immediately. The pipeline in Baltic Sea's depths has been the subject of heated debate for years as it would allow Russian gas to flow directly to Germany, bypassing Ukraine pipelines. Many argue the pipeline is a European investment to ensure supply, while opponents criticize Nord Stream 2 from environmental, geopolitical, and security standpoints.

The two sides, U.S. and Germany, appeared to be negotiating for a deal over the project's completion, adding clauses of sanctions against Russia from Germany's side, shutting off natural gas deliveries through the pipeline, in case Russia tries something funny (or not so funny) in Ukraine. The pipeline was initially scheduled for completion by the end of 2019. 2300 km out of approximately 2460 km had been laid by end of the same year, when Swiss pipelaying company Allseas Group suspended activity in fears of U.S. sanctions legislation. By mid-February 2021, about 150 km still remain incomplete, mostly in Danish waters. In late January 2021, Europe stopped Nord Stream 2 again, as a sanction for the detainment of Russian opposition leader Alexei Navalny. On the same day, German Chancellor Angela Merkel reconfirmed her belief in the project: "My basic attitude has not yet changed to the point where I say the project should not exist". For years, the German chancellor had a 'dual' type of speech even acknowledging some concerns about the project being "not just economic, but that, of course, political factors must also be taken into account." Still, the government has officially remained in favour of Nord Steam 2. A conservative German politician and the chairman of the foreign affairs committee, has commented: "In my view, the federal government's language regime that, as a private economic project, Nord Stream 2 has nothing to do with politics is unacceptable and provocative." In January 2021, the regional government officials from the German state, where the NS2 pipeline will be landing, used environmental reasons to defend the project, an approach which was openly criticized in Germany, basically due to the argument's funny reasoning.

The United States has long been a strong opponent against the project, causing much delay and stalling through sanction threats and lobbying. They openly state that completion of the project will eventually increase Europe's reliance on Russia and imperil the continent's freedom and security. In February, a bipartisan group of congressional representatives expressed claimed ready "to counter Russian malign influence, including by ensuring Nord Stream 2 is never completed." Of course, the U.S. became a major LNG exporter and will happily sell to European customers. The major geopolitical argument has to do with Gazprom being is a state-owned company, purchasing gas from the company funnels money directly to the Russian government, which is being treated as almost 'hostile' in a very weird Euro-Russian dynamic. At the end of the day, Russia did annex Crimea illegally and such actions require money; it might be European money in the future. The EU Commission is also expressing its concerns about the project, for whatever that matters. Honestly, and from a pure efficiency prism, it would be more efficient and easier to update existing pipelines that transit Ukraine, Belarus and Poland rather than submerging miles of pipes in the Baltic Sea, with so many implications. Afterall, Nord Stream 2 will not bear new gas but simply divert it.

"Look, what's important first and foremost is that Germany is one of our closest allies and partners anywhere in the world. And we are working together every single day on so many issues that have a profound impact on the lives of our citizens and working as the closest partners. And the fact that we have a disagreement over Nord Stream 2, and it's a real one, is not affecting and will not affect the overall partnership and relationship. But we've been very clear. President Biden has been very clear that he thinks that Nord Stream 2 is a bad idea and a bad deal for Europe, for us, for the alliance. It undermines basic EU principles in terms of energy security and energy independence. It, I think, poses a challenge to Ukraine, to Poland, to other countries that we care about. And the fact is we have laws in the United States that require us to sanction companies that are materially helping to build the pipeline. So, I just wanted to make sure that our partners understood our position on this and what we would need to do going forward. And so that's what we did," Antony Blinken pointed out.

Conclusion

While the United States administration seeks to form a trilateral scheme and ultimately coordinate its Russia and China policies, care should be taken to avoid unnecessary escalations and overestimations of the "geopolitical threat" the two powers can represent against U.S. interests as a duo or in parallel.

Nord Stream 2 seems almost inevitable, especially having reached 95% rate of completion, but the U.S. power and determination cannot be underestimated and potentially not tested. It is also very possible that Russia, China, the indecisive European Union and their decisions might test this determination. The outcomes can be imagined to be frightful, and a Cold War Winter seems to be coming. ■

Wind energy in Europe

2020 STATISTICS AND THE OUTLOOK FOR 2021-2025

This report summarises new installations and financing activity in Europe's wind farms from 1 January to 31 December 2020. It also analyses how European markets will develop in the next five years (2021 to 2025). The outlook is based on WindEurope internal analysis and consultation with its members.

Wind power installations

In 2020 new wind installations in Europe amounted to just 14.7 GW because of delays in commissioning new wind farms due to COVID-19-related supply chain disruptions and restrictions to the movement of people and goods.

Onshore wind installations were 22% lower than our pre-COVID forecast while offshore installations were in line with these predictions. 2020 was the third largest year in terms of overall installations, following on from a record year in 2017 and a strong performance in 2019.

Germany saw the lowest number of installations since 2010, although the rate of onshore installations rose slightly from the previous year. The Netherlands installed the most wind capacity due to strong offshore additions. 2020 was also a record year for wind installations in Norway.

Offshore wind made up 20% of new installations in Europe with 2.9 GW of new capacity connected to the grid in 2020. The Netherlands installed half of that capacity, followed by Belgium which had a record year for offshore installations. Other installations were completed in the UK, Germany, and Portugal.

In 2020 new wind installations in the EU-27 were 10.5 GW. This represents 71% of all installations in Europe. Outside of the EU, installations rose significantly in Norway, Turkey and Russia.

There were 0.4 GW of decommissioned wind capacity in Europe during the year. Thus, overall net installations amounted to 14.3 GW.

Market Outlook 2021-2025

The five-year Market Outlook for wind installations analyses the likely development of wind power capacity in Europe. It lays out two scenarios:

- WindEurope Realistic Expectations Scenario, which provides the best estimate of the installed capacity in Europe over the next 5 years. According to this scenario, there will be 318 GW of total installed capacity in Europe, with an average installation rate of 21 GW. In the Realistic Expectations Scenario the EU-27 will install 15 GW p.a. This is well short of the 18 GW p.a. the EU-27 must install to deliver on the NECPs and the existing 2030 renewable energy target of 32%19.
- WindEurope Low Scenario, in which European governments don't address permitting issues, fail to put in place effectives strategies for repowering and implement new restrictions on the free movement of goods and people due to the pandemic, leading to 292 GW of cumulative installed capacity with an average installation rate of 16 GW.

Both scenarios reflect potential developments in European regulatory frameworks, national policies, project development timelines and the ability of wind to secure further capacity through upcoming auctions and tenders. ■

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