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MAY 2020

ENERGY INDUSTRY REVIEW

CSR IN ROMANIA
From Concept to Action

PERSPECTIVES AND OPINIONS
ExxonMobil to Exit from Neptun Deep Project

THE US-CHINA TRADE DEAL
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Mark Wagley

Vice President and Country Manager of Hunt Oil Company of Romania

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Post Covid-19 Recovery

More than 2 billion people around the world are under some form of restriction with national quarantines, stay-at-home measures and business closures. This situation has halted economies and limited business interactions to video conferences and telecommuting. Major players and sources in the industry suggest that the signs for the future are positive, but it all depends on how investors and policy makers respond to the impacts of the pandemic.

Planning for the recovery now will be repaid in a stronger bounce back. Furthermore, the actions that a company takes during this recovery period can set the foundation for sustained growth and performance after the pandemic is over.

The IEA recognizes in their 'Oil Market Report – April 2020' that lower prices could have a range of negative effects on the energy transition as well.

Beyond the immediate impact on health, the current crisis has major implications for global economies, energy use and CO_2 emissions. The IEA analysis of daily data through mid-April shows that countries in full lockdown are experiencing an average 25% decline in energy demand per week and countries in partial lockdown an average 18% decline. Daily data collected for 30 countries until 14 April, representing over two-thirds of global energy demand, show that demand depression depends on duration and stringency of lockdowns.

Global energy demand declined by 3.8% in the first quarter of 2020, with most of the impact felt in March as confinement measures were enforced in Europe, North America and elsewhere.

Global coal demand was hit the hardest, falling by almost 8% compared with the first quarter of 2019. Three reasons converged to explain this drop. China was the country the hardest hit by Covid-19 in the first quarter; cheap gas and continued growth in renewables elsewhere challenged coal; and mild weather also capped coal use.

***"The impact of the coronavirus around the world and the resulting turmoil in global markets are dominating global attention,"* says IEA Executive Director Fatih Birol.**

Oil demand was also hit strongly, down nearly 5% in the first quarter, mostly by curtailment in mobility and aviation, which account for nearly 60% of global oil demand. By the end of March, global road transport activity was almost 50% below the 2019 average and aviation 60% below.

The impact of the pandemic on gas demand was more moderate, at around 2%, as gas-based economies were not strongly affected in the first quarter of 2020.

Renewables were the only source that posted a growth in demand, driven by larger installed capacity and priority dispatch.

Electricity demand has been significantly reduced as a result of lockdown measures, with knock-on effects on the power mix. Electricity demand has been depressed by 20% or more during periods of full lockdown in several countries, as upticks for residential demand are far outweighed by reductions in commercial and industrial operations. Demand reductions have lifted the share of renewables in the electricity supply, as their output is largely unaffected by demand. Demand fell for all other sources of electricity, including coal, gas and nuclear power.

Looking at the full year, IEA explores a scenario that quantifies the energy impacts of a widespread global recession caused by months-long restrictions on mobility and social and economic activity. Within this scenario, the recovery from the depths of the lockdown recession is only gradual and is accompanied by a substantial permanent loss in economic activity, despite macroeconomic policy efforts.

The result of such a scenario is that energy demand contracts by 6%, the largest in 70 years in percentage terms and the largest ever in absolute terms. The impact of Covid-19 on energy demand in 2020 would be more than seven times larger than the impact of the 2008 financial crisis on global energy demand.

Talking to renowned experts from the energy sector on preparing for recovery and 'the new normal' we may find out some ways and measures to be taken immediately and come next months. This is what we tried to present in our current issue. ■

Lavinia Iancu *is the Publisher of the Energy Industry Review*

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Gas Pipeline Linking Moldova to Romania Almost Finished

An important new gas pipeline from Iasi to Chisinau, which will link Moldova to the European energy system via Romania and reduce its energy dependence on Russia, is now 90 per cent finished, the Moldovan Economy and Infrastructure Minister, Serghei Raileanu, recently stated.

"It is in our best interest to ensure our energy security, but also that of the region, by diversifying natural gas supply routes. By interconnecting with the transport networks in Romania and by integrating Moldova into the European energy system, we will be able to do this," Serghei Raileanu mentioned. "We are closely monitoring the progress of this strategic project in order to ensure its construction in the established terms and to benefit from the pipeline by the end of the current year," he added.

The pipeline is being built by Vestmoldtransgaz, which is owned by Transgaz, and 106 of the 120 km have now been completed. Since early 2019, construction is being carried out on all seven sectors of the pipeline on Moldovan territory.

The deadline announced by the investor to finish the pipeline is the second half of 2020. The estimated cost of the project is 76 million euros, according to draft estimates done within the project documentation developed by Transgaz.

The administrator of Vestmoldtransgaz, Iulian Butnaru, stated that the work is being carried out within the planned deadlines.

"Transgaz must be fully involved in the energy network expansion process, in the completion of the BRUA gas pipeline, and in the completion of the Iasi-Chisinau gas pipeline and other investment projects," Prime Minister Ludovic Orban said.

EBRD Approves New Strategy for Romania

On April 24, the EBRD's Board of Directors has approved a new strategy for Romania which will guide the Bank's investment and policy engagement in the country during the next five years. The EBRD work will include measures in response to the ongoing coronavirus crisis and efforts towards economic recovery.

To date, the EBRD has invested almost EUR 8.7 billion in the Romanian economy.

In the period from 2020 to 2025, the EBRD's investments and policy work will support: Sustainable infrastructure and regional development; Productivity by helping private companies expand and improve workforce skills; Financial intermediation and further development of capital markets.

"The EBRD is well placed to support the modernisation of the Romanian economy, including helping the country overcome the impact of coronavirus outbreak. We will channel investment into the areas where Romania needs the most support: building infrastructure, especially in the regions; boosting private sector productivity; and further developing the financial sector and capital markets," Mark Davis, EBRD Regional Director for Romania and Bulgaria, said.

NIS Operational Updates in Romania

The Naftna Industrija Srbije (NIS) announced operational update for Romania. Due to the Covid-19 pandemic the state of emergency and a nationwide lockdown was imposed by the Romanian government on March 25, 2020. Consequently, the operator NIS, has temporarily ceased new exploration field activity until such time that the lockdown is lifted and social distancing requirements can be safely relaxed. It is expected that this will substantially delay the planned 2020 exploration programs in the EX2, EX3, EX7 and EX8 exploration blocks in Romania.

On the Teremia North discovery, the initial discovery well, Teremia-1000 has experienced mechanical problems resulting in an inflow of formation water. A workover is planned for 2021. An appraisal well, Teremia-1001, was drilled and completed in 1Q 2019 and, following initial testing, was placed on long term experimental production in July 2019. Production rates have stabilised around 150 bopd. Block EX-8; A second appraisal well, Teremia-1002, was drilled into the extension of the Teremia North discovery in Block EX-8. The well was completed and tested in 4Q 2019 and has subsequently been placed on long term experimental production with rates stabilising around 150 bopd.

General Turnaround of the Petromidia Refinery Finalized

Rompetrol Rafinare, a member company of KMG International, has successfully completed the turnaround of the Petromidia refinery and has initiated the restart of the production units. In the next period, they will re-enter the operational flow and gradually reach the nominal capacities.

The works were coordinated by Rominserv, the provider of technological solutions for the KMG International Group, and were carried out on a large area, of over 200 hectares, with considerable distances between work points, mainly in the open air and in compliance with the rules of social distancing. For the general turnaround of the Petromidia refinery, only Romanian companies were contracted.

Durind the general turnaround, Rominserv and Rompetrol Rafinare specialists focused on maintenance operations, compliance, but also on new projects to support the refinery's evolution on the upward operating trend in recent years. The most important investment projects were the replacement of the reactors from the Catalytic Reforming installation with some of the latest generation and the replacement of the main assemblies of the Catalytic Cracking installation, with some more efficient from the point of view of the operational processes.

In total, almost 1,500 works were executed. In the 45 days, the teams intervened on a number of 1,000 static machines, 150 rotative machines, over 2,600 pipes and tubes and approximately 560 electrical machines.

With the general turnaround in 2020, the Petromidia refinery and the Petrochemical Division will align with the new operating strategy, with a general turnaround scheduled for 4 years and technological shutdowns scheduled for 2 years.

The re-commissioning of the Petromidia facilities is carried out simultaneously with the resumption of production processes at the Vega refinery, the only national producer of bitumen and hexane. The unit in Ploiesti was also under a general turnaround, for the maintenance and compliance of the existing installations on the platform.

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Publisher:
Lavinia Iancu
lavinia@energyindustryreview.com

Business Development Manager:
Marius Vladareanu
marius@energyindustryreview.com

Scientific Board:
President: Prof. Niculae Napoleon Antonescu PhD
Members:
Prof. Lazar Avram PhD; Assoc. Prof. Marius Stan; Prof. Ionut Purica PhD; Alexandru Patruti PhD

Contributing Writers:
Adrian Stoica, Daniel Lazar, Dumitru Chisalita, Ioan-Corneliu Dinu, Evgenios Zogopoulos

Digital Manager:
Justin Iancu

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41 Costache Negruzzi St., 100147,
Ploiesti, Prahova, Romania
Phone: +40 (0)344-143.530;
E-mail: office@energyindustryreview.com

ExxonMobil Reducing 2020 Capex by 30%

ExxonMobil announced it is reducing its 2020 capital spending by 30 percent and lowering cash operating expenses by 15 percent in response to low commodity prices resulting from oversupply and demand weakness from the Covid-19 pandemic.

Capital investments for 2020 are now expected to be about USD 23 billion, down from the previously announced USD 33 billion. The 15 percent decrease in cash operating expenses is driven by deliberate actions to increase efficiencies and reduce costs, and includes expected lower energy costs.

"After a thorough evaluation of the impacts of the pandemic and market conditions, we have worked closely with business partners to plan and execute capital adjustments that preserve long-term value, maximize cost efficiency, and put us in the strongest position when market conditions improve," said Darren Woods, chairman and chief executive officer of Exxon Mobil Corporation.

As market conditions evolve, the company will continue evaluating the impacts of decreased demand on its 2020 production levels as well as longer-term production impacts.

Expert Petroleum to Increase Gas Production on Depleted Fields in Ukraine

According to the results of the open tender, Naftogaz Group has attracted an international company, Expert Petroleum, to increase hydrocarbon production on fields of JSC Ukrgasvydobuvannya in Western Ukraine. Within the first ever full-scale Production Enhancement Contract (PEC) in the history of Ukraine's oil and gas industry, the Western partner has committed to about 1 bln UAH (conversion of USD 30mln, based on the forecast course) into intensification, drilling and development of infrastructure in the first 5 years of cooperation and, potentially, make additional investments after that.

Partnership between Naftogaz and Expert Petroleum will generate at least an additional 300 million cubic meters of gas within 5 years from 13 small fields in Western Ukraine.

The contract between Expert Petroleum and Ukrgazvydobuvannia is concluded for 15 years, with the possibility of extension for another 10 years. To execute this contract and its related services, Expert Petroleum has registered a dedicated Ukrainian company which will be a party to the contract. Naftogaz Group will approve the development plans, annual work program and budget, proposed by the operator company on these fields. The operator will receive a fixed fee for support of the baseline production (at the level of current operating costs of Ukrgasvydobuvannya, taking into account the inflation component) and for achieving incremental production.

Daimler and Volvo to Partner for Large-scale Production of Fuel Cells

Sharing the Green Deal vision of sustainable transport and a carbon neutral Europe by 2050, two leading companies in the commercial vehicle industry, Daimler Truck AG and the Volvo Group, have signed a preliminary non-binding agreement to establish a new joint venture. The intention is to develop, produce and commercialize fuel cell systems for heavy-duty vehicle applications and other use cases. Daimler will consolidate all its current fuel cell activities in the joint venture. The Volvo Group will acquire 50% in the joint venture for the sum of approximately EUR 0.6 billion on a cash and debt free basis.

The Volvo Group and Daimler Truck AG will be 50/50 partners in the joint venture, which will operate as an independent and autonomous entity, with Daimler Truck AG and the Volvo Group continuing to be competitors in all other areas of business. Joining forces will decrease development costs for both companies and accelerate the market introduction of fuel cell systems in products used for heavy-duty transport and demanding long-haul applications. In the context of the current economic downturn cooperation has become even more necessary in order to meet the Green Deal objectives within a feasible time-frame.

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Kraftanlagen Chosen to Modernise the InfraLeuna Power Plant

Kraftanlagen, a subsidiary of Bouygues Construction in the Energies & Services division, has been chosen by InfraLeuna GmbH to lay the foundations for secure energy supply for the Leuna chemical complex, near Leipzig. The contract is worth more than EUR 100 million for Kraftanlagen.

This ambitious project follows on the commissioning in January 2020 of the Kiel coastal power plant, a highly flexible installation and a flagship project for the energy transition.

The modernisation of the existing InfraLeuna power plant will provide a high-performance combined-cycle gas and steam turbine plant, with improved efficiency and flexibility. In addition to the construction of the new combined-cycle plant, the contract includes the connection of the existing gas turbine to the new heat recovery steam generator.

Kraftanlagen will be the general contractor for the entire modernisation project. It will be responsible for the engineering studies, construction and commissioning of the whole plant.

LUKOIL Ranks Top 5 in First Eurasian Ecological Rating of Oil and Gas Companies

LUKOIL has entered the top five in the environmental openness rating among Eurasian oil & gas companies held following the results of 2019. The Russian WWF and the CREON analytical group assessed the potential environmental impact and information openness of the rating participants. The rating includes 20 Russian companies (with oil and gas condensate production volume exceeding 1.5 million tons), 14 companies from Kazakhstan, and 2 companies from Azerbaijan.

Oil & gas companies were evaluated on three main criteria: environmental management quality in the company, environmental impact and environmental friendliness level, as well as readiness to disclose information on the environmental impact during production activities.

LUKOIL was one of the first Russian companies to adopt the Industrial Safety, Labor and Environment Protection Policy. The Group's organizations also have the 2018-2020 Environmental Safety Program that includes over 900 environmental measures. The company shows positive dynamics in terms of APG utilization, air emissions reduction, and efficient use of water resources. The company publishes its Sustainability Report annually and demonstrates maximum openness during its interaction with civil society, local communities, and indigenous peoples when discussing future and existing projects.

Most State-of-the-art Cable Laying Vessel in the World

Nexans Aurora encompasses more than a century of Nexans' experience in submarine cable installation and brings cable installation to the next level with regards to capacity and capability. With a large 10,000 tons capacity, split turntable, and a world leading vessel design, the vessel is well prepared for complex construction tasks in severe weather conditions anywhere in the world.

When finished in 2021, it will be the most state-of-the-art cable laying vessel in the world. Last year, Nexans hosted the grand block ceremony that represented a key step in the construction of its ground-breaking cable installation vessel, the 'Nexans Aurora.' The grand blocks are the major components in the construction of the hull. They are being assembled at CRIST, in the Polish port of Gdynia, while the engineering, outfitting and system integration, equipment preparations, testing, sea trials and finalizing will be carried out at Ulstein Verft, Norway.

The vessel will be outfitted for power cable laying, including bundle laying, cable jointing, repair, cable system protection and trenching.

The Aurora design is based on the combined experience of Nexans, Skipsteknisk, Ulstein Verft and MAATS Tech. The aim is to produce a subsea cable and umbilical systems installation vessel for worldwide operations, covering the full range of shallow and deep subsea activities.

Kraftanlagen Romania
A member of Bouygues Construction

ipip S.A.
A member of Bouygues Construction

Kraftanlagen Romania S.R.L. was founded in 2007 as a subsidiary of the German company Kraftanlagen München GmbH and expanded its local services successfully in 2016 with IPIP S.A.

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- Project management
- Technical assistance for commission, start-up, test run, guarantee test
- Supply and installation of all pipelines and brackets
  Basic and precision installation of all components, such as devices, columns, pumps and compressors
- Steel construction
- Installation of cracking and reaction furnaces
- Tank farm construction
- System integration, operating checks and commissioning
- Plant revisions
- Pipeline and bracket corrosion protection
- Insulation
- Scaffolding

Joining Forces to Decarbonize Power Generation

Uniper and Siemens Gas and Power signed a cooperation agreement for the development of projects on the decarbonization of power generation and promoting sector coupling. It extends the long-standing partnership between the two companies. It is important to look at the energy, mobility and industry sectors together, because they all can and must contribute to reducing greenhouse gases. One focus of the planned cooperation is the production and use of 'green hydrogen' - in other words, hydrogen from renewable energy sources. The companies intend to implement projects in this field together, addressing the entire value chain.

The scope of the new cooperation agreement also includes the evaluation of the potential of Uniper's existing gas turbines and gas storage facilities for the use of hydrogen. The focus of the work is to define what role can hydrogen play in the future evolution of Uniper's coal power plants. Uniper recently announced that it would close or convert its coal-fired power plants in Europe by 2025 at the latest. Uniper's coal-exit plan is instrumental to make the company achieve its objective of becoming climate neutral in its European power generation by 2035.

Siemens Gas and Power is helping its customers achieve their decarbonization goals. 'Brownfield transformation' projects are designed to decarbonize coal-fired power plants and significantly reduce CO2 emissions from gas-fired power plants, including the integration of storage solutions through to the use of 'green gas'.

Oil Well Cementing Market Worth USD 848.6 Million by 2026

The global oil well cementing market was estimated at a worth of USD 503.0 million in 2017 and is projected to grow at a CAGR of 6.3% over the forecast period. Increasing exploration and production from unconventional oil & gas reserves, rising count of matured wells, and increasing production from offshore reserves are expected to be the major driving factors for growth of oil well cement market over the forecast period.

There are several grades of these cement products, but majorly are categorized into ordinary, moderate sulphate resistant (MSR), and high sulphate resistant (HSR). On the basis of application, the global market is further segmented into onshore and offshore. Ordinary (Grade 0) also known as normal Portland cement is one of the widely used type of Portland cement which is the most common cement type for general use as a basic ingredient of non-specialty grout, mortar, stucco, and concrete.

MSR also called type II cement is used where precaution against moderate sulphate attack is important.

Is Silicon the Key to Another Technological Revolution?

Silicon is one of the most important materials of the past century. Silicon, key to the digital revolution, is beginning to show potential in Li-ion batteries, a critical technology in solving the longer-term crisis of climate change.

It is perhaps a stretch to compare battery technology to the digital revolution that silicon transistors enabled, but they are undoubtedly central to the decarbonisation of modern society. On-road transport in the EU is responsible for 30% of CO2-equivalent emissions, according to the European Environment Agency. In most cases, battery electric vehicles (BEVs) are best placed to reduce these emissions (leaving for the time being arguments for/against hydrogen, fuel cells, biofuels etc). For those interested, the new IDTechEx report 'Electric Vehicles 2020-2030' reviews the electric vehicle market beyond just cars, including analysis of vehicle segments where Li-ion may not be the optimal choice. Despite being best placed to replace internal combustion engine (ICE) cars, BEVs are still more expensive on an upfront basis, while range and re-fuelling times still struggle to compete with ICE vehicles. Increasing economies of scale, manufacturing innovations and vertical integration should help to push battery prices down further, but improved battery performance requires new materials and technology innovations.

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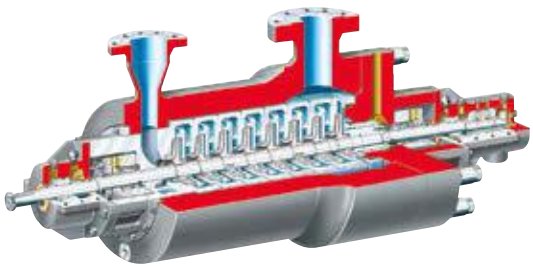

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Planning Through a Crisis

As the world's essential energy workers continue to support the 'at home' needs of business and society and energy entrepreneurs work to accelerate clean, reliable and affordable energy for public health systems, our worldwide energy community is pulling together to share practical wisdom and contribute a value-adding voice and timely insights in these challenging times.

Society's response to the ongoing crisis can provide a source of realistic hope – supporting our community-wide reflection and new cooperation on 'how to' build societal resilience through energy transition if we pull together as a worldwide community of energy systems designers, builders and pathfinders.

To help our members and their wider communities pull together, we have launched two surveys to establish a set of short-term scenarios that identify how the crisis is impacting organisations around the world and facilitate an exchange of best practices across regions on how to cope with the crisis. Our agile community-based scenario building process is gathering informed perspectives of our globally diverse energy community and engaging wider perspectives on emerging developments.

I want to bring you preliminary findings from the first of our surveys, covering business impact and continuity planning.

Almost 95% of our World Energy community said that their organisations are already affected by impacts and/or responses to the COVID-19 pandemic, with more than half of respondents experiencing significant disruption.

The first round of our global community survey has brought to light key challenges to, and recommendations for, managing the ongoing crisis.

Emotional resilience challenges

Almost 95% of our World Energy community said that their organisations are already affected by impacts and/or responses to the COVID-19 pandemic, with more than half of respondents experiencing significant disruption. Unsurprisingly, one of the top three management concerns is the welfare of employees and their families. The pervasive anxiety about the COVID-19 virus and the need and/or requirement for extended periods of social distancing and self-isolation is adding to pre-existing sense of loneliness in a more digitally connected world. Meanwhile, many of our energy heroes are maintaining essential system operations, control centre staff and key operations staff, who have volunteered to be sequestered, are relying on their organisations and trade unions to help care for their families and the wider communities in which they reside.

Economic resilience challenges

Dealing with the sudden drop in demand fuel and electricity load reductions has emerged as another top concern for management. We have seen a significant drop in the demand for power, gas and transport fuels, with daily grid loads falling by up to 45% in some countries. This raise new technical challenges in some parts of the system, as less load results in more REN onto grid (e.g. up from 10-10% to 40-40%), and creates potential implications for take-and-pay contracts in other parts as lower levels of gas burn. Pervasive across most countries is the global 'low oil price war', impacting not only fossil fuel-heavy companies and systems but the economics of new energy developments as well.

Digital resilience challenges

While some positive impacts are expected

Dr Angela Wilkinson *is the World Energy Council's Secretary General & CEO*

as a result of recent events, such as advancing digitalisation and the development of better resilience skills and capabilities, the crisis has also exposed digital gaps and blurred divides between household and workforce. It has created unprecedented stress on large swaths of parents as 'breadwinners' and home educators. At the same time, new and rapid changes from work to home settings have exposed cybersecurity vulnerabilities and increased the risk of breaches.

Top recommendations for managing the crisis

The key recommendation from respondents has been to accelerate digital transformation in organisations. From digital infrastructure, to skills, to communication strategy, these transformations have enabled better business continuity and provided new ways of working. Team engagement and a focus on supporting staff who are working remotely is also seen as being essential to ongoing wellbeing, whether social, emotional or physical.

Respondents have also utilized the current situation as an opportunity to develop new skills and organisational capabilities, including scenarios planning, risk management and resilience. Planning ahead, maintaining transparency and open communication, and matching human resources with changing demand has also been deem invaluable, as has the importance of reduced or changed expectations, and the need to act fast and decisively while maintaining flexibility in the face of uncertainties. ■

Oil Apocalypse?

PRICES FALLING 70% AND MAYBE EVEN MORE

The game, already shocking, between supply and demand, is the umbrella currently sheltering oil, this resource which represents, as known, the combination of two energy fronts. Prices fell 70% and maybe even more, compared to the beginning of the year.

According to some international experts, oil price could continue to plunge, reaching level as low as USD 10/bbl. Moreover, the oil crisis will not be over, as we expect, with the exit from the current pandemic.

Analysing the comments of experts from the industrial and academic space, as well as from the energy system, the conclusion would be that the scale of the crisis will reach impressive dimensions and forms. The same opinions say that for the time being the end to what has already been destroyed so far is not visible, and the effects that will follow may have unexpected forms after 2020. Year considered lost! So, we can start shifting our attention to 2021...

Thinking about oil, the sharp decline of demand is obvious. The actual production reached 11 billion barrels per day, with a potential desired increased to 15-20 billion barrels per day. The figures are estimated by Bloomberg in the article 'Oil's Apocalyptic April Could Reverberate for Years to Come', published on April 1. What will be after will depend on the growth vector of transports, which absorb more than half of the total global consumption.

It is estimated by OPEC that producing only 25% of the production so far begins to be uneconomic. But when we reach, if we do so, only 10% of the oil production known for years and we are used to? This is the question!

In North America a litre of gasoline costs less than a litre of beer. On the one hand, it is true that oil prices fell by 70% compared to the beginning of the year, but the current transactions are made at USD 22/bbl.

Producers' losses are around 40 billion, losses accepted by both Russia and Saudi Arabia. Oil markets' experts claim that so far Russia knew how to cope given the abundant reserves it estimates.

The same abundance defines the foreign exchange reserves, the explanation being in the resistance to the devaluation of the rouble by more than 20%, devaluation due to the reduced quantities of extracted oil/product. At the same time, taxation is also declining against the backdrop of the current oil prices. Thus, Russia's losses have already exceeded USD 40 billion, with a negative balance of the state itself.

The rigidity of supply maintained until prices exceed the marginal costs could be found even unloaded on fields.

It is estimated by OPEC that producing only 25% of the production so far begins to be uneconomic. But when we reach, if we do so, only 10% of the oil production known for years and we are used to? This is the question!

The largest energy groups in the world, of Big Oil and Big Energy type, will soon need new adequate strategies considering the new situation. The strategies will target not only oil production, but also its sale. The same is valid for natural gas. Both resources, oil and gas, being primary resources that will impose the new strategies. Experts claim the strategies will also target renewables. All groups considered 'majors' - BP, Eni, Equinor, Repsol, Royal Dutch Shell, Total etc. - are already engaged in accommodating their own strategies.

In the latest edition of 'Energia' magazine, founded and led by one of the best-known experts of the energy sector, prof. Alberto Clò, former Minister of Industry of Italy, presented in an article the potential strategies defined in technical and economic parameters for the near future.

The article presents the example of a Dutch energy giant which, investing in 2018 in two

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

photovoltaic energy producers, Silicon Ranch and Cleantech Solar, will most likely get in the future to rank first in the world in terms of electricity production from renewable sources (solar and wind). This example could lead to the conclusion that, within several years, electricity production from renewable sources will definitely become paramount. In parallel, the production of thermal energy, meaning the one that has been historically dependent on fossil sources, will fall significantly. On the other hand, it is true that a lot of oil is extracted and sold at present in the world.

According to data of the International Energy Agency, energy produced from fossil sources accounts for 80% and that from renewable sources does not exceed 2% of total energy produced.

Another example quoted by prof. Alberto Clò in his article is Next Era Energy, the largest global electricity producer from renewable sources, with 50 GW and 10 million customers at the end of 2019, with a turnover of USD 17 billion.

However, the tendency to substitute oil and natural gas, in the medium and long-term, is clearly visible.

On a planetary scale, a new industrial geography of the old Big Oil and Big Gas is born. Oil majors are regrouping. In parallel, the application of the new Low Carbon technologies is expected! There are also exceptions, such as Occidental Petroleum, which owns shares in Shell and has spent USD 70 billion to buy BG Group, the multinational British giant that relies more on natural gas and LNG, thus targeting the reduction of pollution, avoiding oil as much as possible.

Anyway, what happens on the global oil markets represents the quasi-axiomatic truth that oil is not depleting, it rather seems to be a jewellery that will not grow old by its absence or exhaustion. For now, the supply is at its best and the price - as we all see it!

Recovering from the Coronavirus Crisis

The key of recovery from the coronavirus crisis is adopting measures ensuring the functioning of the economy, in the given conditions, and subsequently allowing an economic comeback without substantial losses.

Thus, CONAF proposes the Romanian Government to grant to the private sector an incentive amounting to RON 5,500 (the average gross salary) during the state of emergency for each employee kept for 6 months. CONAF also proposes the elimination of technical unemployment and alternating conventional work with work from home.

It is time to focus on actions that will deliver a future evolution of the economy. We are aware that immediately after the current crisis, another imminent crisis, the economic one, will break out, and to avoid being affected in an overwhelming proportion we need to act now for a future independent of measures to reduce and prevent coronavirus disease and the health crisis all states of the world are going through.

Romania must reinvent itself and pay increased attention to the private sector, the only one able to economically support the recovery from crisis through subsidies from the Government in the amount of the average gross salary (RON 5,500 gross) during the state of emergency, for each employee maintained for 6 months. In other words, instead of stimulating the increase in unemployment, be it technical, we stimulate the maintenance of jobs, payment of salary contributions to the state budget and security of jobs for employees.

Romania must reinvent itself and pay increased attention to the private sector, the only one able to economically support the recovery from crisis through subsidies from the Government.

Social distancing proves to be a good measure in the conditions of the pandemic, but distancing from the real economy will create in the future problems difficult to solve. To balance the social distancing measures with those of stimulating entrepreneurs by determining them to keep the lucrative personnel, the latter could work from home alternatively to the conventional work, so that at companies' level the impact of the coronavirus crisis will decrease and the employee will come out of isolation at home. Society must slowly continue its evolution and the pandemic measures must be alternated with those of return to the normal economic cycle.

Stimulating private companies

Eliminating technical unemployment and replacing it with measures stimulating private companies in the amount of the average gross salary will also eliminate inequality between the public and the private sector.

Currently the employees in the public system do not feel the pressure of losing their jobs or the decrease in their standard of living, while those in the private sector 'tremble' for fear of losing their jobs and implicitly of closing the businesses in the affected sectors.

The measure, besides the beneficial impact in the economy, a much lower unemployment rate, also has an emotional impact: regaining trust of those who support the Romanian economy.

Without incentives granted to the private environment, the unemployment rate could exceed 10% at global level, and the experience of the previous crises has taught us that the later the recovery of companies, the longer the social assistance of the redundant employees and the consumption will be affected, thus creating fundamental imbalances in the economy.

This measure would position the Romanian

Cristina Chiriac *is the President of CONAF*

economy 'in slowdown mode' during the COVID-19 pandemic. Subsidizing salaries from the state is meant to keep jobs and the period of lucrative activity could alternate with that of work from home by employees. The crisis created by the coronavirus has highlighted numerous challenges for the economy, especially in low-income countries, such as Romania. Currently, decisive and coordinated measures must be taken to minimize the future human and economic impact. Through these measures we aim to maintain financial stability, reduce to the minimum the loss of jobs and, most importantly keep businesses running.

Slowing down the economy

CONAF reminds the mathematical model found in Israel through which the economy will recover from the crisis created by the coronavirus. The model is based on an intermittent closure of the social and economic activity. This model combines the two crises: the epidemiologic one, of social distancing, and that of continuing the economic activity, although in reduced parameters.

Most often the solution is in front of us, we don't have to invent anything, but adapt the real economy to solutions and models that already exist and have been tested. It has been scientifically proven that a strategy of working five days and stopping the activity for ten days will be much more bearable for the economy and reduce the impact created by the coronavirus, thus preventing the collapse of many sectors and avoiding the situation of throwing people into unemployment and poverty. ■

Hunt Oil Company of Romania Quest for a Clean Energy Future as per Mark Wagley

THE LARGEST CONTIGUOUS 3D GEOPHYSICAL PROJECT IN ONSHORE EUROPE

Hunt Oil Company of Dallas, Texas is a privately held exploration and production company that has conducted petroleum operations for more than 85 years. Today, it is one of the world's leading independent energy companies, with operations in North America, South America, Europe and the Middle East.
In 2010, Hunt Oil Company of Romania (HOCOR), an affiliate of Hunt Oil Company, announced the relocation of the Hunt London office to Bucharest, Romania. HOCOR commenced a joint venture with OMV Petrom in September, 2010 for two exploration licenses in the country and has been the operator since 2013.
The Energy Industry Review team spoke with Mark Wagley - Vice President and Country Manager at Hunt Oil Company of Romania and former President of Romanian Petroleum Exploration & Production Companies Association (ROPEPCA), on a range of topics from industry issues, workforce retention, CSR programs, breakthrough technologies, and his advice for young professionals.

by LAVINIA IANCU

Photographs by JUSTIN IANCU

Mark Wagley is Vice President and Country Manager at Hunt Oil Company of Romania, a position he has held since 2013. He is responsible for strategy and vision for HOCOR's activities in Romania and nearby regions, identifying new business opportunities that enable the company to achieve its growth objectives. He builds and oversees a multi-discipline and multi-cultural office and field staff by providing effective leadership including performance oversight and technical competency. He also develops relationships with local oil and gas professional organizations and Government stakeholders to ensure compliance with local law and to share best practices. Before his current position, Mark was the Appalachian District Superintendent based in Pennsylvania (2010-2013) for Hunt Oil Co. Previous to that (2002-2010), he acted as Production Superintendent for Hunt Oil Co. in the East Texas & North Louisiana Basins. Mark joined Hunt in 1992, and between 1992-2002, he held the position of Production Supervisor in the Republic of Yemen.

◀ **1st photo - Prospectiuni activity, near Cocora Commune**

2nd photo – Padina Development Facility

Dear Mr. Wagley, you represent Hunt Oil Company in Romania and nearby regions. How did you apply your vast experience garnered over almost 40 years within the oil and gas industry to the activity in Romania?

Hunt has a wealth of knowledge and experience having drilled wells on every continent except Antarctica.

We have a strong corporate culture grounded on: Respect for the Individual, Humility, Community-Centric, Creativity, Commitment to Excellence, Teamwork, Honesty and Integrity. Further we have demonstrated the ability to differentiate ourselves by being agile, adaptable and contrarian when appropriate.

My career path led me to be the Sr. Executive for Hunt in Romania, so it is my primary responsibility to perpetuate these values with our workforce and key stakeholders.

How do you see the exploration and production operations in Romania compared to the other regions? Do you find any similarities between Romania and Texas, for example? And differences … ?

Romania has many parallels with my home state of Texas as both are blessed with abundant natural resources, have a well-educated workforce, and are well

positioned to be net energy exporters.

Due to the pace of activity in Texas, practically all services needed to conduct operations are only a phone call away.

Operating in Romania requires advanced planning as the pace of activity in the past decade has been very low, and contractors are attempting to recover from the downturn. Dealing with the snow and colder climate in Romania has presented challenges. You don't need snow fences or shovels in Texas sunshine!

What are the projects you are preparing or are already in progress in Romania?

We just recently completed the largest contiguous 3D Geophysical project in onshore Europe.

The South Urziceni 3D project consisted of acquiring 1,589 sq. km of data in the western extension of the Moesian Platform over a three-county area with the objective to evaluate the hydrocarbon potential in the deeper section of the underexplored subsurface below 3,500 meters.

The Romanian company, Prospectiuni, deployed over 120,000 geophone stations, along with three fleets of four vibrators combined with eight shooting crews which completed the project in 5 months.

On the Urziceni 3D project, we utilized cable-less nodal technology to increase trace density while decreasing Health, Safety, and Environment (HSE) exposure and greatly reducing environmental and social impacts.

During the operations over 900,000 man-hours were worked and 2,274,877 km driven incident free.

Our team is very proud of this project and look forward to applying our lessons learned to future acquisitions, which are planned to re-commence in the fall of 2020.

Lately, most of the companies from the energy sector unveiled their programs and plans in the CSR area. What is Hunt Oil Company's approach in this regard abroad and in Romania?

Hunt strives to provide opportunities for open and honest communication with local communities concerning all projects involving the organization's corporate area of influence.

As a responsible member of the community, Hunt aims to develop long term relationships with the people and communities the company serves.

As part of the recent South Urziceni 3D project, we engaged 36 communes in Braila, Buzau, and Ialomita counties and provided significant community engagement projects specific to the needs of the individual communities, with a focus on education.

We installed gas fired heating systems in schools where parts of the school could not be utilized during winter months, donated laptops to the local Technological High School, built playground parks, provided new school furniture, and supported English as a Second Language (ESL) and dropout prevention programs.

In previous years, we have supported local communities by funding much needed emergency response vehicles (Ambulance, Fire & Personnel support trucks) which now serve over 25,000 people in the area.

We find these type of projects to be of significant benefit to all stakeholders, by raising the quality of life in both the communities we operate and at the same time providing better support to our operations through the added infrastructure and fostering the positive and collaborative relationships we have successfully built within those communities.

How has digitalization and the 'Fourth Industrial Revolution' impacted the way HOCOR thinks about the business? What new breakthrough technologies do you use?

In today's global economy, the environment in which we operate is constantly changing, and we foresee this rate of change to increase exponentially as a result of the digitalization revolution and speed at which information flows.

Ray Hunt likes to say, "Darwin had it right, it is not the biggest nor the strongest, not even the most intelligent that survive; it is those who can successfully adapt the quickest."

At Hunt, we embrace this change and are constantly seeking to use it to maximum advantage. We have implemented a Business Process Innovation initiative with the goal of improving efficiencies, improving our fiscal discipline, and increasing

1st photo – Inaugurating CSR educational project, Milosesti Commune

2nd photo – Inaugurating Playground Park, Amara Town

3rd photo – Gas handling facility, Buzau County

4th photo – Drilling operations, Rusetu Commune

value. An example of this is the implementation of a real time drilling rig pit level monitoring and alarm system. These systems are not new to the industry. But what is new is the ability for a computer to discern between the changes in operating parameters, when compared to human perception. The computer also monitors on a continuous basis, all of which translate to the earlier identification and communication of potential problems to key staff members responsible for solving such problems. The initiative will make us quicker, more agile, and more adaptable.

The oil and gas industry is marked by price volatility, and faces a potentially changing energy mix, challenging engineers to think about the long term. How can petroleum engineers become multiskilled professionals with knowledge and experience not just in their traditional fields, but also in big data, artificial intelligence, digitalization, data transformation?

There is indeed a changing energy mix underway. Coal is dying as a primary fuel source and renewables are evolving at a very fast rate. However, hydrocarbons, in general, will continue to play a majority role in human mobility far into the future.

Hunt Oil Company intends to continue to be a key player in that arena.

As evidence of that we perceive Data Analytics and Machine Learning are not to be feared, but used as additional tools to be added to a Geoscientist's existing 'tool kit'.

We have employed personnel that specialize in these fields. These specialists work side by side with traditional Petroleum Engineers, and other disciplines, in a team-based environment, where everyone brings their strengths to bear on the project at hand. Of course, the transfer of knowledge between all team members naturally occurs as part of the process, and we have recently launched a digital academy in our Dallas headquarters to teach these skills to our technical staff. For those who have yet to enter the work force, we would encourage the pursuit of a Geoscience/Engineering major augmented by Computer Science with a concentration on AI.

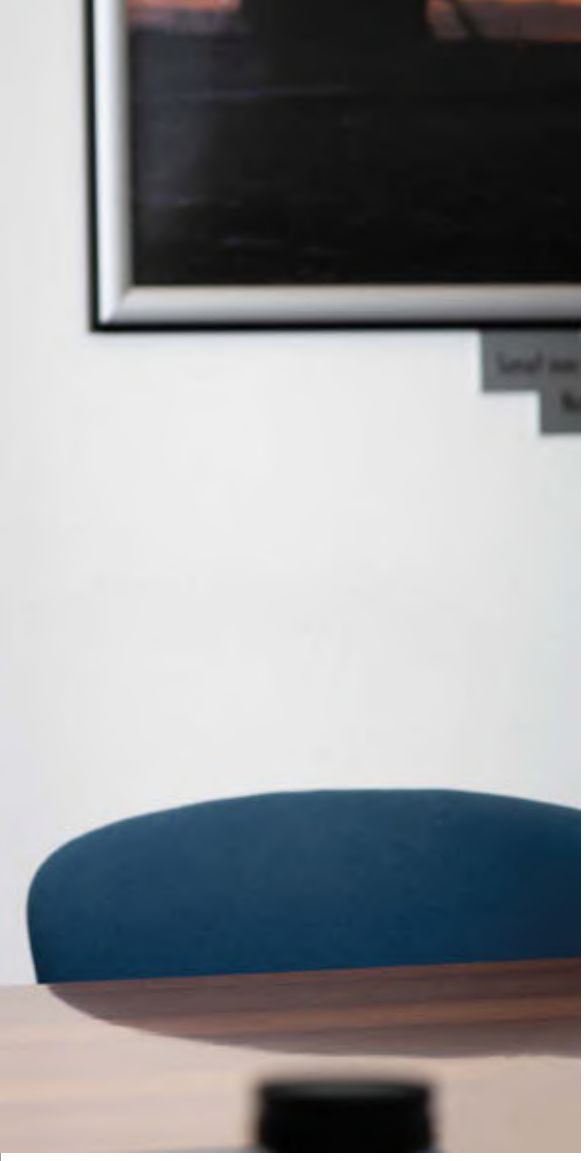
What have been Hunt Oil of Romania's main achievements/ accomplishments in the last years?

We are currently the 4th largest producer of natural gas in Romania and continue to make significant investments to increase our role in ensuring Romania's transition to a clean energy future for which gas would be a transition fuel and an energy source easily available when renewables are not.

The Padina discovery is currently producing at a rate of 2,666 barrels of oil equivalent per day. We went from drilling the well to first gas sales in 22 months leaning on lessons learned from other regions. We have built a very strong multi-disciplined team that has proven to be agile and adaptive to the many changes we are facing in the new global economy. The strengths recognized by our partners and the Romanian oil industry are our ability to transform opportunities into reality quickly, the efficient use of both the project capital we employ and the cost to operate, while honouring and fostering the grounding corporate values that bind our company culture and operations.

What do you consider the biggest challenges that the oil and gas industry and your company are facing at the moment on the Romanian market? How is HOCOR managing them?

Romania has a lot of positive attributes and has made great strides in welcoming foreign investment.



Drilling and testing operations, Adjud ▼

As the country continues to grow, it is important that they continue working to provide a stable financial climate because judicial, legislative, fiscal and regulatory unpredictability can complicate the business environment.

Capital has wheels and favours predictable and stable fiscal regimes.

Investors always seek the highest risk adjusted returns on the funds they employ. Unstable fiscal environments translate to higher risk.

We are active members of ROPEPCA and engage the Romanian authorities through our membership. ROPEPCA has been consistent in expressing its point of view in public consultations and remains open to active dialogue with authorities for the benefit of authorities, stakeholders, and business.

What is your perspective on the evolution of the industry in which you are active in the context of political and economic instability?

Managing risk has always been an integral part of the energy business, and regardless of where they are in the world, oil and gas companies will always be sensitive to the potential for political and economic instability.

As I mentioned, establishing and maintaining rule of law and a stable investment structure is key to anywhere we invest.

How would you describe the evolution of your company until now? What estimates do you have for 2020 and the next several years?

We have been consistent in our mission to be a growth-oriented industry leader respected throughout the world for the quality and competence of our people, the efficiency and scope of our operations and our rich heritage of honesty and integrity.

For 2020, we intend to execute another very large 3D Geophysical project in Braila, Galati and Vrancea Counties, and together with the data obtained from the South Urziceni project, we intend to use processing algorithms and work flows proven successful elsewhere to obtain knowledge of the deeper underexplored subsurface. In the long term, we will transform that data into drillable opportunities that ultimately will lead to further development of the resources for the benefit of our company and the country.

How can O&G companies better develop their talent and manage their workforce?

We must invest in their continuing education and provide a stable, predictable work environment where they can excel and be recognized and rewarded for their contribution.

Additionally, it is imperative to create a work environment that is fun and where new ideas are free to be expressed without fear.

Advice to young professionals

Since you are a Senior Executive with many years of service behind you, would you like to share some thoughts for the younger oil & gas generation? What is the most important lesson you have learned in your career that you think would benefit young professionals today?

Be realistic in managing expectations for your career.

Work hard and continue to invest in yourself through continuing education and networking with peers.

Identify a mentor and emulate the positives.

We all experience ups and downs, both in our careers and in our lives. It is how we react to these peaks and valleys that define our character.

Our core values provide us strength in the valleys, and humility at the peak, with the realization that these instances will only be temporary. We must embrace and celebrate the changes that life inevitably throws at us.

What would you say is the formula to a successful career?

Investing in a shared goal and owning the result whether positive or negative will provide the fuel to succeed. Most of us are lucky if get three good opportunities in our lifetimes for a step change in career advancement. All too often we fail to recognize them. A good sign for recognizing those opportunities is when we are fearful and uncomfortable with the potential change in front of us. That is the exact moment you should grab the bull by the horns and take on something new. And if you fail, you will have learned more from that than your previous successes. ■

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The European Gas Market

ANALYSING THE ROLE OF TRANSMISSION TARIFFS

The European Union Agency for the Cooperation of Energy Regulators (ACER) published a report assessing the implementation of the Network Code on harmonized transmission tariff structures for gas, which was designed to facilitate cross-border trade by providing a level playing field between domestic and cross-border users and by increasing transparency. With its review, the Agency aims to promote a better interpretation of the key principles of the EU legislation, as well as a review of national tariff practices' compatibility with the Network Code.

Main findings

• Transparency on the reference price methodologies has improved significantly: transparency increases the understanding of tariff setting methodologies in the EU and may lead to more effective tariff designs in the future. The Report includes best practices across EU Member States and also presents several shortcomings, like incomplete descriptions of the methodologies.

• Regional networks need to be better defined: ACER reports on the different treatment of regional networks across the EU. Regional networks supply domestic consumers and cannot be used for transporting gas to interconnection points between Member States. Allocating the costs of regional networks to users that do not benefit from them leads to cross-subsidies between users.

• Charges unrelated to transmission activities: Some Transmission System Operators collect charges unrelated to transmission, such as storage facilities, Liquefied Natural Gas facilities, biogas promotion, etc. ACER identifies the risks of these measures while acknowledging where these are useful. The Agency stresses the need for financial neutrality of the entity collecting these charges and that efficiently sized assets are charged to beneficiaries using these assets.

• In addition, the Agency has also assessed a large number of other implementation issues, such as clarifying the scope of the Network Code. The report also includes reflections on volume risk applications for transit flows, on inter-transmission system compensations, benchmarking tariffs, revenue reconciliation and cost allocation assessment.

Finally, the report also covers tariff changes and an assessment of best practices in terms of the publication of values and parameters related to the allowed revenue methodologies.

Country sheet: Romania

Romanian Energy Regulatory Authority (ANRE) has set the gas transmission tariffs following the motivated decision136 published on 18 March 2019 for the following period:

• Duration of the regulatory period: 1 October 2019 – 30 September 2024 (5 years);

• Duration of the tariff period: 1 October 2019 – 30 September 2020 (1 year);

• Entry into force of new tariffs: 1 October 2019.

ANRE sets tariffs for the SNTGN Transgaz SA operating in Romania.

The allowed revenue for the tariff period from 1 October 2019 to 30 September 2020 is EUR

255,665,724 (RON 1,214,407.44 million).

ANRE applies a postage stamp RPM. The methodology is applied separately to all the TSOs.

The following adjustments are applied to the RPM:

• Rescaling applied to all points;

• Discounts to points to and from storage facilities. ANRE applies a 50% discount to capacity tariffs at entry/exit points from/to storage facilities.

The applied RPM results in the following ratios:

• Capacity - commodity split: 85% - 15%;

• Transmission - non-transmission: All allowed revenue is allocated as transmission as the allowed revenue is set only for transmission and does not include any other activities;

• Intra-system - cross-system: 83.41%-16.59%;

• Entry-exit split: 50/50 (for capacity).

The NRA applies ex-post discounts for standard capacity products for interruptible capacity.

The NRA applies the following non-transmission services. The revenue for these services is not set by the NRA.

• Connection services as described in ANRE Order nr.71/2018, tariffs for connection services.

• Complementary transmission services according to ANRE Order nr. 172/2018, tariffs for complementary services.

The NRA applies commodity-based transmission tariffs. The commodity component comprises variable costs and it is allocated in whole to the transmitted gas quantity. As of 1 October 2019, the fixed component of the regulated revenue increases by 5% each year, as compared to the current level of 70% used for setting capacity booking tariffs up to the level of 85% of the regulated revenue.

The commodity-based transmission tariff is applied to all exit points for the utilization of the system.

The commodity charge is applied to the quantity measured at all exits points, which is considered to be the amount of gas transported in the system.

The TSO does not apply fixed payable prices.

The reconciliation of the TSO is performed every year. For regulatory year 2019-2020, the regulatory account amounts to EUR 35,344,933 over-recovery (RON 167,888.43 million – 4.75 RON/EUR). This represents 7.23% of the allowed (regulated) revenue for tariff period 1 October 2019 – 30 September 2020.

How has ANRE addressed with the recommendations made by the Agency in the Report on the final tariff consultation?

In the Report of the Agency analysing the tariff consultation of Romania, the Agency recommended the following:

Firstly, that the reasoning supporting the choice of RPM is not sufficient. If the decision as referred to in Article 27(4) of the NC TAR were not to provide a better reasoning, the Agency would not consider such a Decision as complying with the requirement to take a motivated decision.

• The Agency notes that ANRE includes several elements that had not

been included in the consultation, such a more detailed comparison with the CWD methodology, a description of the complexity of the network and some reference to the transit pipelines. The Agency notes that this information has not been reviewed as part of this assessment.

Secondly, the Agency recommended ANRE to explain in the motivated decision how the costs related to the 'transit' pipelines are taken into account in the RPM. The Agency understood from the consultation from ANRE that the RPM would apply to all points of the Romanian network and that the costs of the 'transit' pipelines will not enter the RAB, and will not be allocated via the RPM (only the connection of the transit pipeline with the NTS would be included). The Agency recommended ANRE to explain who will pay for the assets that are not included in the RAB and how this is compliant with the NC TAR. The Agency will monitor how these pipelines are treated.

- ANRE has clarified that the pipelines between Isaccea II and III – Negru Voda II and III are not connected with the Romanian NTS and are under the regulation of ANRE order nr. 34/2016 which rules the methodology for the allocation of transmission capacity and the setting of tariffs. These pipelines are still under the historical commercial contracts signed with Gazprom Export.
- Related to the Isaccea 1 - Negru Voda 1 pipelines, ANRE has clarified to the Agency that the impact applying the RPM to these pipelines is low. The costs associated with this pipeline represent less than 5% of the revenue allowed for the natural gas transmission activity and its additional capacity is of almost 10% of NTS capacity without the transit pipelines. As for the use of this pipeline, ANRE has already monitored the quantities and associated capacities and found out a constant degree of utilization of the pipeline over the past 3 years.

Thirdly, the Agency recommended ANRE to elaborate in the final decision on the way the 'flows' are determined. The Agency noted that ANRE intended decrease the flow-based charge gradually from starting levels of 40% of the allowed revenue (in 2017) down to 15%. The decrease would be based on a 5% reduction per year. The Agency considers this gradual decrease sensible and the final share of 15% appropriate.

- The Agency notes that the motivated decision clarifies that flows are measured using measurements at exit points.

Fourthly, the Agency recommended ANRE to include in the final decision the modality in which revenue for non-transmission services are reconciled. ANRE has notified the Agency that the revenue related to these services is separated from those of transmission services and covered by tariffs calculated according to the ANRE decisions 71/2018 and 172/2018. For these activities ANRE does not approve a specific revenue. ANRE explained to the Agency that the reconciliation is not applicable to these services.

- Regarding the non-transmission tariff for a connection service. The Agency has understood that the costs of such connections are not known in advanced and that therefore cannot be established ex-ante. No new assets from new connections are included in RAB of transmission services.
- Regarding the complementary transmission services, the Agency notes that tariffs are available at the TSO's website.

Fifthly, the Agency suggests ANRE to use the following units in the simplified tariff model: RON/MWh for the commodity charge, but use a tariff expressed in RON/MWh/h/day, RON/MWh/h/month, RON/MWh/h/quarter and RON/MWh/h/year for the capacity charges.

- The Agency acknowledges that the motivated decision includes tariffs for yearly capacity products in the recommended units.

Sixthly, the Agency recommended ANRE to include the information in the simplified model in English. The Agency notes that ANRE has translated to English the simplified model included in the motivated decision.

Finally, the Agency remarks that it could not check the compliance of the calculation of cross-system flows as an input to the CAA. This calculation should follow the description in Article 5(a)-(c) of the NC TAR.

Applying Network Code on Gas Balancing Support Short-term Markets

ACER also published its report on enabling short-term gas markets after interim balancing measures (Fourth ACER Report on the implementation of the Balancing Network Code) with a view to end interim measures in the EU balancing zones. ACER has been reporting on the implementation of this Network Code since 2016.

The report finds that market-based balancing benefits network users and replaces the transmission system operator as the sole balancing agent. The Agency also reports that balancing data transparency helps imbalance price signals and imbalance trades to develop and that market-based balancing regimes support liquid short-term markets in the Union.

The Code envisaged full compliance from interim measures within five years from the entry into force, with the exception of balancing platforms (allowed until 16 April 2024). The Report follows up on whether the interim measures foreseen to expire by 16 April 2019 were completed. ■

Products

API and non-API downhole pumps
Fiberglass Sucker Rods (FSR) and accessories
Steel Sucker Rods (SSR) and accessories
Plunger lift equipment and accessories

Product Services

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FSR/SSR technical service and installation
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CDI
OILFIELD SERVICES

How to Save Costs by Preventing Fluid Loss Effectively

Loss of circulation while drilling, is a problem faced by the drilling industry on a daily basis. Unfortunately, if these problems are not addressed accordingly, the results may induce non-productive time and compromise the well integrity. Which may require unplanned technical efforts and cost money to solve over and above what is budgeted/planned for.

Whilst many of the major drilling fluids companies supply their own line of LCM products, a number of specialized players have emerged to capitalize on an industry need for more innovative solutions to the costly problems. The products from said companies so far have had a relatively low success rate in fixing these drilling challenges cost effectively. The majority of wells drilling for oil and gas, in particular the deeper and deviated wells, will incur cost overruns due

to drilling challenges caused by lost circulation and wellbore instabilities.

Therefore, there is room for innovation, to give operators significant cost savings and also enable drilling more undrillable formations where previous attempts have failed due to high formation pressures. Drilchem have developed a range of products that are eco-friendly and non-damaging to producing formations. These products are based on patented and specially engineered organic fiber technology, proven to be highly efficient in dealing with wellbore instability.

New ways to reduce cost

Operators are looking for new ways to manage known risks and know there are considerable savings to be had from trying things differently. On a recent project, Drilchem was able to contribute to the Operator saving two casing strings by careful analysis of offset well data and the introduction of Drilchem products through a critical fluid screening process. This was done to manage the risk of losses and formation breakouts, and the cost savings from not using the two casing strings made the project a unique success story for the Operator. These products, when added to the drilling fluids, can stabilize highly reactive shales, prevent severe loss of circulation and assist in stabilizing the wellbore from high formation pressures. Operators can thereby achieve longer OH sections and better hole conditions with a good chance of reducing the number of casing strings. Fracseal is used to enhance wellbore stability and Stoploss is used to deal with cases of severe lost circulation.

Fracseal is manufactured from micronized organic cellulose materials and can be used to optimize filtercake performance creating a lattice like network on the borehole wall effectively sealing off the formation with a very thin filtercake. In doing this the apparent fracture gradient can be increased by sealing the fracture and isolating the fracture tip so to prevent it from propagating and resulting in a loss scenario.

Stoploss has been designed specifically for severe to total loss situations, where the only alternatives to curing the losses are setting a cement plug and possibly sidetracking. The effectiveness of the product has been highlighted in geomechanics studies showing its ability to seal fracture widths estimated at 50 cm in diameter.

It is estimated that 15% to 20% of the total costs of drilling operations is accounted for by drilling fluids and that 2 billion USD per annum is spent fixing problems caused by loss of circulation. It's a competitive market and the cost savings are significant when the right strategy is chosen.

Everyone should be focusing on 0 losses and 0 NPT. For Operators, the above drivers underscore the potential for finding new synergies between primary mud suppliers and specialized companies/operators whose products are eco-friendly, easy to transport, use and handle at the rig site, and that ultimately will cut costs and optimize drilling budgets.

Dosco PetroServices is the official & exclusive distributor of Drilchem products for the CEE Region. If you are interested and require more information please don't hesitate to contact us.

Oil and Gas Sector Gears up for Recovery

COMMON EFFORT OF STATE AND INDUSTRY

In the context of the crisis generated by COVID-19 and the deep impact that measures recently adopted by authorities have on the economy, the Oil and Gas Employers' Federation (FPPG) requests the Government permanent consultations in order to prioritize the projects aimed to kick-start the economy, to achieve medium and long-term recovery and stimulate private investments through competitive fiscal conditions.

"We unanimously recognize that it is of primary importance to protect people both during the state of emergency established and after lifting it. At the same time, diminishing the negative impact of the Covid-19 pandemic on the economic competitiveness of Romania in the long run can be achieved by restoring balance between state and society" FPPG representatives said.

The oil and gas industry is facing the most difficult period of the last century. At the same time, the oil and gas industry can become a driver for the economic recovery of Romania, given its share in the economy through the investments made, the annual contributions to the state budget and the number of employees. In this context, the members of the federation propose the following measures:

1. Economic recovery through large scale projects - the Black Sea and the urgent need to amend the offshore law in order to clarify the stability clause, defining competitive fiscal terms and creating free market conditions.

2. Gas market liberalization and eliminating the supplementary charge as of July 1 - correlated with the implementation of measures to protect vulnerable consumers.

3. Upgrading the Energy Law (123/2012):

a. So that the amendments made allow new investments in electricity production capacities (bilateral contracts).

b. Liberalization must allow autonomous pricing, eliminate the centralized markets obligations (CMO) and replace them with a Gas Release Program, discussed first with the entire industry.

4. Unlocking projects from European funds - to facilitate new technological solutions allowing collaboration between industries in the energy transition process.

5. Digitization of the oil and gas industry in order to cut red tape and promote new technologies to support both companies and authorities.

6. Promoting energy efficiency projects - they would allow significant investments in the energy efficiency of buildings and would also contribute to the decrease in utility bills.

7. Urgent amendment of the Labour Code and correlation of provisions with employers' needs.

The analysis of the current situation and FPPG proposals for economic recovery will be sent to authorities and published on the website of the association.

About FPPG

The Oil and Gas Employers' Federation (FPPG) is a Romanian legal entity of private law, non-lucrative, non-governmental, autonomous, independent from the public authorities, without a political nature; it is representative at the level of the activity sector 'Energy, Oil & Gas and Energy Mining'.

FPPG has constantly supported the principles of stability, predictability and competitiveness of the legislative framework applicable to the energy sector in Romania, as well as the responsibility of companies in the field in terms of safety, health and security of operations and staff.

FPPG is a founding member of the Concordia Employers' Confederation, the only Romanian employers' confederation affiliated to IOE (International Organization of Employers).

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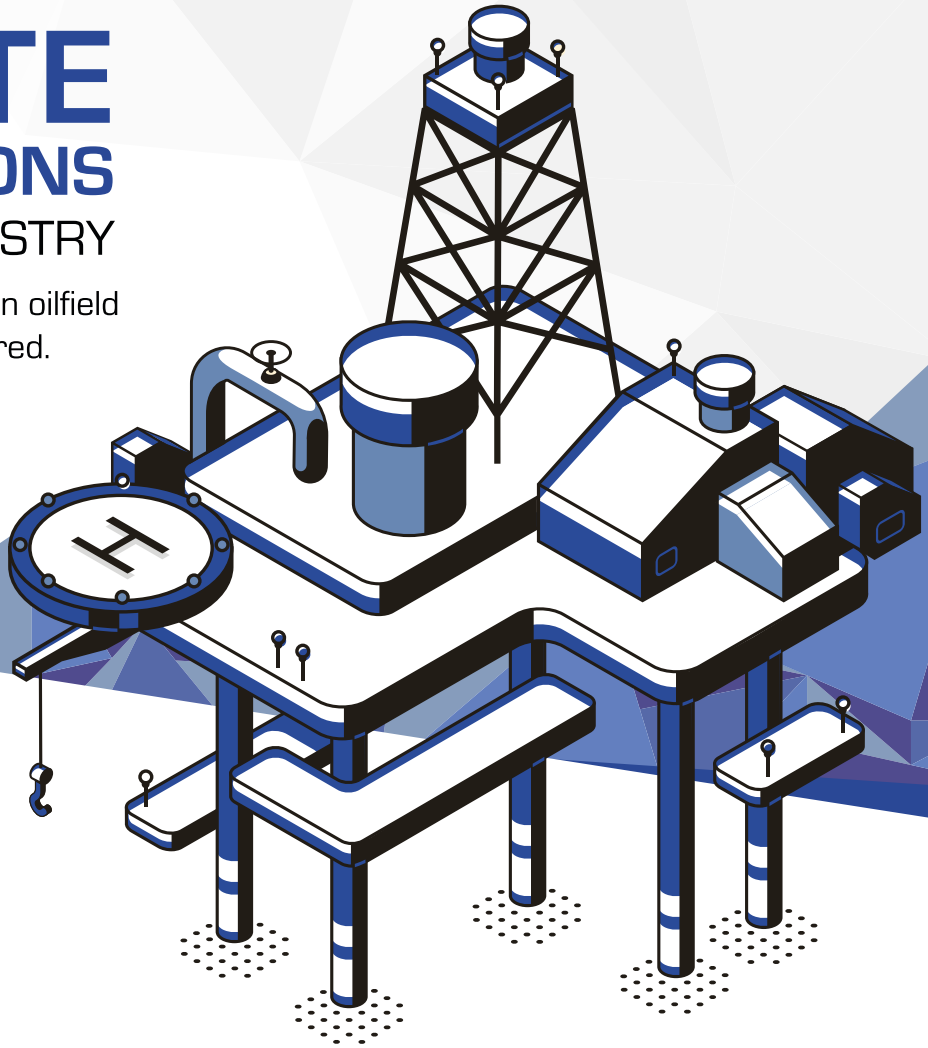

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How to Turn the Black Sea into an Economic Driver After the Crisis

The global energy sector is hit hard by the corona-crisis. The sharp decrease in the oil and gas demand, which overlapped the price war triggered by Saudi Arabia after Russia's refusal to reduce its oil production, endangers the major energy projects of the world, as well as the future, at least in the medium term, of transition towards decarbonization established under the new policy of the European Union, known as the Green Deal. Caught in this equation with several unknown elements, Romania must support the energy system, which may be key to restarting the economy in the following period, especially due to offshore projects in the Black Sea. But for this the state is now called to unlock the projects by establishing an investment framework ensuring, in the term, the stability and competitiveness of the fiscal and regulatory regime.

by **Adrian Stoica**

Attending a conference call, organized by Sustainable Romania and EM 360, Niculae Havrilet, Secretary of State in the Ministry of Economy, Energy and Business Environment (MEEMA), said the current prices on the gas market discourage investments. Quotations on the wholesale gas market, which are now similar to the import ones, are back to the level of 2008, when they stood at USD 110/TCM. In 2012, when the major Black Sea gas extraction projects were launched, the price was USD 450/TCM.

"A price of USD 360/TCM was feasible at the time for starting the projects. Amid the decrease in prices and their unpredictability, the reduction of demand and the apparition of new routes for supplying gas to Europe, the risks related to investments have become very high," Niculae Havrilet said. He mentioned that, despite these major imbalances that disrupt the activity of energy markets, the US company ExxonMobil has not stopped the activity in the Black Sea, where together with OMV Petrom it carries out the Neptun Deep project, but has not made yet the final investment decision, mentioning that it was related to the amendment of the Offshore Law.

Top priority: Amending the Offshore Law

In the opinion of the representatives of the Oil and Gas Employers' Federation (FPPG), amending the Offshore Law (Law No. 256/2018), to bring it in line with investors' requirements, is absolutely necessary.

"Changing the provisions of the Offshore Law to ensure stability and competitiveness of the fiscal and regulatory regime, of the Energy Law, as well as a liberalized gas market are things expected by investors," said in turn Adrian Badea, Vice-President of FPPG. This measure would generate investments of several billion euros in the first years alone, before the actual extraction of the first gas molecules. Moreover, Black Sea gas could be the basis for developing related industries which, in turn, would generate considerable economic benefits, he also said. The importance of the oil sector in restarting the engines of the economy in the post-crisis period remains vital, even if now the sector is strongly hit, emphasized in turn Daniel Apostol, director within the Sustainable Romania project. "The analysis on the new post-crisis economy must start from the assumption that a lot will change and at the question how to restart the economy we need to start from oil," he pointed out.

"A price of USD 360/TCM was feasible at the time for starting the projects. Amid the decrease in prices and their unpredictability, the reduction of demand and the apparition of new routes for supplying gas to Europe, the risks related to investments have become very high. Despite these major imbalances that disrupt the activity of energy markets, the US company ExxonMobil has not stopped the activity in the Black Sea, where together with OMV Petrom it carries out the Neptun Deep project," **Niculae Havrilet, Secretary of State in the Ministry of Economy, Energy and Business Environment said.**

Amendment of the Offshore Law, a benefit for all

In the opinion of Deloitte consultant Razvan Nicolescu, Romania has two major opportunities in the following period: decarbonization and tapping the potential of mineral resources. "It is up to us how we capitalize on these opportunities. There is an idea created in our case that if the Offshore Law is amended only the companies benefit, not the state. The fact is that if it is not amended, we all lose, including the consumers," he said.

Despite the advantages that starting Black Sea projects would bring, amending the Offshore Law will take time, in the opinion of Secretary of State Niculae Havrilet, the amendment following to take place after the parliamentary elections.

The first project financed through the 10.d Facility

Besides the Iernut gas-fired power plant, under construction, Romgaz is preparing the construction a new gas-fired power plant of 450 MW in Iernut. For it there is already a feasibility study and the execution contract could be signed by the end of the year. The project has all chances to be the first of the 140 submitted by Romania financed through the 10.d Facility - the EU Modernization Fund, Niculae Havrilet announced.

For Romgaz, increasing the power generation capacities, so that it is no longer dependent on gas prices, is the priority in the following period in terms of business development, said Mihaela Toader, specialist in European funds at Romgaz.

Another project that could quickly receive funds through the 10.d Facility is that regarding the restructuring of Complexul Energetic Oltenia. Here the plan is to obtain a restructuring aid worth EUR 241mln to purchase emission allowances, but subject to submitting a restructuring plan within six months. It would include the switch to gas of several energy groups that are currently coal-fired and building several photovoltaic parks with a total capacity of 300 MW. For Romania natural gas can now become a major asset, after before the crisis

many of the projects that used this resource could not be financed.

"The EU is facing two trends: continuing the Green Deal project and the natural trend of slowing down the project due to fewer funds amid the current crisis. Now the gas price is a challenge because a low price makes projects unprofitable. The state will now have to play an important role, as it can tilt the balance," said in turn Corneliu Bodea, President of the Romanian Energy Centre (REC).

Financing the increase in energy efficiency

In the opinion of Radu Dudau, the President of think tank Energy Policy Group (EPG), another opportunity to restart the national economy after the corona-crisis is represented by projects intended to increase energy efficiency, with a focus on the energy efficiency of buildings. According to him, at MEEMA level there is a project under discussion to create a national fund intended to finance these projects.

According to a recent study conducted by EPG, most of the 5.1 million residential buildings of Romania were built before 1990, at a low level of energy efficiency standards, with energy performance of 180-400 kWh/sqm/year. Also, 2.4 million apartments built before 1985 need technical renovation and modernization. One in seven residential buildings has damaged interiors, often with consequences on the health and welfare of inhabitants. The Ministry of Environment in February 2020 announced a new building renovation program, allocating EUR 90 million for individual houses and EUR 80 million for public buildings.

Although the allocated funds are significant, they remain insufficient, in conditions in which the new nZEB standards (Nearly Zero-Energy Buildings), imposed by the Energy Performance of Buildings Directive, lead to a significant increase in costs. From this perspective, new funding sources are needed, including, besides the European funds, state guarantees, low-interest loans and subsidies based on the measurable gains of energy efficiency, public funding for renovation of buildings in the communities affected by energy poverty, EPG analysis also shows.

"Another opportunity to restart the national economy after the corona-crisis is represented by projects intended to increase energy efficiency, with a focus on the energy efficiency of buildings. At MEEMA level there is a project under discussion to create a national fund intended to finance these projects," **Radu Dudau, President of think tank Energy Policy Group said.**

Liberalization of energy prices brought forward

Government is analysing the possibility to bring forward by half a year, compared to the provisions of the legislation in force, the liberalization of electricity prices for population. Re-liberalization of electricity prices, after the cancellation of the provisions regarding price capping under the famous GEO No. 114/2018, is provided for January 1, 2021. Regarding gas prices, Government wants to observe the current schedule, which provides for liberalization on the same date, July 1.

"We would like to also liberalize the electricity market as of July 1 and have lower prices for end-consumers. We are discussing this possibility, because ANRE can no longer establish administered prices for producers. On both markets, for electricity and natural gas, the upstream, wholesale markets have a low level and this puts a downward pressure at the end-consumer," Niculae Havrilet mentioned.

Oil Market Remains Under Pressure

THE CRAZY MONTH IS OVER

by **Adrian Stoica**

Saudi Arabia and Russia on Sunday, April 11 ended the oil price war, following an agreement establishing the reduction of supplies by 9.7 million barrels per day in May and June, the equivalent of 10% of the global production. Despite this massive cut, the global oil market will continue to remain under pressure in the following months.

According to the terms agreed by OPEC and its allies, the reduction of production will continue until 2022, but in smaller percentages. Despite the largest production cut ever operated, it is possible that the market remains oversupplied with oil for several months from the catastrophic collapse of demand, caused by the lockdowns established by the governments of the world to slow the spread of coronavirus, the international media notes.

"The OPEC+ agreement will not prevent sharp inventory builds in coming months, and near-term oil prices in the physical market will likely remain under pressure," said Martijn Rats, global oil strategist at Morgan Stanley.

While supplies will be reduced by 10%, the drop in demand is twice as large, which means that the world's oil tanks will continue to fill day by day, as long as the planes stay on the ground, businesses are closed and billions of people stay home, the international media reports. The major consumer countries that supported this agreement signed on April 11, including the US, China, Japan, India and South Korea, have even agreed to buy oil, increasing their reserves to boost the market.

Month of chaos on the oil market

The recent agreement ended a period in which the OPEC+ alliance appeared to be dead, with former partners engaged in oil-trade warfare. It all started on March 6, when Russian Energy Minister Alexander Novak said his country was ready to increase oil production in April.

Dissatisfied with Russia's refusal to cut production, Saudi Arabia embarked on a war whose weapons took everyone aback. Riyadh came up on the market with the biggest price discounts in the last 30 years and announced that it would increase production to 12 million barrels per day in April, i.e. a 25% increase compared to February.

What followed was the most chaotic month in the oil market's history, threatening the stability of the oil-dependent nations from Nigeria to Iraq and overturning the business plans of industry giants like ExxonMobil and Royal Dutch Shell.

Without realizing it, the Saudis had started a price war at the worst possible time, when the coronavirus outbreak had already spread beyond Wuhan and the governments started to establish lockdowns. Due to restrictions, global oil demand has decreased by about 30 million barrels per day, or about 30% of the global production. The price of Brent oil, used as a global benchmark, recorded a dramatic fall. While at the beginning of the year it was traded at over USD 70/bbl, on March 30 it was traded at USD 21.65/bbl, the lowest price recorded in almost two decades.

Russia came out rumpled

While three years ago, Vladimir Putin's deal with OPEC to reduce oil production and raise prices was a triumph for the Kremlin leader that strengthened his position on the world politics scene, now Moscow has had to make harsh concessions after the US president Donald Trump stepped in to end the price war, the international press notes after the deal was concluded.

"The ill-fated decision to face off against Saudi Arabia in early March was a strategic mistake and now we're paying the price, a much higher price than we could have paid," said political analyst Andrey Kortunov, director of the Russian International Affairs Council, who added: "This looks like a victory for the US, and Russia ends up a bigger loser than Saudi Arabia." ■

Negative Oil Prices

"THERE WILL BE BLOOD"

Our first thoughts after seeing the unfolding oil prices crisis was the title of the 2007 Hollywood movie: "There will be blood". It is about the early years of the 20th century, when Daniel Plainview, an oil prospector, entangles himself in a story of family, religion, hatred, oil and madness, focusing on the ruthless nature of the early days of the oil business. Apparently, the real-life business was, is and will remain ruthless for the foreseeable future, and sometimes the global players bring the game past the thresholds of 'sanity'.

by **Evgenios Zogopoulos**

It was not a surprise that oil demand would lower due to the shutdown of many sectors of the global economy; but this is not the whole story and the absurd started manifesting really recently. Demand for oil has plummeted in these recent weeks while the coronavirus pandemic has been shutting down multiple pillars of the economy, eliminating much of the need for fuel to transfers good or transport people. Without a use for it, the world's biggest players (producers) are running out of places to store all the oil that companies continued to pump out of the ground but consumers did not ask for. To be more specific, crude oil is only the raw material from which gasoline is made after being refined to diesel, jet fuel and other products. Apparently, it is very costly for big corporations, like ExxonMobil and Royal Dutch Shell, to refine oil and transport it to gas stations. It requires employment of thousands of people throughout the supply chain sequence. In addition, state imposed and local taxes account for up to 20% of what customers pay at the gas stations in the United States. Similar is the example of many other European and Asian states, where taxes can bring the final prices even higher.

What happened?

This meltdown has never happened before, even if we did have collapses in the past, and experts did not expect prices to stay negative for much. Demand for oil is will probably remain volatile for months because few experts believe the economy will quickly rebound to where it was before the pandemic. As global demand for crude oil has plummeted, the United States has seen its oil storage capacity go out of the window because airlines and other buyers aren't using nearly as much crude as they were before the crisis. WTI oil is down more than 100% this year; Brent oil has fallen about 65%. With storage at capacity, those companies that could store oil aren't buying it anymore as they do not use it and have no space to store it. As sellers rushed to dispose (or more accurately, throw away) the May contracts, futures prices nosedived and plunged below zero for the first time. Those prices, of negative USD 4.47 per barrel, practically meant that companies would have to pay a buyer to take oil off their hands and store it if they want to exit the market. Of course, not many cases like that happened, but there will definitely be some interesting (or comical) stories of people who ended up with the May contracts and the bag in their hands.

International oil hasn't been impacted as bad as its American counterpart. The June contract for Brent crude, the primary benchmark for global prices, is down about 23% to USD 19.67 per barrel. The main reason for this difference between the two benchmarks can be traced back to storage capacity. More specifically, crude is priced in the middle of the North Sea, where tanker storage is ample and accessible, while WTI oil storage in the U.S. is limited as well as landlocked. As a result, Brent is more removed from the coronavirus demand shock while WTI prices are much more sensitive to that shock.

Ultimately, the market continues to be severely impacted and directly connected with the pandemic's status. Billions are still under lockdown or living under some version of a restrictive regime. Analysts keep trying to forecast, with an increasing acceptance that the shock to demand will probably

last much more than initially expected.

Recently, Halliburton also offered a grim outlook for the oil market. "We expect activity in North America land to sharply decline during the second quarter and remain depressed through year-end, impacting all basins," Halliburton's Chief Executive Officer Jeff Miller said in a statement. The oilfield services giant reported a net loss of USD 1 billion for Q1.

Those weird figures may not be quite as large in May and beyond, but there is little chance that global demand will recover back to the levels of the glorious past. Mark Lewis, global head of sustainability research at BNP Paribas Asset Management, argues in the FT that "we may have just witnessed the permanent peak in oil demand. Greater efficiency, more EVs and also permanent changes in behaviour stemming from the pandemic could add up to a peak in consumption."

Is this the end?

There are of course some mitigating factors in this equation and the insane numbers. The prices for WTI reflect the contract for May, which expires soon. The collapse is a reflection of traders abandoning the May contract, and moving on to June. The thinly-traded May contract loses some relevance, and analysts say that the June contract – trading at USD 20 per barrel as of April 20 – now becomes the important number to watch. The result is really part of the insanity and indicative of the situation: no one wants physical delivery of WTI for May, and with storage options dwindling in some places, almost panicked traders liquidated their positions, selling contracts at insane discounts. With the contract expiring on April 21, nobody wanted to be left holding the bomb. Unable to actually accept physical delivery, traders ended up paying someone to take oil off of their hands; hence the interesting stories mentioned earlier.

Louise Dickson, Oil Market Analyst at Rystad Energy, said in a statement: "The intraday WTI destruction today is certainly epic in scale, which is largely a case of jitters ahead of the WTI May 2020 futures contract expiring tomorrow and storage fears finally materializing. But if you have been watching the physical spot prices in the North Sea, currently trading in the USD 15-18 range, this drop in WTI May 2020 futures isn't as shocking."

This cringe and bizarre situation could be forgotten as traders move on to the June WTI contract, which has been trading at USD 20 per barrel. But while June doesn't appear quite as catastrophic, oil at USD 20 is not a price at which most oil companies, or countries, can survive for a very long period of time. Moreover, nothing indicates (apparently) that USD 20 would be the absolute bottom of this barrel.

Is OPEC on top of this? Maybe not

The dramatic evolution of the plunging oil prices did not just start with the COVID19 crisis; it has its roots to the very delicate 'peace pacts' and the balance among global ruthless players – hence: "there will be blood". Even if OPEC did agree to immense and almost monumental production cuts, Russia was at a brink of oil war with the Saudis just before this started. Saudi Arabia and Russia were already being pushed, by the circumstances, to produce less because they themselves were running out of room to store it. That would presumably help sustain the prices but the deal was fragile and the smaller, hungry players even more ruthless and uncontrollable. The cuts alone would not be able to retain the wave that was coming but eventually the war on the supply side met the demand destruction at the same time and we just got ourselves the perfect storm.

Russia and Saudi Arabia depend heavily on their oil revenues to sustain themselves. Even if the Saudis rely heavily (up to 50% of their GDP) on oil production, Russia is following (40% of their GDP). Even if Russia has a more diversified economy it still needs a price of 60 dollars a barrel to balance its budget. Accordingly, Saudi Arabia needs an 80 dollars-per-barrel price to balance its budget, realize its plans to diversify its economy and sustain a heavily subsidized economy. A price war would work for no one, right? Maybe, in a saner world than the one we live in.

The International Energy Agency warned: "There is no feasible agreement that could cut supply by enough to offset such near-term demand losses". The agency expects that the plunging prices and increasingly reduced storage capacity will force U.S. producers to reduce production. By the end of the year, it expects output to be 2 million barrels per day lower than in December 2019. Their powerlessness in the face of the demand collapse was plainly visible in the latest capitulation. OPEC just seemed powerless to control this spiral.

Countries like Saudi Arabia, UAE and Kuwait depend on higher oil in order not just to budget themselves, but to survive. Smaller, and cheaper, players like Iraq, Iran and Venezuela face an actual existential threat oil prices remain at current levels. In Africa, the pandemic stopped the Nigeria growth story cold. For the United States and Canada, the spiral may have unforeseen consequences. Things are already getting out of hand whether president Trump wants to admit it or not.

"A return to sustainable prices will require a recovery of the global economy as well as disciplined production by OPEC and other major producers," said Michael Garvey, head of oil & gas investment banking at Adour Capital. "The longer prices remain at these extreme lows, the more capital-starved the operations become, reducing production capacity," Garvey said. "We are at the beginning of what will be a challenging period for the industry."

While China cancelled 10 shipments of crude oil from Saudi Arabia for April and May, other OPEC members like African and South American states, and Iraq as well as Russia, not in the oil-producing cartel, are facing additional cancellations. Analysts expect more measures to regulate the situation but no one can predict or reassure for their effectiveness.

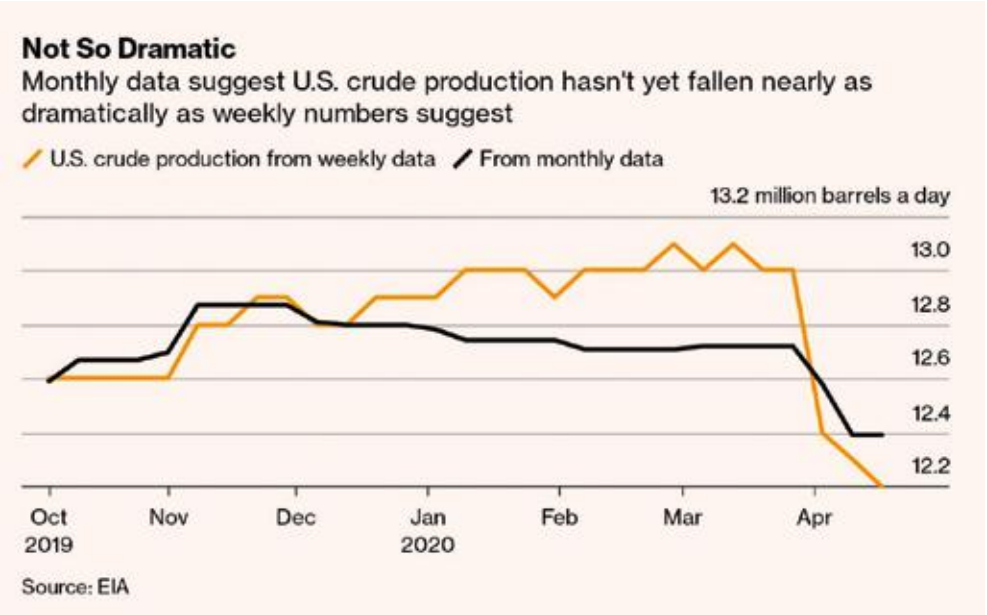
How the pieces are set on the global oil chess game

Saudi Arabia's story is one of oil. The industry accounts for 70% of export earnings and half of GDP. With approximately USD 500 billion in their sovereign wealth fund the Saudis have the means to wait for the storm to pass. Saudi Arabia expected a rebound to 40 dollars per barrel following the peace treaty with Russia regarding the production and prices. With oil at the current price, the kingdom planned to take a loss of 40 billion. Even before the Russia-Saudi price war, Aljazeera reported the government had asked for state agencies to reduce costs by at least a third. Most probably, the central government will put on hold many major programs too. This will in no way guarantee stability for the long run, as more than a million jobs are at stake and much of the population is supported in some way by the government-backed social programs, which will now be have to be funded by the savings.

According to the Acuity oil and gas research, the unemployment rates across the UAE, could rise due to COVID19, but as in the case of the Saudis their savings can provide a short-term solution.

Iraq is the second-biggest oil exporter in OPEC. The Iraqis have nearly one tenth of the country's population employed in state owned agencies and the vast majority of the funding is coming from oil. Similar to Iran, the pandemic effectively closed the Iraqi private sector economy since March. Iraq apparently, devasted by the wars, does not have sovereign wealth funds like many of its middle eastern counterparts to use as a reserve. Iraq is facing a potentially existential threat while this situation develops.

The pandemic had deep impacts on the demand from Russia's largest clients like China, the European Union and not only. The cuts were particularly painful as Russia depends on oil shipments for at least a third of their GDP. Current oil prices



undermine Russian efforts to protect its economy, including the recent peace treaty with Saudi Arabia to cut crude production as well as a government's stimulus package. The heavy dependence of the Russians on oil is evidently putting at risk over a million jobs.

While the Mexican government announced stronger and deeper austerity measures the president also vowed there would be no layoffs of government employees. This is hardly imaginable as Mexico was a distant player in the Russian-Saudi shakedown. It was only in March that the Mexican oil industry seemed to defy the Saudi-Russia price war with Petroleos Mexicanos staying on track to double drilling to 423 wells by 2020. This proved how uncontrollable the global situation is and how little it matters if the 'big boys' agree or not.

Back in Africa, prices put the brakes on continent's fastest-growing economy. With oil making up roughly 9% of GDP, Nigeria has a break-even oil price of USD 57 according to independent analysis from the oil and gas research team at Acuity Knowledge Partners. Oil is more than essential for governmental funding and it represents up to 90% of total exports. The IMF expects Nigeria's economy to shrink significantly due to the crisis with the country keeping in storage up to 50 million barrels of unsold crude oil by May. Unemployment will reportedly rise by approximately 25%, even if more than 20 million people were already unemployed. Additionally, even if the country has some small savings (reportedly up to 2 billion US dollars), it will not be enough as a retainer to the spiral foreseen.

Canada was heavily impacted by the oil war between Russia and Saudi Arabia, with COVID19 launching an additional attack. Either of these two factors could have disrupted Alberta's oil production but was meant to face their combined strength. The collateral damage seems indeed catastrophic.

Conclusion

All in all, some very useful and not so jaw dropping conclusions can be drawn out of this situation. First of all, the oil business is at the very mercy of COVID19; the longer the pandemic lasts, the greater the damage oil producers will have to take. Prices, through regulation, will most probably go up in the near future but no one can tell how high; marginal producers and the small players on the chess board are going to be eliminated or contained so this will help the 'big boys' set the game straight again.

Another conclusion is that OPEC, as an organization, seems unable to handle critical situations such as this one. It looks more like a 'nice to have' agency but not the game changing organization that would control the crisis and mitigate the global risks.

Additionally, we just witnessed that the big players are not willing to step down in their price shakedowns and will not hesitate to go toe to toe even if that hurts themselves and the business in total. The smaller players are even more ruthless, as they smelled the blood in this case and moved in immediately to cover the demand with even lower prices, only to make the situation worst.

Finally, it starts to become evident that oil seems to be turning into a hard to handle resource. Not just for its technical requirements but also because the world is slowly detaching itself from it. We have written in the recent past that evolutionary forces might be slowly pushing oil out of the big picture; that seems to be in contrast with the immense cloud of interwoven global interests that are directly linked to the oil business.

It only makes (some) sense for these global oil players to protect their interests through any means available (regulation, lobbying etc.), maintaining a very delicate balance within the ecosystem. In this case, the balance has been distorted both due to mistakes of the players but also primarily due to COVID19 – a very strong and unforeseen factor. It is only natural that when this essential balance is lost, chaos will break loose and the gentlemen's agreements will go out of the window; hence "there will be blood". ■

Launch of the European Alliance for a Green Recovery

At the initiative of Pascal Canfin, Chair of the Environment Committee at the European Parliament, 180 political decision-makers, business leaders, trade unions, NGOs, and think tanks have come together to form a European alliance for a Green Recovery.

In the face of the coronavirus crisis, the biggest challenge Europe has faced in peacetime, with devastating consequences and a shock to the economy tougher than the 2008 crisis, Ministers from 11 countries, 79 cross-party MEPs from 17 Member States, 37 CEOs, 28 business associations representing 10 different sectors, trade union confederation representing members from 90 national trade union organisations and 10 trade union federations, 7 NGOs and 6 think tanks, have committed to working together to create, support and implement solutions to prepare our economies for the world of tomorrow.

It comes days after EU environment ministers launched an appeal for the European Green Deal to be placed at the heart of the EU's post-pandemic recovery plan.

This first pan-European call for mobilisation on post-crisis green investment packages will work to build the recovery and transformation plans which enshrine the fight against climate change and biodiversity as a key pillar of the economic strategy. Sharing the belief that the economic recovery will only come with massive investments to protect and create jobs and to support all companies, regions and sectors that have suffered from the economy coming to a sudden halt, the alliance commits to contribute to the post-crisis investment decisions needed to reboot and reboost our economy.

Covid-19 will not make climate change and nature degradation go away. The fight against this crisis will not be won without a solid economic response. The alliance commits to participate in the fight and the victory of these two battles simultaneously, and by doing so, being stronger together.

"There will be a before and after COVID-19 crisis. We are choosing to accelerate the ecological transition when the time comes to reinvest in the economy," Pascal Canfin said. "The COVID-19 has not made the climate crisis go away. The public money that states and Europe will spend to reinvest in the economy must be consistent with the Green Deal," he added.

"After the financial crisis in 2009, we had not yet demonstrated the profitability of housing renovation, zero-emission cars were only prototypes, wind turbines cost 3 times more than today, and solar 7 times," the signatories affirmed in their statement. Signatories also said they are "committed to offering the necessary investment solutions, aligned with climate commitments, to revive the economy after the crisis."

The parties are calling for a 'worldwide alliance' of politicians, decision-makers, business leaders, trade unions, and civil society groups to support a green transition after the pandemic.

The statement was signed by the environment ministers of Austria, Denmark, Finland, Italy, Latvia, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Germany, France and Greece - while Flemish nationalists in Belgium blocked the action at national level.

According to the director of the European branch of NGO World Wildlife Fund (WWF), Ester Asin, "the broad support for this statement clearly shows that Europe's response to the Covid-19 crisis must put us firmly on the path to a truly sustainable, climate-neutral and just economy".

Despite the resilience of some countries, such as Poland and the Czech Republic, half of member states have signed a separate open letter urging the EU to ensure its commitment to the Green Deal.

In their letter, ministers urged to "withstand the temptations of short-term solutions in response to the present crisis that risk locking the EU in a fossil fuel economy for decades to come".

According to the European Commission, "green investments will be a key driver of the recovery, not an obstacle to it".

While European nations still need to join forces to deal with the pandemic, the future recovery will offer the region a chance to develop a new model of prosperity, believes German Environment Minister Svenja Schulze, who is among the signatories of the call. "This new model must be geared to the climate goals, provide the necessary tailwind for a climate-neutral economy throughout Europe and help us to master future challenges together," she underlined.

Call to EU leaders: an EU Green Recovery to restart Europe

As the fight against COVID-19 has brought the EU economy close to a standstill, together with 31 signatories from Europe's electricity, heating, cooling, building and transport sectors, WindEurope calls for the European institutions to stand behind the European Green Deal to restart Europe. The EU institutions should fully integrate the proposed national and European economic packages with the European Green deal and help accelerate the necessary investments, notably to drive a renewable-based electrification.

The signatories of the letter represent millions of employees from Europe's renewable energy and energy efficiency value chains across the electricity, heating, cooling, building and transport sectors as well as supportive associations.

They call on the EU Commission to:

- Fully integrate the proposed economic stimulus packages and the European Green Deal (as proposed by the European Council). Investments in a zero-carbon infrastructure and innovative solutions are the best and most cost-effective route to economic recovery on a national and supranational level while at the same time preparing the grounds for a secure and sustainable energy system.
- Bring forward the necessary investments for rapid recovery.
- Use the stimulus packages to accelerate investments in energy efficiency, renewable heating and cooling, electricity, mobility, zero-carbon buildings, and industrial processes.
- Ensure ongoing supply of clean energy and ongoing investments in energy transition can continue in the current pandemic as essential services.

"COVID-19 has forced the world into an economic pause. Now, you have the power to use the Green Deal to restart Europe and drive its economy with a focus on energy efficiency and renewable energy across all sectors. Such investments are both labour-rich and shovel-ready. The renewable energy, flexibility and energy efficiency solutions industries are now cost-competitive and can sustain local jobs across Europe. With a strong European manufacturing base, Europe can show world-wide industrial leadership. We trust you to take the right decisions. Our joint industries and associations are committed to making a green economic recovery a collective success," the signatories of the letter concluded.

Cepi, the Confederation of European paper industries and its members across Europe, strongly support the initiative of Pascal Canfin, Chair of the Environment Committee at the European Parliament, to launch a European Alliance for a Green Recovery.

Cepi joins 180 political decision-makers, business leaders, trade unions, NGOs, and think tanks who have come together to create the alliance.

"This first pan-European call for mobilisation on post-crisis green investment packages will work to build the recovery and transformation plans which enshrine the fight against climate change and biodiversity as a key pillar of the economic strategy. Sharing the belief that the economic recovery will only come with massive investments to protect and create jobs and to support all companies, regions and sectors that have suffered from the economy coming to a sudden halt, the alliance commits to contribute to the post-crisis investment decisions needed to reboot and re-boost our economy. Covid-19 will not make climate change and nature degradation go away.

The fight against this crisis will not be won without a solid economic response. The alliance commits to participate in the fight and the victory of these two battles simultaneously, and by doing so, being stronger together," Cepi showed in a press release. ■

Green Hydrogen for a European Green Deal

A 2X40 GW INITIATIVE

2x40 GW Green Hydrogen Initiative paper, an initiative of the European industry association Hydrogen Europe, promotes a massive increase of electrolyser production within the EU in order to support green hydrogen production. The 2x40 GW Green Hydrogen Initiative can be regarded as a great asset for the implementation of the European Green Deal. By realising a 2x40 GW electrolyser capacity, producing green hydrogen, about 82 million-ton CO2 emissions per year could be avoided in the EU, the report shows. The paper presents concrete next steps to underpin a concrete industrial roll-out.

Hydrogen to play a pivotal role in a sustainable energy system

The European Union together with North Africa, Ukraine and other neighbouring countries have a unique opportunity to realise a green hydrogen system. Europe including Ukraine has good renewable energy resources, while North Africa has outstanding and abundant resources. Europe can re-use its gas infrastructure with interconnections to North-Africa and other countries to transport and store hydrogen.

And Europe has a globally leading industry for clean hydrogen production, especially in electrolyser manufacturing.

"If the European Union, in close cooperation with its neighbouring countries, wants to build on these unique assets and create a world leading industry for renewable hydrogen production, the time to act is now," the association asserts.

Dedicated and integrated multi GW green hydrogen production plants, will thereby unlock the vast renewable energy potential.

The European hydrogen industry are committed to maintaining a strong and world-leading electrolyser industry and market and to producing renewable hydrogen at equal and eventually lower cost than low-carbon (blue) hydrogen. A prerequisite is that a 2x40 GW electrolyser market in the European Union and its neighbouring countries (e.g. North Africa and Ukraine) will develop as soon as possible.

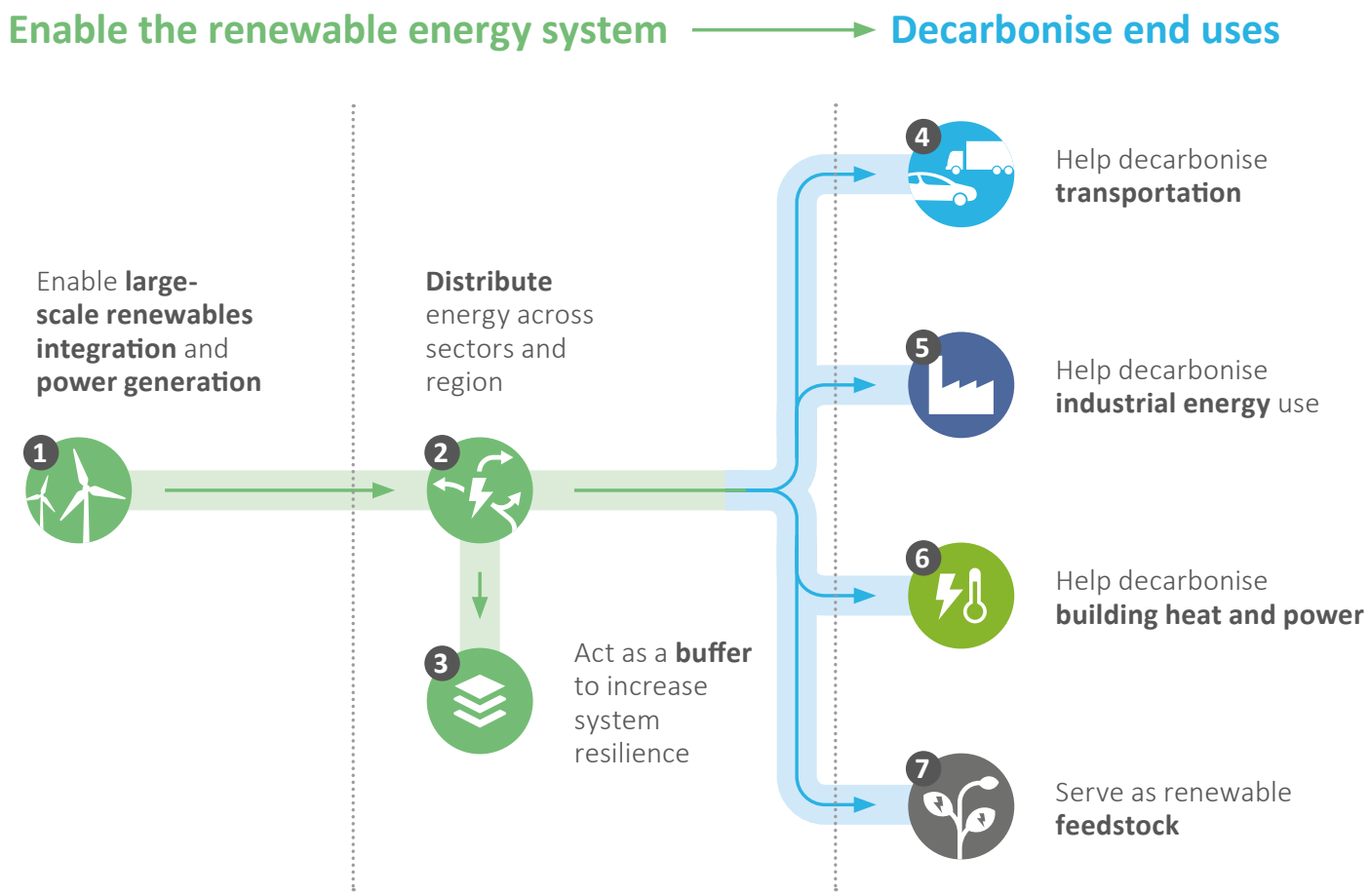
A roadmap for 40 GW electrolyser capacity in the EU by 2030 shows a 6 GW captive market (hydrogen production at the demand location) and 34 GW hydrogen market (hydrogen production near the resource). A roadmap for 40 GW electrolyser capacity in North Africa and Ukraine by 2030 includes 7.5 GW hydrogen production for the domestic market and a 32.5 GW hydrogen production capacity for export.

If a 2x40 GW electrolyser market in 2030 is realised alongside the required additional renewable energy capacity, renewable hydrogen will become cost competitive with fossil (grey) hydrogen. GW-scale electrolysers at wind and solar hydrogen production sites will produce renewable hydrogen cost competitively with low-carbon hydrogen production (1.5-2.0 EUR/kg) in 2025 and with grey hydrogen (1.0-1.5 EUR/kg) in 2030.

By realizing 2x40 GW electrolyser capacity, producing green hydrogen, about 82 million -on CO2 emissions per year could be avoided in the EU. The total investments in electrolyser capacity will be 25-30 billion Euro, creating 140,000-170,000 jobs in manufacturing and maintenance of 2x40 GW electrolysers.

The industry needs the European Union and its member states to design, create and facilitate a hydrogen market, infrastructure and economy.

Crucial is the design and realisation of new, unique and long-lasting mutual co-operation mechanisms



on political, societal and economic levels between the EU and North Africa, Ukraine and other neighbouring countries.

The unique opportunity for the EU and its neighbouring countries to develop a green hydrogen economy will contribute to economic growth, the creation of jobs and a sustainable, affordable and fair energy system. Building on this position, Europe and its neighbours can become world market leaders for green hydrogen production technologies.

Big challenges

Climate change is a serious problem, urging us to significantly reduce greenhouse gas emissions across all sectors. This implies radical changes towards a sustainable and circular economy that is at the same time constructive and competitive. Hydrogen can play a crucial role in achieving both a clean and prosperous economy.

Hydrogen and electricity are both carbon free energy carriers that can be produced from fossil energy resources as well as renewable energy resources. Both carriers will be necessary in a sustainable energy system and are complementary to each other.

Hydrogen can balance energy production and use in location and time, and decarbonise end uses (HydrogenCouncil, Hydrogen scaling up; a sustainable pathway to the global energy transition, 2017)

Hydrogen allows for cost-efficient bulk transport of energy over long distances together with cost-effective storage of large energy volumes. Hydrogen can therefore decouple energy production and usage in location and time. Additionally, hydrogen can be used to decarbonise all energy use:

- In industry, both for feedstock and high temperature heat;
- In mobility, for road, rail, water and air transport;
- In buildings, for heating and cooling;
- In electricity, to balance electricity demand and supply.

Renewable electricity continues to drop in price and will soon enable the production of hydrogen at costs lower than oil or natural gas at dedicated hydrogen production plants

(combining wind and/or PV with electrolysers at one site).

Hydrogen and electricity grid infrastructures together with large scale seasonal hydrogen storage and small-scale day-night electricity storage, in mutual co-existence, will be essential to realise a sustainable, reliable, zero-emission and cost-effective energy system.

A unique opportunity to realise a green hydrogen system

Europe and the neighbouring regions have good renewable resources and the industrial capacity to quickly and cost effectively realise a green hydrogen system. Europe also requires considerable amounts of hydrogen to decarbonise the industry, transport and building sector.

Moreover, Europe has an extensive natural gas infrastructure. Converting part of the existing gas infrastructure for transport and storage of hydrogen will give Europe a unique opportunity to deliver on its commitments for renewable energy production and usage while utilising this current vast infrastructure asset. It will provide the European hydrogen industry a competitive advantage to produce sustainable and circular products and services while creating many green jobs at the same time.

Increasing demand for hydrogen in Europe

Europe is an industrialised region with major petrochemical and chemical industries that produce about 6 to 15% of the total global refining and chemicals output. Most of the hydrogen currently produced is used as a feedstock to make other materials. European hydrogen demand was about 325 TWh hydrogen in 2015, mainly used in refineries and in the chemical and agribusiness industry for the production of methanol and ammonia. Most of the hydrogen used in these industries is currently produced from natural gas through steam methane reforming.

If the CO2 is released to the air the hydrogen is referred to as 'grey hydrogen' (FCH JU, Hydrogen Roadmap Europe, a sustainable pathway for the European energy transition, 2019).

It is expected that the current demand for hydrogen as feedstock will grow. But also new opportunities for hydrogen use as feedstock are emerging. In steel production, hydrogen can replace coal to reduce iron ore. And hydrogen together with CO2 can be used to produce synthetic fuels, such as methanol and kerosene.

Apart from the use of hydrogen as feedstock, hydrogen can also be used in industry to produce high temperature heat and steam, replacing natural gas and coal. High temperature heat can be produced from hydrogen by retrofitting existing gas furnaces and boilers.

Hydrogen-powered vehicles are now available in the car, taxi, van, bus, truck, forklifts and tractor markets. Their market shares will increase rapidly in the next decades. In other transportation markets, such as rail, shipping and aviation (including drones), hydrogen will gain market share too. Fuel cells will become the dominant technology in the future, whereby hydrogen will be chemically converted into electricity that drives an electric motor.

In buildings, hydrogen can be used for heating and power. Hydrogen can replace natural gas or oil in boilers to produce heat. Hydrogen boilers and hydrogen-ready boilers (boilers that now run on natural gas and in the future on hydrogen) have entered the market in 2019.

Next to these boilers, also small fuel cell micro CHP (Combined Heat and Power) installations entered the market. These micro CHP fuel cells provide both electricity and heat to buildings.

European companies such as BDR Thermea, Viessmann, Bosch and others have brought these new hydrogen appliances already to the market.

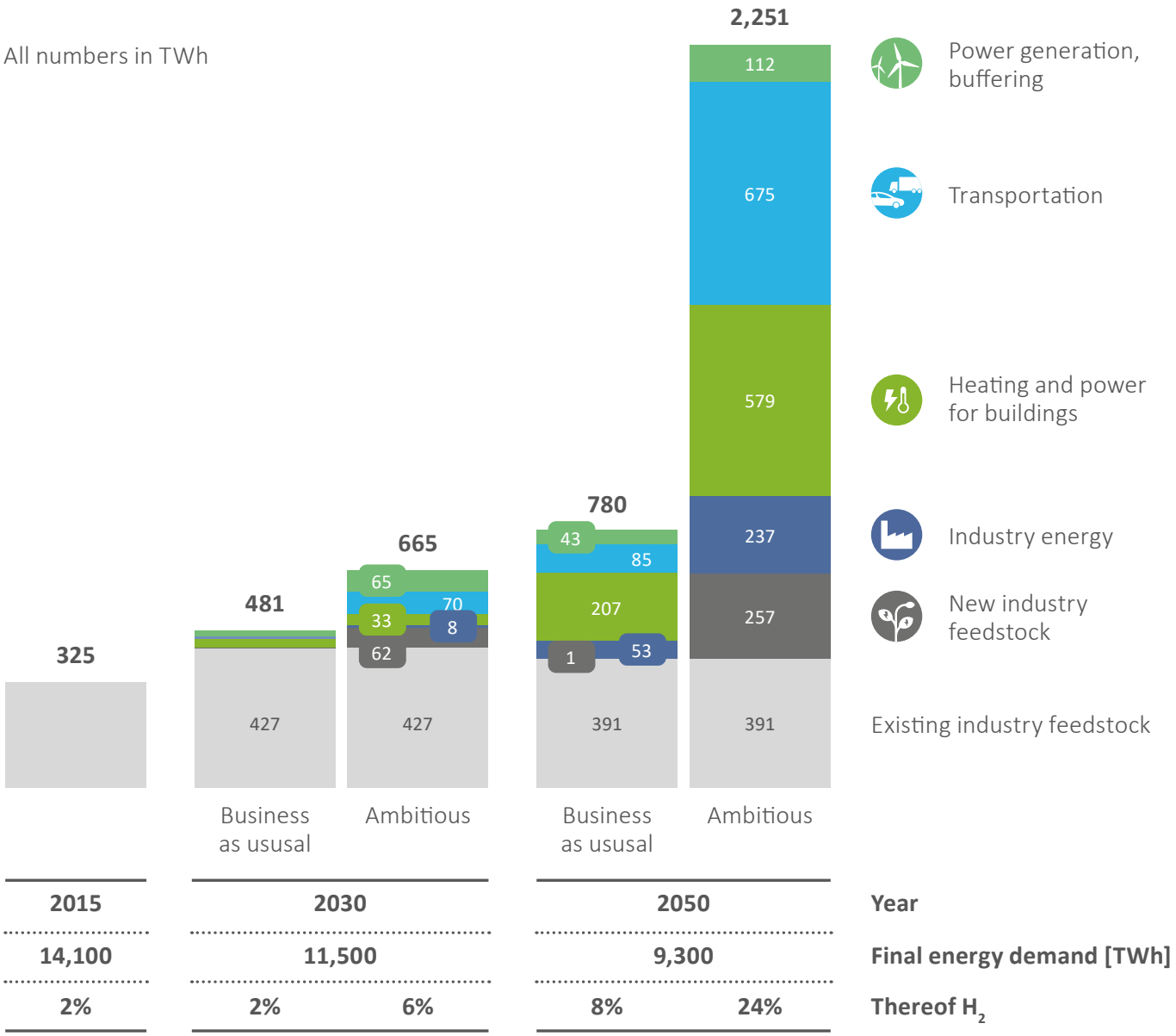
Last but not least, hydrogen is highly needed to balance the electricity system. Hydrogen can be stored and transported cheaply and easily and is therefore very suited to match electricity supply and demand in time and place. Hydrogen can replace natural gas in existing power plants after minor modification, in both the gas turbines and boilers. In future, fuel cells can be used to balance the power system, both centralized as well as decentralized peak power or CHP plants.

The FCH JU (Fuel Cell Hydrogen Joint Undertaking) released the report 'Hydrogen Roadmap Europe, a Sustainable Pathway for the European Energy Transition' in January 2019 (FCH JU, 2019). This report makes the case that achieving the energy transition in the EU will require hydrogen at large scale. Without hydrogen, the EU would miss its decarbonization objective.

An ambitious roadmap for the use of hydrogen in Europe in the different sectors is considered to be necessary to keep global warming "well below 2 degrees Celsius above preindustrial levels". Already in 2030, the use of hydrogen will be more than doubled to 665 TWh, compared to 2015 use.

Good renewable energy resources far from the demand

In Europe there are good solar and wind energy resources, especially in the North and



South of Europe. In the neighbouring regions of North-Africa and the Middle East there are even better solar and also good wind resources.

However, the areas with good resources are usually far away from the energy demand at industrial sites and cities in Europe. Conversion to hydrogen at the solar and wind farm offers the opportunity to transport the solar and wind electricity over large distances relatively cheap and without losses.

In Europe, good renewable energy resources are geographically distributed.

An ambitious roadmap for the deployment of hydrogen in the European Union as outlined in 'Hydrogen roadmap Europe, a Sustainable Pathway for the European Energy Transition(FCH JU, 2019)

However, they are not evenly distributed among EU Member States and, therefore, large-scale, pan-European energy transport, trade and storage are necessary.

Large scale on- and offshore wind can be produced at competitive and subsidy-free prices in several parts of Europe. Large-scale offshore wind has great potential in the North Sea, Irish Sea, Baltic Sea and parts of the Mediterranean Sea.

And large-scale onshore wind potential can be found in Greece, the UK, Ireland and in many other coastal areas in Europe such as Portugal, Poland and Germany. Large-scale solar PV can nowadays also be built

competitively and subsidy-free, most notably in Southern Europe, for instance in Spain, Portugal, Italy and Greece.

Furthermore, low cost hydropower electricity can be produced in Iceland, Norway, Sweden, Austria and Switzerland, amongst others and geothermal electricity in Iceland, Italy, Poland and Hungary. Although, the potential expansion of the hydropower and geothermal capacity is limited, the future introduction of marine/tidal energy converters could furthermore augment the production of renewable electricity and hydrogen in the UK, Portugal, Norway and Iceland.

Ukraine has good wind resources together with a large potential for biomass. These resources could be both used for green hydrogen production together with green CO2 production from biomass.

Renewable energy transport and storage via hydrogen

The good renewable energy resources in Europe, North Africa and Middle East are located far from the European energy demand at industrial sites and cities. At these good renewable energy resources sites abundant, cheap but intermittent solar and wind electricity can be produced. The challenge now is how this energy can be transported and stored at low costs and losses. Conversion of solar and wind electricity at the production site into hydrogen offers a solution for this challenge, because transport and storage cost for hydrogen are significantly cheaper than for electricity.

Hydrogen transport cost by pipeline are about 10-20 times cheaper than electricity transport cost by a cable. A fundamental difference between electricity transport by cables and hydrogen transport by pipelines is the capacity of the infrastructure. An electricity transport cable has a capacity between 1-2 GW, while a hydrogen pipeline can have a capacity between 15 and 30 GW. Besides, transporting electricity via cables incurs losses, while hydrogen transport by pipelines does not have losses.

Next to the transport cost, hydrogen storage cost can be cheap. Hydrogen storage cost in salt caverns are at least a factor of 100 cheaper than electricity storage cost in batteries.

Therefore, at good solar and wind resources areas multi GW solar and wind farms can be realised, producing electricity that is directly converted in hydrogen by water electrolysis.

Instead of solar and wind power plants, these are solar and wind hydrogen plants. Producing cheap hydrogen at multi GW solar and wind farms, large scale hydrogen transport by pipelines and hydrogen storage in salt caverns can offer lower overall energy system cost, a reliable energy system and above all a clean, decarbonised energy system.

Europe to use its gas infrastructure to transport and store hydrogen

A challenge for the fast expansion of renewable electricity capacity in Europe is the limited electricity grid capacity. In 2018, close to EUR 1 billion of renewable on- and offshore wind electricity in Germany was curtailed because of capacity constraints in the electricity grid.

Part of the solution to integrating large amounts of renewable energy into the energy system without necessarily requiring massive electricity grid upgrades is the conversion to hydrogen.

A well-developed gas infrastructure is in place, connected to the gas production regions in Europe (North Sea, Norway and the Netherlands) and outside Europe (Russia, Algeria, Libya). The energy transmission capacity in the gas infrastructure is at least a factor 10 larger than the capacity of the electricity grid.

Re-using the natural gas pipelines to transport hydrogen

The existing gas infrastructure can be relatively easily and quickly converted to accommodate hydrogen at modest cost. In addition, building 'new' gas infrastructure is 10-20 times cheaper than building the same energy transport capacity with a 'new' electricity infrastructure.

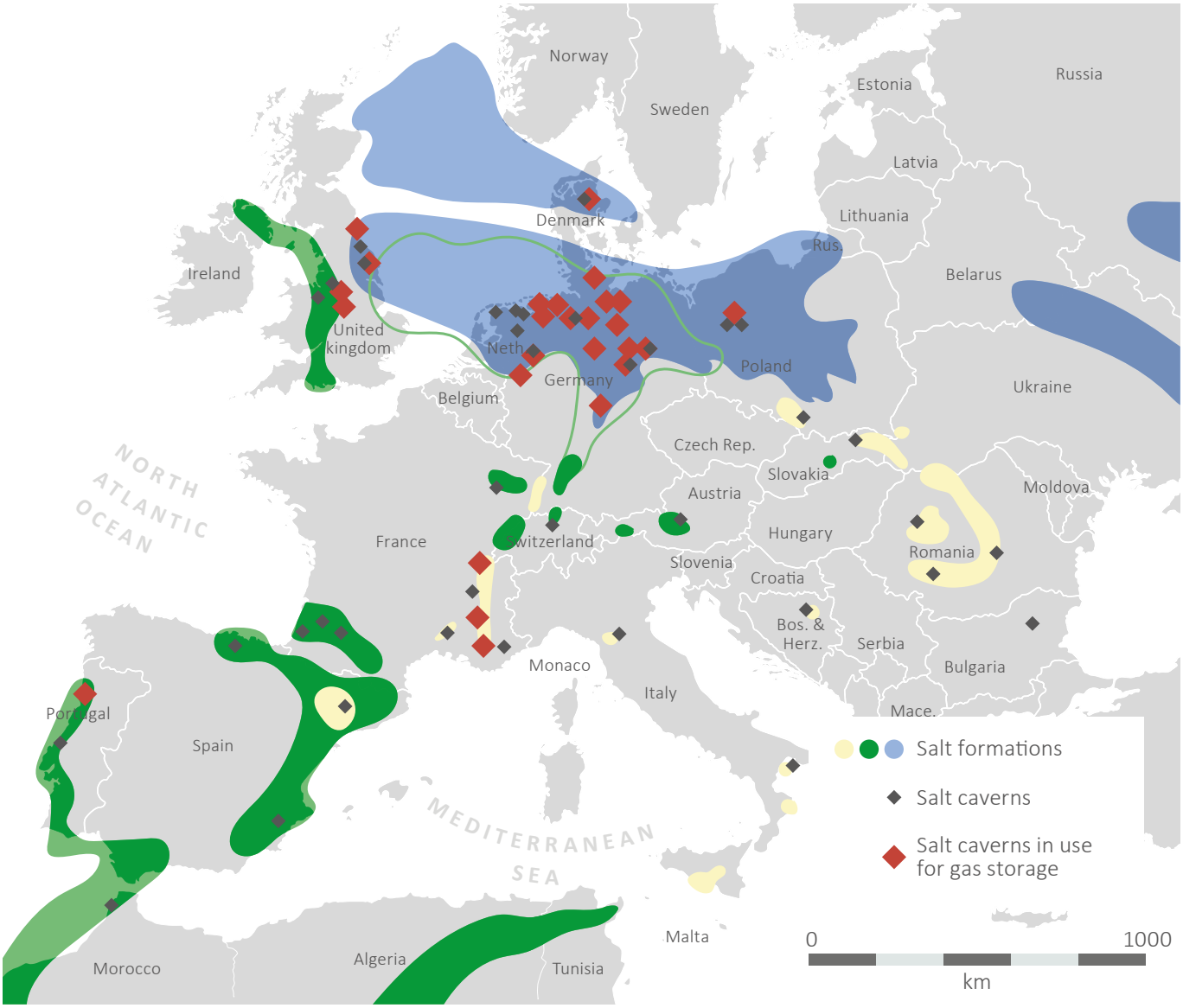
However, to unlock the wind resources in the Baltic Sea and the wind and solar resources in Greece, new hydrogen pipeline infrastructure is required.

Gasunie, a European gas infrastructure company, has started to realise a hydrogen backbone pipeline infrastructure in the Netherlands, by converting natural gas pipelines. This hydrogen backbone connects hydrogen production sites, among others from offshore wind at the North Sea, to hydrogen storage in salt caverns and to the demand in industrial clusters.

Gasunie has already converted a 12 km natural gas pipeline into a hydrogen pipeline that has been operational since November 2018.

Also, in Germany, FNB Gas, the association of the large national gas transport companies in Germany, has developed a plan for a 5.900 km hydrogen transmission grid, partly by converting existing natural gas pipelines, to connect future hydrogen production centres in northern Germany, with large scale hydrogen storage in salt caverns and to the large customers in the west and south.

Besides green hydrogen, also blue hydrogen (hydrogen from fossil fuels, whereby the CO2 is captured and stored) could be fed into this backbone hydrogen infrastructure, whereby blue hydrogen could create the large volumes of hydrogen, necessary to respond to the large demand centres and initiate the fast conversion of the natural gas infrastructure into a hydrogen infrastructure.



Salt formations with salt caverns throughout Europe. The red diamonds are salt caverns in use for natural gas storage (Bünger, Michalski, Crotogino, & Kruck, 2016)

A world class electrolyser industry for hydrogen production

Hydrogen is an energy carrier, like electricity and it must be produced from an energy source.

It can be (electro)chemically processed from fossil energy sources, such as gas, oil, coal or fossil electricity, or from renewable resources, such as green electricity, biogas, biomass or directly from sunlight. Hydrogen produced from biogas, biomass and via electrolysis from water with renewable electricity is called renewable or green hydrogen. In the electrolyser technology, Europe has a strong market position and is globally leading.

Although there is little dedicated hydrogen production via water electrolysis today, electrolysers are not a new technology. Today, worldwide about 20-25 GW of electrolyser capacity is operated mostly for chlorine production. By electrolysis of salt dissolved in water, chlorine is produced from the salt, but at the same time hydrogen is produced from water. Hydrogen is a by-product, that is partly used to produce heat or steam. Globally, a large part of these chlorine electrolysers has been produced by European companies and, therefore, the electrolyser industry and supply chain in Europe have a strong world market position today.

Especially the European industry delivers advanced high-quality electrolysers which meet high safety standards. This is a good starting position to build a leading water electrolyser industry in Europe. ■

World's First Offshore Green Hydrogen Project

Neptune Energy announced leading energy infrastructure company, Gasunie, will join as a new partner on the PosHYdon pilot, the world's first offshore green hydrogen project.

PosHYdon integrates three energy systems in the Dutch North Sea: offshore wind, offshore gas and offshore hydrogen and will involve the installation of hydrogen-producing plant on the Neptune-operated Q13a platform.

Gasunie, which manages and maintains infrastructure for large-scale transport and storage of gases in the Netherlands and northern Germany, is the latest to join the PosHYdon consortium following NOGAT B.V. and Noordgastransport B.V., both owners of large gas transport pipelines in the North Sea.

"We are very pleased to welcome Gasunie as a partner. Gasunie is already working hard to accelerate the energy transition, including several hydrogen pilots on land, and have the necessary knowledge and experience with electrolysis in-house," Lex de Groot, Managing Director of Neptune Energy in the Netherlands, said.

Now these two worlds onshore and offshore are literally connected in terms of infrastructure. The pipelines and infrastructure at sea of NOGAT and Noordgastransport are already suitable for hydrogen and that is good news as offshore production will continue to be crucial to meet Dutch energy demand.

"The Netherlands is in a special position as, in addition to an extensive gas infrastructure network, we can harvest large amounts of wind energy in the North Sea, quantities that are also important internationally. The wind energy can be used to generate hydrogen, then transport onshore along with natural gas via the existing large pipelines of NOGAT and Noordgastransport for customers in industry, the transport sector and for Dutch homes. PosHYdon is key to accelerating this," Lex de Groot also mentioned.

"The Netherlands is in a strong position to lead the transition to a hydrogen economy. We have the North Sea for the production of wind and gas, the ports as logistics hubs, the industrial clusters that want to switch to green molecules and excellent infrastructure for transport and storage," Han Fennema, CEO of N.V. Nederlandse Gasunie, added. "This comes together nicely in the Netherlands. If we want to achieve our climate ambitions, we must have a large-scale hydrogen infrastructure in good time. This pilot project can be an important step in the right direction," Han Fennema said.

The PosHYdon pilot is an initiative of Nexstep, the Dutch association for decommissioning and reuse, and TNO, the Netherlands organisation for applied scientific research, in close collaboration with the industry.

Electricity generated by offshore wind turbines will be used to power the hydrogen plant on the Q13a platform, converting seawater into

The Q13a is the first fully electrified platform in the Dutch North Sea, located approximately 13 kilometres off the coast of Scheveningen. | © Photo: Nextstep

demineralized water, then into hydrogen via electrolysis. The aim of the pilot is to gain experience of integrating working energy systems at sea and the production of hydrogen in an offshore environment.

The Q13a is the first fully electrified platform in the Dutch North Sea, located approximately 13 kilometres off the coast of Scheveningen (The Hague).

Partners in the Q13a-A platform are: EBN B.V. (40%) and TAQA Offshore B.V. (10%).

Background

In July, 2019 Neptune Energy announced its selection for a pilot project to create the first offshore green hydrogen plant in the Dutch sector of the North Sea.

The pilot was commissioned by Nexstep, the Dutch Association for Decommissioning and Re-Use, and TNO, the Netherlands Organisation for applied scientific research, in collaboration with the industry.

The Q13a-A platform is well-suited for the project; as the first fully electrified offshore oil platform in the Dutch North Sea, it saves approximately 16.5 kilotonnes of CO2 per year. This is the equivalent of 115,500 flights from Amsterdam to Paris.

The platform will convert seawater to demineralised water and use green electricity to produce hydrogen. Due to begin production later in 2021, the pilot will provide the participants with the opportunity to develop their experience of producing hydrogen in an offshore environment.

The pilot is a spin-off of the North Sea Energy program, a public-private research consortium of more than 30 parties from the energy value chain. The aim of the program is to develop relevant knowledge to progress potential opportunities and make the right choices for the future in such way that they lead to a new, flexible and integrated energy system after 2030. With smart connections between current and future forms of energy production in the North Sea, integrated energy systems can help society make time, cost and space savings and reduce CO2 emissions. The North Sea Energy program aims to make best use the synergy advantages arising from integration of existing and new energy systems. ■

VARD Secures NOK 500mln New Contract

THE HULL TO BE BUILT AT VARD BRAILA IN ROMANIA

VARD secured a new contract for the design and construction of one stern trawler for P/F Akraberg, a subsidiary of Framherji in the Faroe Islands. The contract value is in excess of NOK 500 million.

The new vessel will be the first new building of VARD's own design sold to the Faroe Islands. VARD's shipyards in Norway have in the past built many fishing vessels to Faroese ship owners, which several of the vessels were highly innovative at the time and a leap forward for the local fishing industry. The newly developed trawler of VARD 8 03 design is based on a range of highly advanced and well-proven fishing vessels from VARD, designed with the latest demands for fish health management, efficiency and environmentally-friendly operations. The vessel has been developed in close cooperation with Framherji and will have the latest green technology on board.

"The new contract is a bright spot for VARD, our employees and suppliers, and shows that it is possible to look forward despite challenging times. We are all looking forward to build a new generation fishing vessel to the Faroes Islands again. We are proud of the long history our Norwegian yards and the fishermen at the Faroe Islands have built in the past, and hope this project will be the start of a new era together," Erik Haakonsholm, General Manager of Offshore and Specialized vessels of VARD, says.

With a high focus on the quality of catch, crew safety and sustainable operations, the vessel will have the most efficient technology to bring the catch ashore while minimizing its environmental footprint.

"We are really looking forward to build our new flagship at VARD, and to take delivery from a Norwegian yard with a broad experience within fisheries and shipbuilding of advanced trawlers. It has been a pleasure for us to be involved in the whole design phase, and we have integrated our ideas and requirements in the project. Over generations, it has been strong relationships between The Faroe Islands and Norway, and we are excited to be a part of that story in the future," Annfinnur Olsen, CEO in Framherji, commented.

Full utilization of the biomass

The new vessel of VARD 8 03 design, is a further development of VARD 8 02, which is in operations for several fishing companies in Norway. The new trawler will be equipped with the latest technology, equipment and solutions for onboard production. To secure high quality of the fish, all the catch will be processed onboard, packed and stored in freezers or refrigerators and the fish waste is stored in specialized ensilage tanks, before unloading at the harbor.

The trawler will be equipped with VARD's innovative catch handling solutions, with a live fish tank to keep the fish healthy until processing, an advanced fish processing factory, high cargo capacity for refrigerated and frozen fish, as well as ensilage tanks to ensure full utilization of the biomass from each catch.

The vessel will be arranged for triple trawling and have a length of 84 meters and a beam of 16.7 meters. The cargo capacity for frozen products will be approximately 2000 m3 divided over two decks, in addition to ensilage capacity of approximately 550 m3. Total fuel oil capacity is approximately 950 m3. Accommodation is arranged for 25 people in single cabins on board.

SeaQ® flexible solutions on board

For optimal efficiency, the trawler will be equipped with a hybrid propulsion system combining both diesel-mechanical and diesel-electric propulsion, including batteries. Further, a fully integrated SeaQ Energy Storage System and SeaQ Power Management System will be delivered by Vard Electro, for optimal power and fuel economy in all operations. The frequency drives for the electrical winches are driven directly from the SeaQ Micro Grid that will increase the efficiency and enable to store regenerated power from winches to the SeaQ Energy Storage System, resulting in environmentally friendly operations.

On the bridge, the vessel will be equipped with VARD's flexible SeaQ Bridge, which enables each captain to choose a preferential setup on all screens on the bridge. It is easy and intuitive to use.

Delivery in 2022

The stern trawler of VARD 8 03 design is developed by Vard Design in Ålesund, Norway. Delivery of the vessel is scheduled from Vard Brattvaag in Norway in Q2 2022. The hull will be built at Vard Braila in Romania.

VARD 8-SERIES

With innovative solutions VARD aims to take environmental sustainability to a higher level in fisheries, focusing on energy saving propulsion and machinery, power and management systems, together with high standard interior, ensuring good working environment and comfort for life on board.

About P/F Akraberg and Framherji

P/F Akraberg is a subsidiary of Framherji, one of the leading and most innovative fishing companies in the Faroe Islands. The Fuglafjørður-based company is together with its subsidiaries owner and operator of 6 fishing vessels with catch rights in Faroese and International waters, focusing on ground fish and pelagic species. ■

Ion Lungu, AFEER President

Adequate and Optimal Solutions After Emerging from the Crisis

by **Lavinia Iancu**

Ion Lungu has been President of Association of Electricity Suppliers in Romania (AFEER) since 2006. He joined CEZ team in early 2007, after an experience of more than 30 years in the energy sector where he held various positions, including that of President of the National Energy Regulatory Authority (ANRE). He initially held the position of commercial and supply manager at Electrica, currently being CEO at CEZ Trade, a company within CEZ Romania, specializing in energy trading.

Ion Lungu has also had a dynamic academic activity, at the Polytechnic University of Bucharest and 'Valahia' University of Targoviste, during 1979 - 2006, and currently at the Academy of Economic Studies (ASE). He is member of numerous notorious national and international organizations, including: AFEER, Romanian Energy Policy Association (APER); Energy Regulators Regional Association (ERRA) (2000-2004). He is author and co-author of five technical publications and 125 scientific papers in the field of high voltage technique, electricity use and regulations in the energy sector. Ion Lungu, PhD, was decorated with the 'National Order of Merit' as Knight.

Discussing about the influence of the decisive factors on the evolution of the energy sector in the current period, AFEER President has mentioned: the major legislative changes generated by the Regulation no. 943 and transposition of the Directive (EU) no. 944/2019, which bring substantial changes in the energy market; the elections that will take place this year, with impact on political decisions and, last but not least, the crisis overlapping these issues.

Thus, specific measures are required in order to adapt to the crisis period. Legislative changes have been made, generated by the need for the economy to work, as well as some aspects relating to the impact on the positioning of decision-makers in the future elections.

GEO 29/20 provided the SMEs with the possibility to postpone the payment for utilities during the emergency period, without having any provision on a potential support for utility suppliers, which ensure the relationship with the end-customers and collect the money. AFEER opinion

is that if there is a disruption in suppliers' cash, it will also reflect on the other operators and there could be malfunctions in the transmission, distribution or production of electricity. The Association has had a reaction and requested that support be granted to suppliers to ensure a cash flow, amid this GEO, in conjunction with the reduction of energy consumption and consequently of revenues.

Regarding energy consumption, during March 15 - April 10, it fell by approximately 7%. And for the end of April AFEER estimates a decline of energy consumption by approximately 10%. "We hope that at the end of the state of emergency period the decrease in consumption, at country level, will be around 10-12%," the association says.

"A surprise for us was also represented by granting the right to postpone utility payment for three months for almost all household and industrial consumers (legislative initiative). AFEER has had a rapid response. We understand and act in this regard so that those who really need it be helped. It is absolutely necessary to define the vulnerable consumer, which would be the beneficiary of a support. Unfortunately, we found that the last proposal adopted in the Parliament was not a reasonable one, especially regarding the possibility for suppliers to access advantageous loans for ensuring the cash flow. I can say that from our discussions, carried out with bank representatives, they were not willing to finance the energy trading and supply activity, considered activities with a relatively high risk. Guaranteeing payments by the state would be the ideal element. Financing from state treasury is illusory!" said Ion Lungu.

Regarding the opportunities after the crisis, AFEER has learned in this period the importance and necessity of digitization and computerization of the energy sector. The suppliers understood and aligned themselves with this process. After the crisis, many of the business models will be changed and accommodated, operations will be digitized, but work from home cannot replace entirely the office work, the association believes.

As punctual recommendations, AFEER considers the recovery of the entire economy at the level before the crisis and supporting investments in the energy sector. The decrease in energy consumption and the reduction of energy prices decrease the appetite for investments in the energy sector. Investments in the production segment are recovered in the long run; obviously there will be reluctance. A fundamental support from the Government is needed, so that we don't face a decrease in investments, with a devastating impact in energy and in the entire economy. The Association points out that adequate and optimal solutions are needed after emerging from the crisis.

Regarding the long-term bilateral contracts, AFEER has been a constant supporter thereof.

"We see that ANRE shows openness towards this type of contracts, defining them as contracts exceeding the period of one year. We consider that long-term means that it is not a short term, i.e. without DAM and ID," Ion Lungu points out.

"Once again, I emphasize that the deferral of payment of energy bills for very large categories of consumers, without real possibilities of loans and guarantee of payment to suppliers, attracts a chain of non-payments throughout the energy system: production, transmission and distribution, operators who, in their turn, will not be able to pay their suppliers for raw materials, equipment, services and, as a result, will disturb a large part of the economy," concludes the president of the association. ■

How Does the Covid-19 Crisis Affect the Romanian Energy Sector

by DANIEL LAZAR

The global crisis generated by the Covid-19 pandemic has inevitably had an echo in the Romanian energy sector. Fewer investments, technical unemployment, applications for emergency certificates, decreases in fuel prices at the pump, lower resource consumption – all these have been generated by a situation that humankind has never faced before. First there was a focus on performing contracts and investments in the short term, then the burning desire to skimp cash resources of companies, protect own employees, procure the raw materials and materials for maintenance, and now to set a strategy to overcome the period in which our country has been in State of Emergency. We will see next how some companies in the national energy sector have reacted and what measures have they taken for economic recovery.

Lower gas production, but also reduced consumption

Domestic gas companies, in particular Romgaz and OMV Petrom, have reduced their production since the beginning of April, by approximately 8.5% in only two weeks, adapting on the go to the collapse of consumption, which fell on average by almost 40%. Lockdown on the economy has affected industrial consumption, very important during summer, when the residential consumption is reduced. While on April 1 and 2, according to Transgaz data, consumption in Romania was 400 GWh/day and production - approximately 272 GWh/day, consumption reached in only several days 246 GWh/day and production - 249 GWh/day. But there were also other days when consumption was even lower. On April 20, for example, 228 GWh were consumed and 249 GWh were produced and on April 17 - 231 GWh and 251 GWh respectively. Until the second week of April, the domestic companies continued to import approximately 60 GWh from Hungary, taking advantage of the advantageous import price. With the sharp decrease in consumption, imports were tempered at 35 GWh/day during the period April 18-20, and 45 GWh on April 21. Compared to the similar period of last year, when 320 GWh were consumed on average, gas consumption is by about a quarter lower and production - by approximately 10%. Additional production in the days when it was higher than consumption, as well as a volume equivalent to the imported gas, were stored. Thus, while last year, in this period of the year, a gas quantity of 4.1 TWh was stored (12.5% of the total storage capacity), currently 19.4 TWh are stored (59% of the total storage capacity). Last year, a level of 19.4 TWh stored was reached only in early August, and in the previous years - only in October. The occupation rate of storage facilities and especially the reduction of consumption as a result of lockdown on economy put a considerable pressure on the price. Currently, the price of gas with delivery in May is RON 51/MWh, by RON 17 below the price regulated under the controversial GEO 114/2018, which created the difficult situation last year.

Transgaz puts up for public debate the transmission plan until 2029

At Transgaz level an Emergency Cell was set up, among the internal measures ordered the company's management considering three major lines of

action: ensuring continuity of the gas transmission service and the safety of the NTS; minimizing the effects on health and security of employees; ensuring the security of company's objectives.

In order to ensure the continuity of the natural gas transmission service and the optimal operation of the NTS, measures have been laid down for hierarchizing the company's activities, emphasizing the basic activities that cannot be interrupted, whose operation is obligatory and requires special safety measures: the natural gas transmission and dispatching, the activity of the NTS intervention/ maintenance teams for situations that endanger the operation of the NST. In this respect, the key functions that must be continuously ensured have been established, the sensitive functions have been defined with high exposure due to the nature of the activity and measures have been taken to ensure that the respective employees can carry on their activity continuously and in a safe manner.

The company has recently posted on its own website, for public consultation, the Plan for the Development of the National Gas Transmission System for the period 2020-2029.

OMV Petrom has applied for type 1 emergency certificate

OMV Petrom Marketing, company operating the largest network of filling stations in the country, has applied for obtaining the type 1 emergency certificate, in order to interrupt the activity, but not targeting the main activity, marketing of fuels, but that of restaurant type only on the terraces of OMV filling stations, those of Petrom having no terraces. This activity has been suspended under the military ordinance 1, but the company continued to pay the specific tax for restaurants, bars and hotels, determined depending on surface and location.

Strategies for the proximity of production

The coronavirus pandemic has forced governments and companies around the world to regain immediate access to essential products such as food and medicine. The urgent need for high stocks and stronger supply chains has sparked debates among economists and political decision-makers regarding the disadvantages of globalization and whether production should be placed closer to home.

Romania is preparing to come out of lockdown, but the officials claim the economy will not be the same, their intention being to increase domestic production to ensure the security of supply with food, natural gas and medical equipment, in the idea of being prepared if new crises occur in the future.

"It is clear that we need to redesign industrial production. We will focus on the sectors that showed encouraging signs even before the crisis: energy, petrochemistry and defence," claims Minister of Economy, Energy and Business Environment Virgil Popescu.

Even if the collapse of the oil price might seem good news for consumers, this could affect the sales of the largest Romanian company, OMV Petrom. The Minister of Economy does not expect OMV Petrom to stop the Neptun Deep gas project in the Black Sea and adds that the state-owned company Romgaz is still interested in taking over a stake in this project, in conditions in which ExxonMobil wants to sell its stake of 50%. "We cannot say that if project does not start this year or the next it will not be implemented at all. This project will be completed," Virgil Popescu mentioned.

Possible takeovers of businesses

At the level of the entire continent, the decrease in asset price has sparked concerns that important companies could be targeted for takeovers. For this reason, Romania is concerned when it comes to fulfilling the plans on selling a minority stake in Hidroelectrica in September. The Minister of Economy says any decision will be influenced by market conditions. Declaring the state of emergency in Romania has already suspended mergers and acquisitions in the energy sector, in conditions in which previously the Czech utility group CEZ has shown interest in selling its domestic assets. "I don't think it's wise for any party to consider deals because prices are distorted. I'm sure CEZ will be able to resume the process. We wanted to be sure that we will not be taken by surprise," the Minister of Economy also mentioned.

Economic recession in Romania

Although Romanian officials expect a recession of almost 2% in 2020, analysts don't agree with these estimates. The recession recorded in Europe will be the worst since the fall of communism, and Romania will be one of the most affected countries, especially given that it has the largest budget deficit in the EU, analysts from Capital Economics warn. "The limited space for response is likely to mean that economic recovery will be one of the poorest in the region," they claim in a recently published report, according to which Romania will register an economic contraction of 7.5% in 2020.

Historic day: oil price reached a negative value!

April 20, 2020 was a day that will remain in

the history of financial markets as the first time when the oil price reached a negative value.

Romania is still a net oil importer. "OMV Petrom produces around 4 million barrels per year. Romania's consumption in normal years is 10-11 million barrels, so we have an oil import. We can say we are somehow lucky at this point that the Petromidia refinery is undergoing turnaround of one month and a half and a lot of oil is consumed from the domestic production. So, we have not stopped the wells to have this problem like the Americans have. Also, as it can be seen from that ordinance, we adopted on the possibility to sell on the market fuels without that biofuel addition can help in this moment, because it was very complicated to import biofuel added to gasoline and it had to remain in storage. Now we can unlock such storage," the Minister of Economy mentioned. He mentioned that the decrease in prices at the pump helps for the moment, but it is not a signal of recovery of the global and national economy. "It is a sign for the global economy that in the US oil gets to be sold at a negative price. The price of imported oil will fall, and this will lead to reductions at the pump, but fuel consumption in Romania has already fallen by around 30%. It is clear that the import demand is also lower than in normal months, but it does not mean that the price at the pump should not decrease if the oil price goes below this quotation of USD 25/bbl. (...) It is not something necessarily good for the economy that the price is falling, because it proves that there is no consumption in the market, there is no consumption in Europe, there is no consumption in the world and it means that the economy does not work," added Virgil Popescu.

The state budget, affected by the payment of royalties, taxes and excise duties

Razvan Nicolescu, consultant at Deloitte and member of NATO group of experts for energy security, said "for Romania the consequences of this situation differ from one category to the next. For consumers, especially for carriers, this collapse in prices seems to be a short-term gain, which they cannot enjoy however, due to the massive reduction in activity generated by the medical crisis. In the long term, if this situation will lead to bankruptcy and abandonment of production in the oil industry, this will not help the price prospects, that is, consumers will not benefit. For the state, this is not good news at all, because tens of thousands of people still work in the Romanian oil industry. In addition, the state budget will be affected by the payment of royalties, taxes and excise duties generated by the decrease of quotation, consumption and, eventually, production.

For the industry the situation is very worrying. In the production segment, in Romania there are small oilfields in terms of productivity, with a high number of wells and a significantly higher production cost than the international average. This type of production is the first hit by a massive price decrease over a long term. In terms of refining, we are not seriously affected yet by chance. Petromidia refinery has been closed for turnaround since mid-March. Even so, amid the massive drop in consumption, the other two major refineries (Petrobrazi and Petrotel) have already started to face operating problems. If Petromidia completes its turnaround on time and starts on May 1, the situation will be further complicated.

The state can really help the local refining industry and consumers at the same time, reducing the mandatory biofuel quotas that come from import. That is, instead of importing biofuels, we could temporarily replace the biofuel molecule with the gasoline one. This is the only way to reduce the risk of stopping the activity in refineries and people being sent into technical unemployment, refineries which are currently working near the minimum operating limit (about two thirds of the capacity). Consumers would also benefit, because they would no longer pay the imported biofuels, which do not bring certain benefits from the perspective of environmental protection and are more expensive than the conventional fuels produced in the refineries in Romania. The measure of reducing the biofuel quota only in case of a problem with the import supply, already adopted by the authorities, only accidentally helps the local refining sector."

Opportunities

As in any difficult situation, there are also opportunities. Oil Terminal, company that manages important storage capacities in Constanta, could become one of the energy companies in Romania that could benefit the most from the current crisis. An increase in storage tariffs for crude oil and petroleum products, the transparency of available capacities and the rapid commissioning of as many capacities as possible could significantly increase the revenues and profitability of Oil Terminal. There could also be a theoretical opportunity for the state. There is storage capacity at the National Agency that manages State Reserves. But I find it hard to believe that our administration could consider doing what Donald Trump did in the United States, that is to buy crude oil at low prices, store it, and then eventually sell it during more favourable times. For years, such strategies are not implemented in our country due to the lack of assumption but also of the entrepreneurial vision in the administration.

UniCredit forecasts an extreme economic downturn

UniCredit forecasts a serious downturn of the European economy in 2020. "The mother of all

recessions has arrived!" UniCredit economists expect a 6% decrease in the global Gross Domestic Product in 2020, after a decline of production twice deeper than that during the financial crisis of 2008-2009, amid the coronavirus pandemic. The Eurozone economy will be hit quite hard by the social distancing measures, with a 13% decrease in GDP, three times higher than the one in 2009, and the deficits and public debts would explode. The relatively good news is that the recovery would be slightly faster than in the previous crisis, but it would take years to reach the level of 2019. The second quarter of 2020 will be one of the worst in history, with a decrease by over 20% in production compared to the first quarter in the Eurozone, in conditions in which lockdown imposed by governments to stop the spread of coronavirus seriously affects the economy.

"Across the world, the necessary social distancing measures to contain the spread of Covid-19 has meant a large part of the global economy has essentially been shut down, particularly those firms supplying non-essential goods and services," notes Daniel Vernazza, Chief International Economist at UniCredit. "We expect containment measures in the US and in Europe to last through June and to ease only gradually in 2H20," Vernazza adds. Once the epidemic curve is flattened and containment measures are eased, output should recover fairly strongly in 2H20, but output will not simply snap back to its pre-COVID-19 levels. "Containment measures will likely have to continue through year-end, albeit scaled-down from the current situation, until a vaccine and/or human immunity is amassed to prevent a second wave of the outbreak. The risk alone of a second wave will weigh on investment and lift precautionary saving. Potential output might be damaged as a result of firm bankruptcies and higher (long-term) unemployment," Vernazza believes. He adds that the risks are rather that the economic recovery will not be so fast. Social distancing measures will keep the eurozone economy running at about 75% of its normal speed until the end of 2Q20 and they will be lifted gradually.

Fiscal and monetary support will limit but not fully neutralize permanent damage to productive capacity, household income and human capital, shows Macro Valli, Head of Macro Research, Chief European Economist at UniCredit. For the whole 2020, Gross Domestic Product is expected to contract by 13%. The economy would rebound by about 10% qoq in both 3Q20 and 4Q20 and by the same 10% in 2021. Even if the recovery seems fast, at the end of next year the European economy will be 4% below the level at the end of 2019, according to UniCredit estimates.

The European Central Bank has scrapped concentration limits of one third for its pandemic emergency purchase program, which in Valli's opinion has sent a powerful signal that the bank is ready to act as a buyer of last resort in the government-bond market, which has allowed the states to give up fiscal rules under the Stability and Growth Pact. Fiscal deficits would exceed two-digits as a result of economic downturn (and revenues to budgets) and the increase in states' expenses. The average of the Eurozone grows from a deficit of 0.7% in 2019 to 11% in 2020. Central and Eastern Europe will move from an economic growth of 1.8% in 2019 to a decrease by 6.3% this year and an increase by 6% in 2021. UniCredit does not present separate data for Romania.

Erste estimates that Romania's economy will fall by 4.7% this year, while ING sees a contraction of 6.6%. Over 1 million persons were sent into unemployment in the last month.

Trading of majority stakes prohibited

Trading of majority stakes in companies within the National Energy System, irrespective of their ownership form, is suspended during the state of emergency, according to Military Ordinance no. 8. Trading can be resumed after closing the state of emergency, with the appropriate postponement of deadlines provided in the previous calendar. In such situations is the Czech group CEZ, which is in full process of selling its assets in Romania. The stake is important, given that in April binding bids were submitted by the interested parties, and the companies that plan to purchase CEZ assets include Romanian companies: Hidroelectrica, Electrica and the Energy Assets Management Company (SAPE). The military ordinance gives more time for these companies to get ready to participate in the asset sale process.

Instead of conclusions

"The national energy system worked very well, it was very stable, there were no issues. But there was a very clear decline of consumption and this clearly leads to lower revenues, receipts, profitability. We requested energy companies to provide a very clear investment program for the following five years, with very clear deadlines. Let's not forget that Romania is engaged in this European project, in Green Deal, and we have many investments to do. I expect the start of extensive investments in this area of energy," said the Minister of Economy, Energy and Business Environment.

Mankind has not been in a situation comparable to this in decades. There have been crises, but their impact was regional or affected only some sectors. Now the entire planet has been shut down economically. We are no longer talking about pollution (even cities suffocated by traffic and pollutants have come to have mountain air, as is the case of Bucharest or New Delhi), but we are talking about a corona-crisis. When, how and at what costs will it be overcome? ■

KAESER COMPRESOARE®

Mobilair M59

SETTING NEW STANDARDS IN THE 5M³ RANGE

A new basic body, a new engine that meets EU Emissions Stage V, a lightweight version, plus polyethylene gull-wing doors and a wide range of options, including compressed air treatment and generators for the simultaneous production of compressed air and electrical power: the new Mobilair M59 portable compressor has it all. And thanks to pV control, large pressure ranges can be covered with one and the same system.

In addition to the standard 10 bar version, operators requiring increased flexibility can select a version equipped for pressure settings anywhere between 6 and 14 bar. With pV control, familiar from larger Mobilair models, the infinitely adjustable maximum pressure (p) directly influences the maximum flow rate (V). Thanks to this flexible control system, it is equally possible to operate a breaker at a maximum pressure of 7 bar or perform sandblasting work at 10 bar. It also serves to counteract potential pressure losses when working with longer hose lines.

At its lowest pressure setting, the M59 can provide a flow rate of up to 5.5 m^3/min. Setting the pressure using the time-tested Sigma Control Smart controller is easy and convenient – as is the system start-up.

The M59 is powered by a Hatz engine that also meets the stringent EU Emissions Stage V standard. In addition, the European M59 is available as a lightweight version weighing less than 750 kg, permitting a chassis without a service brake. The driver does not need a special trailer licence and can select a smaller towing vehicle. And when the compressor arrives at the building site, it is easier to uncouple and manoeuvre by hand.

Photo: KAESER KOMPRESSOREN SE

Lightweight M59: The brand new HATZ diesel engine in the M59 is a perfect fit for this Made in Germany concept.

To compensate for the extra weight of the required diesel particulate filter while continuing to offer a portable compressor with optional aftercooler and a large enough fuel tank for a full day's work onsite, Kaeser adopted a new approach to lightweight construction. Aluminium offers weight savings as compared to polyethylene – with no loss of robustness or long-term value retention.

Naturally, the M59 is also available on request with a chassis fitted with an overrun brake. This is used, for example, when the user opts for a generator or compressed air treatment equipment with a filter combination for oil-free compressed air. The M59 can also be specified with an 8.5 or 13 kVA generator, thereby transforming it into a mobile power source for construction sites. This is where pV control plays its trump card – depending on the set maximum pressure and current power consumption, the controller ensures the maximum possible flow volume of compressed air and electrical current simultaneously.

For the first time, noise protection is provided by gull-wing doors made of roto-moulded polyethylene. These two large doors swing open to provide perfect access to all service parts.

KAESER KOMPRESSOREN S.R.L.
Address: 179 Ion Mihalache Blvd.,
011181 - Bucharest
Tel.: +40 21 224 56 81
Fax: +40 21 224 56 02
Web: www.kaeser.com
Email: info.romania@kaeser.com

Energy Transformation 2050

A PATH TO CREATE A SUSTAINABLE FUTURE ENERGY SYSTEM

The IRENA's Global Renewables Outlook: Energy transformation 2050 shows the path to create a sustainable future energy system. This flagship report highlights climate-safe investment options until 2050, the policy framework needed for the transition and the challenges faced by different regions. Also, the comprehensive analysis from the International Renewable Energy Agency (IRENA) outlines the investments and technologies needed to decarbonise the energy system in line with the Paris Agreement. It also explores deeper decarbonisation options for the hardest sectors, aiming to eventually cut carbon dioxide (CO2) emissions to zero.

According to IRENA's Director-General Francesco La Camera, raising regional and country-level ambitions will be crucial to meet interlinked energy and climate objectives. The report presents findings on the specific transition prospects for 10 regions around the world. Comprehensive policies could tackle energy and climate goals alongside socio-economic challenges, fostering the transformative decarbonisation of societies.

"Renewables, efficiency and electrification provide a clear focus for action until mid-century. Several regions are poised to reach 70-80% renewable energy use in this outlook. Electrification of heat and transport would similarly rise across the board. The nature of this crisis calls for a major state role in the response. This involves defining the strategies and initiating direct interventions for the way out. Expansionary budget policies may be envisaged to support this effort," Francesco La Camera underlines.

Economies need more than a kick-start. They need stable assets, including an inclusive energy system that supports low-carbon development. Otherwise, even with the global slowdown momentarily reducing carbon dioxide (CO2) emissions, the eventual rebound may restore the long-term trend. Fossil-fuel investments would continue polluting the air, adding to healthcare costs and locking in unsustainable practices.

Although renewable energy technologies may be affected by the pandemic just like other investments, energy market dynamics are unlikely to disrupt investments in renewables. Price volatility undermines the viability of unconventional oil and gas resources, as well as long-term contracts, making the business case for renewables even stronger.

One further result would be the ability to reduce or redirect fossil-fuel subsidies towards clean energy without adding to social disruptions.

A renewable energy roadmap

Economic recovery packages must serve to accelerate a just transition.

"The European Green Deal, to take an existing example, shows how energy investments could align with global climate goals. The time has come to invest trillions, not into fossil fuels, but into sustainable energy infrastructure," IRENA warns.

Recovery measures could help to install flexible power grids, efficiency solutions, electric vehicle (EV) charging systems, energy storage, interconnected hydropower, green hydrogen and multiple other clean energy technologies. With the need for energy decarbonisation unchanged, such investments can safeguard against short-sighted decisions and greater accumulation of stranded assets.

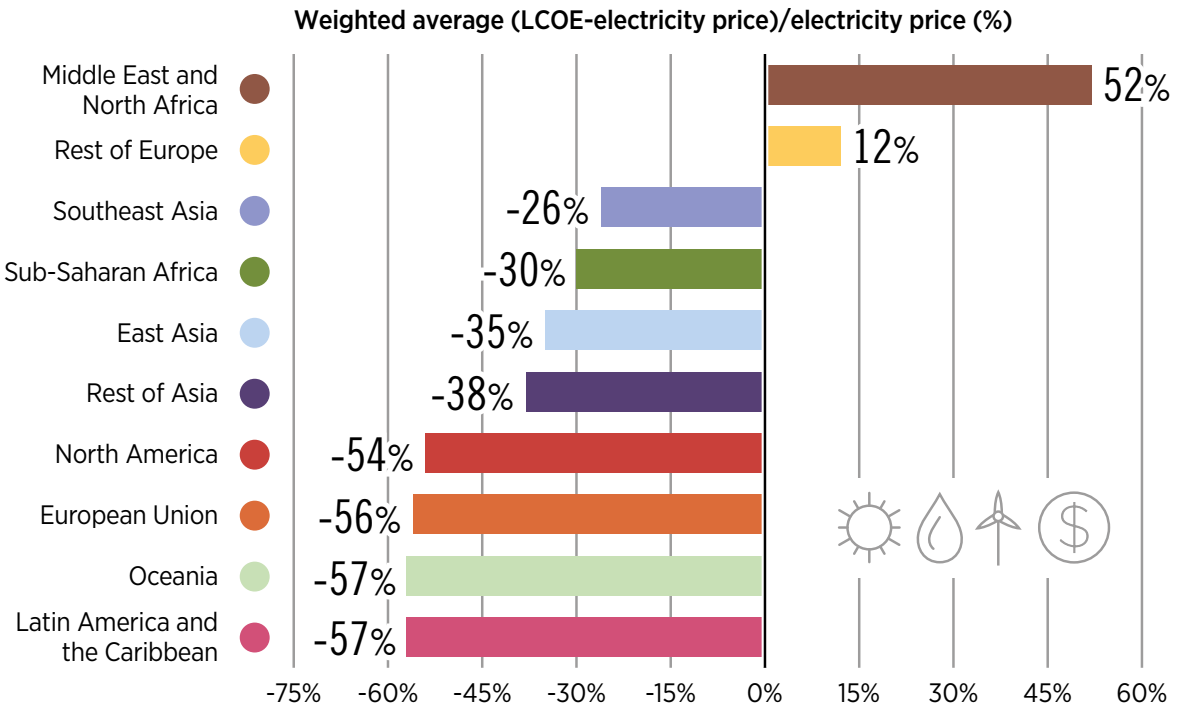
COVID-19 does not change the existential path required to decarbonise our societies and meet sustainability goals. By making the energy transition an integral part of the wider recovery, governments can achieve a step change in the pursuit of a healthy, inclusive, prosperous, just and resilient future.

While each country must work with a different resource mix, all of them need a 21st-century energy system. The response must provide more than just a bail-out for existing socio-economic structures.

"Now, more than ever, public policies and investment decisions must align with the vision of a sustainable and just future. Making this happen requires a broad policy package – one that tackles

Renewable electricity: Cheaper than average electricity price in most regions

Renewable electricity costs compared to electricity prices



Note: Costs denote 2018 values (IRENA, 2019i), electricity prices denote 2019 values (GlobalPetrolPrices, 2019).

Renewable electricity costs are higher than electricity prices, on average, in only 2 of the 10 regions (the Middle East and North Africa region and the Rest of Europe). In all other regions, renewable costs are at least 20% lower than current electricity prices. This shows the potential for renewables to reduce prices of electricity.

energy and climate goals hand in hand with socio-economic challenges at every level. A just transition should leave no one behind," IRENA's Director-General concludes.

Among other findings

Energy-related CO2 emissions have risen by 1% per year on average since 2010. While the health crisis and oil price slump may suppress emissions in 2020, a rebound would restore the long-term trend.

The transition to renewables, efficiency and electrification can drive broad socio-economic development. The outlook's Transforming Energy Scenario aligns energy investments with the need keep global warming 'well below 2oC', in line with the Paris Agreement.

The last portion of CO2 emissions will be the hardest and most expensive to eliminate. The outlook's Deeper Decarbonisation Perspective highlights the need for innovative technologies, business models and behavioural adaptation to reach zero emissions.

Decarbonising energy use in time to avert catastrophic climate change requires intensified international co-operation. With the need for emission reductions unchanged, clean energy investments can safeguard against short-sighted decisions and the accumulation of stranded assets.

Recovery measures following the COVID-19 pandemic could include flexible power grids, efficiency solutions, electric vehicle charging, energy storage, interconnected hydropower, green hydrogen and other technology investments consistent with long-term energy and climate sustainability. ■

Metals Companies Evaluating Alternative Recovery Strategies

In the wake of coronavirus-induced economic uncertainty, metals companies are evaluating strategic alternatives, with many looking externally to bolster growth, according to the Metals Insider, an industry report released by Brown Gibbons Lang & Company (BGL).

Economic forecasts are in flux in today's rapidly-changing environment, but many reflect outlooks of a 'U'-shaped or 'V'-shaped recovery within the next six to 12 months. M&A will remain integral for competitive positioning heading into an economic recovery.

The U.S. manufacturing sector contracted in March with a PMI reading of 49.1 percent, down from 50.1 percent in February.

"The coronavirus pandemic and shocks in global energy markets have impacted all manufacturing sectors," commented Timothy Fiore, Chair of the ISM Manufacturing Business Survey Committee.

Corporate and private equity buyers were active across the metals value chain before the market dislocation, illustrated in Q1 2020 transaction activity. Notably, acquisitions by Acerinox, S.A. (VDM Metals), Cleveland-Cliffs (AK Steel), and SFS Group AG (Truelove & Maclean) indicate strong corporate appetite for deal-making. In addition, private equity funds continued to pursue growth platforms and add-on acquisitions, with Palladium Equity Partners (Reading Alloys), The Jordan Company (Arundel Machine Tool), Wynnchurch Capital (Pennsylvania Machine Works), AEA Investors (Texas Metal Printing), and Audax Group (Rockford Fastener) among the deals completed during the quarter.

M&A will continue to be a primary lever to achieve growth targets, with some investors seeing the current environment as a buying opportunity to acquire capabilities and enter new markets. Well-capitalized buyers will continue to be opportunistic at the 'tuck-in' level, seeking capabilities that fit into forward strategies.

Also anchoring the M&A market is the significant volume of dry powder on the sidelines that will need to be deployed into growth acquisitions.

- Asset selectivity is higher, but the credit markets are open. Pricing and leverage reflect greater downside protection for lenders to compensate for market risk. However, bank balance sheets are healthy, and private debt funds are plentiful and eager to invest capital.
- Private equity funds are coming off years of record fund raising. Sponsors will be creative in how they deploy capital in the current market, with more seeking minority equity stakes and looking at sharing risk opportunistically.

The sun will come out tomorrow

The economic and societal impacts of the coronavirus pandemic are far-reaching, with ripple effects across industries, geographies, and financial markets. While media reporting of the bad news - economies in recession, equity market volatility, supply chain disruption, curtailed consumer spending - is well-covered, positive headlines are slowly beginning to emerge suggesting that the current market dislocation does have an end in sight.

Consultants predict a post-coronavirus 'construction tsunami'

Management consulting firm Pioneer IQ forecasts a faster road to recovery in the U.S. economy, with a silver lining of reshoring manufacturing activity, reported Construction Dive. Pioneer IQ predicts at least two more weeks before the crisis peaks in the U.S., and the country begins to see some return to normalcy by mid-May, Keith Prather predicated; explicit in this prediction are his assumptions of unassuming 1) adequate virus containment, 2) development of a successful COVID-19 treatment program, and 3) a reduction in the mortality rate.

According to Construction Dive, Prather highlighted coronavirus-induced supply chain disruptions, particularly involving goods from China, sharing the opinion that "… American businesses will be hesitant to resume orders from this part of the world." "We believe that going forward there will be a lot of reshoring back in the U.S. where we'll see an increase in our manufacturing ability here as well as heading into Mexico," Prather said. Reshoring will spur a 'surge' of new manufacturing- and supply chain-related construction projects such as factories and warehouses, he added.

Prather speaks to a 'construction tsunami' beginning in the third quarter, driven by pent-up market demand, low interest rates, and a "tremendous amount of liquidity being pumped back into the market."

EY: Most see third quarter recovery

A majority of corporate executives anticipate a medium-term recovery in the economy, according to findings from Ernst & Young's (E&Y) Capital Confidence Barometer (CCB) survey released this March. Fifty-four percent expect a U-shaped recovery, or a period of slower economic activity extending into 2021, while a more optimistic 38 percent predict a V-shaped recovery with economic activity returning to normal in the third quarter of 2020. The survey polled more than 2,900 global C-Suite executives in 46 countries and across 14 sectors.

Companies are not delaying external growth plans. Fifty-six percent of survey respondents are actively planning to pursue acquisitions in the next 12 months.

"Lessons have been learned from the 2008–12 M&A downturn which hindsight shows was an opportunity to make acquisitions of high-quality assets that would have fueled faster growth in a recovering market," commented E&Y Global Vice Chair Steve Krouskos.

Best possible outcome for a quick market recovery

Aggressive central bank stimulus measures and positive economic data from China could support an "always hoped-for V-shaped recovery," JPMorgan analysts stated. China's PMI index increased 9.8 points to 50.1 in March, following a 10.8-point decline in February. Business Insider highlighted the Federal Reserve's purchases of Treasury securities, mortgage-backed securities, and municipal bonds, which reportedly have already helped the asset classes retrace half of their losses. "Such rebounds — which forecast sharp recoveries after short-lived lows — have been the most common trend in economic growth and corporate earnings over the past 50

years," wrote JPMorgan strategist John Normand in a note to clients. "While the US and global economic output may exhibit a slower, U-shaped recovery as activity takes several quarters to normalize, gross-domestic-product growth and profits could surge to previous highs much faster."

Takeaways learned based on conversations with clients, private equity sponsors, and lenders

Readying for a rebound. Metals M&A activity was continuing at a brisk pace before the market disruption, with corporate and private equity buyers active across the metals value chain.

Acquisitions still remain a primary lever to achieve growth targets, with some investors seeing the current environment as a buying opportunity to acquire capabilities and enter new markets. Well-capitalized buyers will continue to be opportunistic at the 'tuck-in' level, seeking capabilities that fit into forward strategies. Findings from E&Y's CCB revealed bolt-on acquisitions will dominate planned M&A activity (42 percent of responses), in addition to acquisition of transitional capabilities (31 percent).

Bank balance sheets are healthy. Private debt funds are plentiful and eager to invest capital.

Private equity funds are coming off years of record fund raising. Significant dry powder will need to be deployed in growth acquisitions. Private equity will be creative in how they deploy capital in today's market, with more seeking minority equity stakes and looking at sharing risk opportunistically.

The credit markets are open… selectively. The cost of debt is going up. Lenders are seeking downside protection in higher spreads and Libor floors. Anecdotally, pricing spreads have increased by an additional 100-200 basis points over Libor, and lenders are reportedly instituting Libor floors of 1 to 2 percent to compensate for increased market risk.

Leverage multiples are more conservative. Equity contribution has increased from 40 percent, on average, to 50 or 60 percent. While company- and deal-specific, we generally expect to see only a modest valuation impact as metals companies already demanded lower leverage.

Balance sheet preservation is top of mind. Some companies are drawing down on their revolvers and credit lines as liquidity protection.

Activity has slowed but not grinded to a halt. Pockets of continued demand are out there. ■

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THE ASSOCIATION FOR THE DEVELOPMENT OF LOCAL ENTREPRENEURSHIP

Credibility Responsibility Excellence

THINK BIG, ACT HUGE

Eni's HPC5 Supercomputer to Support Coronavirus Research

Eni has freely made its supercomputing infrastructure and its molecular modelling skills available for Coronavirus research, offering its contribution with its tools and resources of excellence in the fight against this global emergency.

The collaboration is part of the European EXSCALATE4CoV project, led by the biopharmaceutical company Dompé, which brings together institutions and research centres in Italy and other European countries to identify the safest and most promising drugs in the fight against the Coronavirus. Eni contributes to the project in partnership with Cineca, a non-profit research consortium that involves the collaboration of universities, national research centres and the Italian Ministry of Education, University and Research. The joint team will carry out dynamic molecular simulations of viral proteins relevant to the COVID-19 strain, to identify the most effective pharmaceutical components among the 10,000 present in the databases. Afterwards, an activity will be carried out for the research of new specific anti-viral molecules through the screening of billions of structures.

Eni has already started the activity with Cineca, and is providing the consortium with its technical skills and its HPC5 supercomputing system, the world's most powerful supercomputer for industrial use. Its hybrid architecture makes the algorithms for molecular simulation particularly efficient.

"During a global emergency such as this, we must mobilize all available resources to overcome the challenges ahead. We are proud to contribute to finding solutions to this challenge facing humanity," said Claudio Descalzi, Eni's CEO.

"We thank Eni for its valuable contribution and we are confident that this collaboration will significantly contribute to achieve a result in the next future as well as providing a model for the recovery," said Sanzio Bassini, Director of Cineca's supercomputing department.

Eni's initiatives to support Covid-19 emergency

- As part of its work to stop the spread of coronavirus, Eni has launched a series of initiatives to support those fighting on the frontline the pandemic in Italy, reaching a total contribution of 35 million euros;
- Eni sent ventilators for sub-intensive care to Giovanni XXIII Hospital and a local health facility in Bergamo;
- In Basilicata, Eni continues to supply ventilators, intensive and resuscitation care beds, and mobile units equipped with spirometers, oximeters and ultrasounds, and CPAP (Continuous positive airway pressure) machines;
- Eni has also helped local health units in Ravenna and Ancona, emergency services in Ravenna, and the Italian Red Cross in Pesaro, Ancona and Ortona. Eni is supplying medical equipment including respirators, lung ventilators and defibrillator monitors. All supplies are ongoing;
- In Sicily, Eni has created an engineering plan to set up intensive care wards at 'Vittorio Emanuele' hospital in Gela, which would also help the Azienda

Sanitaria Provinciale's overall planned activity which involves the entire community of the Province. It is also supplying sterilizers to the hospital in Gela. For local health authorities in Messina and Milazzo, the Milazzo Refinery (Eni 50%) is supporting a project to create intensive care wards at Milazzo hospital;

• In Puglia, Eni has helped local health facilities in Taranto and Brindisi by providing intensive care equipment at specific hospitals chosen by the regional government. The company will soon be sending lung ventilators, ventilators and respirators, and patient monitors. Other equipment is also on its way to regular and intensive care wards in Brindisi;

• Eni will deliver a large number of masks to local health facilities in Lombardy, Veneto, Emilia Romagna, the Marches, Basilicata, Puglia, Sicily and Sardinia;

• Eni has begun a great deal of medical and social work to help those fighting the pandemic in Italy, drawing on its previous experience of global medical projects;

• Eni is the Agostino Gemelli IRCCS University Hospital's sole partner on a project to build a hospital in Rome in the former private Columbus Hospital), which will exclusively treat patients with the coronavirus. The facility has 130 bed spaces, 50 of them in intensive care, and has advanced technologies for diagnosing the disease, including RCX, CAT and transthoracic ultrasound. The same project also set up an emergency department for coronavirus patients at Gemelli Hospital;

• At Luigi Sacco IRCCS Hospital in Milan, the company is also setting up an emergency department for the treatment of infectious diseases;

• In Pavia, at San Matteo IRCCS Hospital, Eni is helping set up a high-level isolation unit in the infectious diseases department;

• Eni has also supplied medical equipment, including resuscitation and personal protection equipment, to the San Donato IRCCS Hospital;

• Eni is also funding public information campaigns alongside the Federazione Italiana dei Medici di Medicina Generale (the Italian GPs' association). These include one on the role of family doctors in helping people fight the coronavirus, and another targeting older people, to inform them about services available to them to help with daily tasks now they are not allowed to leave home;

• Eni has given the Lombardy regional government and Civil Protection a series of charter flights to transport medical equipment, such as ventilators and masks (in collaboration with the China-Italy Philanthropy Forum).

HPC5 – Eni's supercomputer

Eni presented its new supercomputer HPC5 in February 2020. It supports the previous system (HPC4), by tripling its computing power from 18 to 52 PetaFlop/s, equivalent to 52 million billion mathematical operations per second, allowing Eni's supercomputing ecosystem to reach a total peak power of 70 PetaFlop/s.

The supercomputer was designed to accelerate the company's transformation and the development of new energy sources. Its excellent computing power is now available for Coronavirus research. Eni's Green Data Center, that houses all of the company's supercomputing systems and data, is the ideal location for the HPC5 presentation: it has been developed to achieve world-leading energy efficiency results also thanks to the nearby photovoltaic plant that is partially powering HPC5. ■

Drone Technology Facilitates Inspections of Hard to Access Areas

by MAGNUS KRYSSARE

The humming of small rotors will be heard more often in the future in maintenance work and inspections in Vattenfall's various operations. Drones can simplify these tasks and reduce the risk of occupational injuries, for example during inspections of hard-to-access plant components. They can also be used to fly over rivers and map ice growth or gather data for building 3D models. Where tests with drones have been carried out, the results have been good, and personnel have a positive attitude to the technology.

"The number of requests for inspections is growing all the time. Drones improve the quality of inspections considerably and also save us time and expense. And, not least, the safety of personnel is improved, which is clearly important," says Anders Lindström, who is responsible for the Digital Inspections area at Vattenfall R&D, where current activities include the development of training for drone pilots.

More efficient inspections

The areas of application of drones are growing all the time, and the number of assignments is on the increase. Vattenfall R&D has been working with drones and sensors for five years, beginning with outdoor flights with so-called photogrammetry, i.e. the conversion of two-dimensional images into 3D to create models of dams. The technology has matured and is now beginning to appear out in operations.

"We're keeping track of drone and sensor technology, and experimenting with the new possibilities. Previously, we had to erect scaffolding to inspect a hydro power dam, for example, which was a time-consuming process. Now you can take a quick look at a structure with a drone. If there's no damage, that's fine. But if repairs are needed, you can decide to put scaffolding up for extended maintenance work. We want to make the inspection process more efficient," Lindström explains.

'Impossible' places become possible

Flying drones has many applications: they can, for example, measure data for 3D models of entire hydro power stations and dams which can then be produced as physical models, they can inspect the shoreline, fly inside dams, fly along power line corridors to look for breaks in lines, fly into reactor containments or district heating boilers to inspect plant components, where human access is difficult without extensive safety measures.

"Drones make it possible to access places that people didn't use to be able to reach. The market trend is a development towards smart drone systems with artificial intelligence, AI, which teaches the drones to find and assess damage," says Lindström.

Hydropower dams are not entirely static from one season to another. Because of temperature differences between the water side and the air side, the crest of the dam moves during the year. Because dams need to last for a long time, it is important to inspect all the beams for damage, but inspecting the inside of a dam is difficult and time-consuming, which is why it is done at planned intervals.

Tests show great potential

With drones, these inspections can be carried out more frequently and with improved documentation for the specific dam. The results of inspections with drones can then be used to update the calculation of dam safety factors by means of computer modelling. A test inspection with drones was carried out in 2019 in one of the concrete dams, which showed the

great potential of the technology.

"The space inside a dam is extremely limited and there is a lot of obstacles in the way, such as pillars and pipes. We really had to concentrate to make sure the drones didn't collide with anything," Joakim Smedlund, a drone pilot, explains the difficulties of flying inside a dam.

The drones can also give valuable information on the outside. When they hover over a hydro power reservoir, they can give an overview that would not be possible with a pair of binoculars from the embankment or dam. They can also give a quick overview of the ice situation upstream during the winter months, which is important, for example, to avoid ice ending up in the hydro power intake and causing damage that could interrupt electricity generation.

Flights inside the nuclear reactor...

Last year, a unique and successful flight with a drone was carried out in the reactor containment at Ringhals 3. Inspection of the sealing plate in the wall of the containment is not easy; the traditional method involves demanding work with a camera on a long stick. During 2020 a similar inspection will be carried out at Ringhals 4.

...and in the district heating boiler

District heating boilers are usually inspected by erecting scaffolding inside the furnace so that the personnel can climb on the inside of the boiler to check for deposits, damage and air leaks. In Uppsala, a test was carried out in which a 30-metre high power-to-heat boiler was inspected from the inside with the aid of a drone. The test was a success, and the inspection of the boiler was completed in a few hours, compared to the few weeks otherwise required for a traditional inspection.

With the growing number of wind power turbines in Vattenfall, the demand for inspection of turbine blades and components of foundations will also increase. Turbine blades are usually inspected by specially trained personnel who are lowered with ropes to investigate signs of wear. There are now a number of solutions on the market where drones and AI are used for this type of inspection, which can free up time for personnel to focus on other inspections and repairs.

"Where we've tested drones, we've been able to improve both safety and quality, and the inspections have become more efficient. One thing's for certain: digital inspection technology is on the advance," says Anders Lindström. ■

Body Worn Camera Solution Based on Open Architecture

Axis Communications, a global leader in network video equipment, has announced the launch of its first body worn solution, which is intended for use by law enforcement bodies and private security agents, especially in the conditions of large areas served by companies, including those in the oil, gas and energy industry.

by **DANIEL LAZAR**

The solution, which includes a robust camera, docking station and system controller, has been designed on an open system architecture that will allow integration with other video management systems (VMS) and evidence management systems (EMS), including those provided by Axis. Therefore, this solution is the most flexible in the world and increases the value of existing software investments.

The benefits of body worn cameras in terms of recording evidence, deterring criminal behaviour and training security officers and staff are well known in the law enforcement sector, being increasingly recognized in the private security industry. Axis company is a pioneer and leader in the field of video surveillance technology, having over 30 years of experience in developing solutions for almost any scenario imaginable. Therefore, its decision to create a body worn solution is as logical as possible, and Axis customers have been increasingly attracted to this idea in recent years.

The body worn solution proposed by Axis is the result of an intensive research and development process that included a methodological approach to the activity of creating new solutions, perfected by the company over several decades of experience, as well as numerous interviews to explore the needs of law enforcement agencies and private security organizations. A key aspect of the solution, which was pointed out by potential customers, was their need to maximize their existing investments in VMS and EMS software. This was the reason for using open architecture. The body worn solution offered by Axis can be used in conjunction with various VMS and EMS software, on-site or in the cloud, which allows integration with other video surveillance data. The product can also be delivered as a complete solution, using AXIS Camera Station and AXIS Case Insight, Axis' own VMS and EMS software.

"During the process of developing a new solution, we always strive to ensure the highest possible video and audio quality within the limits imposed by the specific needs and factors. In the case of the body worn camera, the obvious difficulties are to find the optimal combination of size, weight, the required level of robustness and maximizing battery life. For all of these elements to be perfect, our iterative research and design process included numerous customer conversations, several product prototypes, and several pilot projects in the early stages," explained Fredrik Andersson, Global Product Manager for the New Solutions Initiative within Axis Communications.

The new Axis system with body worn camera includes 3 main hardware components: the camera itself; camera docking station (with 8 ports or 1 port); and the system controller.

The camera captures video images with a resolution of up to 1080p at a frequency of 30 fps, as well as audio using dual microphones provided with

the ability to cancel background noise. Wide Dynamic Range (WDR) technology is used to guarantee image quality, even in the most difficult light conditions, while Axis Zipstream body worn technology reduces the storage capacity required. The battery is designed to last a 'full round', offering 12 hours of normal use and the possibility of being charged in the car or from a portable charger.

The docking station and the system controller are separate units. The system is easily scalable to allow the creation of larger and cheaper body worn systems. The system controller offers a single point of integration and management, allowing fast and reliable video download (100 Mb for each camera). All data is encrypted when it is latent, but also in transit, using the AES256 and TLS protocols. In addition, video data can be fully encrypted, from one end to the other, with specific integration.

The camera also has the following built-in components:

- GPS/GNSS receiver for tracking location;
- Bluetooth Low Energy 4.1 technology;
- Wi-Fi 802.11b/g/n;
- Gyroscope with 6 axes and accelerometer.

The AXIS Body Worn Assistant mobile application allows users to examine videos and add categories, descriptions and notes.

Reliability in use was a major goal in designing the solution, as Andersson explains: "It is essential that these body-worn cameras are easy to use in the field by officers and security personnel, who may be in stressful situations, in bad weather conditions or in poorly lit areas. But at the same time, we wanted the operators responsible for downloading, storing and analysing the video recordings made to enjoy the same ease in using the solution."

The body worn solution created by Axis will be available through the Axis distributor network from the second quarter of 2020. ■

Fighting Tomorrow

THE COVID19 IMPACT ON ENERGY

Amidst the unprecedented COVID19 spiral, news, fake news, borderline mass hysteria and lots and lots of opinions are being spread in lightning speed. The difficulty to control and analyze what makes sense or not, which was already hard pre-COVID19, has been surmounting for weeks now. This article is a sincere effort to analyze what makes sense, highlight some patterns and indicate some signs of the times when it comes to the future of Energy as it is being reshaped in our times.

by Evgenios Zogopoulos
Co-author: Konstantinos Michalopoulos. Dipl. Mining & Metallurgical Engineer at National Technical University of Athens

The Pandemic Analysis: What this pandemic might mean for the energy sector

To start with, some seemingly good news is that banks seem better capitalized than they were in during the Global Financial Crisis (not that it was such a high standard). As the weeks pass though, and the global 'sneeze' does not go away, liquidity is becoming increasingly scarce. Investors are moving away from risk and that is almost expected. This could have a direct effect for the financing of projects in frontier markets as well as newer technologies where risk-sharing practices are not as well established. Smaller developers with projects not yet off the ground could also be hit hard, as their financing becomes scarce. Either way, a significant contraction is expected, followed by a catch-up period over the next years. The way we choose collectively to overcome (or not) the crisis, will determine if the future will be even brighter than pre-COVID.

Since the markets seem stable, for now, another aspect that we never had to deal with in such a way, is drawing attention increasingly: Energy security. Energy security remains a major area of focus and the crisis highlights the critical value of infrastructure and knowledge, as a response to the pandemic. It highlights the immense importance of the sector, and what policy makers need to do in order to ensure that current and future systems remain reliable and dependable.

It is really unclear exactly how this pandemic will impact sub-sectors like renewable energy, which are somewhat protected by long-term power purchase agreements (PPAs).

The most obvious result of these shocks is clear: Economic contractions reduce power demand, because every form of economic activity requires electricity, directly or indirectly. The last recession reduced power demand in the United States by about 10 years' worth of growth.

Since 2010, 102,000 megawatts of coal generating capacity have been retired – nearly one-third of the total U.S. coal fleet – and at least 17,000 megawatts more are expected to retire by 2025.

U.S. electricity use on March 27, 2020 was 3% lower than on March 27, 2019. That difference represents a loss of about three years of sales growth. Electricity use will trace the same path as total economic output as the crisis unfolds, but will likely drop less in percentage. That's because electricity use is a necessity, and essential services and households will continue to use power. Some, like health care, will use much more.

In this context, the Energy mix is being put again on the table. Government policies and public pressure are also forcing utilities to retire coal-fired power plants. Since 2010, 102,000 megawatts of coal generating capacity have been retired – nearly one-third of the total U.S. coal fleet – and at least 17,000 megawatts more are expected to retire by 2025. Most of this will probably be replaced by wind, solar and hydropower. Despite the current crisis, there is long-term pressure from many directions to add carbon-free energy.

Nevertheless, economy-driven demand reductions, which are likely worldwide, will hurt new renewable installations. Utilities will tighten their budgets and defer building new plants. Companies that make solar cells, wind turbines and other green energy technologies will shelve their growth plans and adopt austerity measures. For example, Morgan Stanley's highly respected clean tech analysts project declines of 48%, 28% and 17% in U.S. solar photovoltaic installations in the second, third and fourth quarters of 2020, respectively. Countervailing factors will partly offset this decline, at least in wealthy countries. Many renewable plants are being installed for reasons other than demand growth, such as clean power targets in state laws and regulations, and are already under contract or construction. Voluntary green energy purchases by U.S. companies increased by almost 50% in the last year, to 9,300 megawatts – almost 1% of all U.S. power capacity. And residential customers are choosing to buy more renewable energy through options such as community solar programs.

Since early 2019 crude oil prices have collapsed, declining almost 64%. As oil market guru Daniel Yergin recently observed, this drop is likely to be steep and prolonged "it's a problem of an oil price war in the middle of a constricting market when the walls are closing in. Normally demand would solve the problem in a way, because you would have lower prices that act like a tax cut and it would be a stimulus. But not in this case because of the freezing up of economic activity".

This oil price collapse has also reduced U.S.

natural gas prices by about one-third from year-ago levels. Like electricity and oil, natural gas use rises and falls with economic activity; it is somewhat less sensitive to economic trends than the highly reactive oil sector, and more sensitive than comparatively stable electricity use.

Ordinarily, cheaper natural gas – which is widely used for generating electricity – would stimulate electricity demand by reducing the price of power, thus increasing economic growth. But in this unusual era, the effects of lower oil and gas prices on renewables will be somewhat murky and complex, and will probably differ substantially by market and region.

For some new plants in places where policies do not effectively mandate renewable energy, continued or even new use of oil and gas generation will look cheaper. For example, replacing dirty diesel generation with solar power plus some form of energy storage will not look nearly as attractive now as it did a year ago. This is especially worrisome in emerging nations, where the overwhelming imperative is to expand electricity supply as cheaply as possible. These economies are always short on capital and highly sensitive to energy costs. If they opt for cheap fossil fuels instead of renewables, it will be bad for air quality and climate policy.

Senior officers of IEA stated: "The coronavirus brings other dangers for clean energy transitions. China, the country most heavily affected by the virus initially, is the main global production source of many clean energy technologies, such as solar panels, wind turbines and batteries for electric cars. The Chinese economy was severely disrupted during the government's efforts to contain the virus, especially in February, causing potential supply chain bottlenecks for some technologies and components."

The most significant near-term impacts on renewable plants that are already contracted or under construction may be felt through supply chains. Renewable industry executives are anticipating delivery and construction slowdowns, either because nations shutter industries to slow the spread of coronavirus or because workers start getting sick.

Many parts for large-scale renewable projects come entirely or partially from China, other parts of Asia or the United States. These are specialized supply chains with few ready substitutes. The COVID19 outbreak has already slowed Chinese production of solar panels and materials, delaying projects in countries including India and Australia.

The COVID-19 outbreak has already slowed Chinese production of solar panels and materials, delaying projects in countries including India and Australia.

Manufacturing disruptions in China could contribute to a significant one- or two-year dip in renewable additions.

How energy demand is shaped when people are home quarantined

No one can argue that with the novel corona virus disease (COVID19) some things happen for the first time, especially the confinement of roughly 2,6 billion people which corresponds to one third of the total human population. Just for comparison, the world population in 1940 was 2.3 billion people, 300 million less than those being asked to stay indoors today.

For sure, there are some positive effects such as the drop of carbon dioxide emissions around the globe, but we will examine the impact on energy demand patterns, a result of mass home confinement for the good of public health. Goldman Sachs experts estimate that these confinement measures-that are impacting 92% of the world's GDP-will eventually result to "the largest economic shock of our lifetimes" and might alter permanently the energy markets.

Starting with the electricity system, the energy demand is historically low and the biggest challenge for the grid operators is to keep the system running by continuously adjusting their day-to-day operations without being able to make long-term demand plans. The demand is lower during the morning and middle of the day (less

industrial and commercial load than usual) and the operation of large synchronous generators is becoming a problem that may affect the system's stability. In order to deal with unpredictable demand patterns, scenarios of negative electricity prices during the day were put into the table to simulate the demand patterns before the lockdown. However, without the large electric loads from factories and shops it is hard to bring these patterns to normality.

All the above are well reflected if someone takes a look at the European power and gas prices that have sunk, with the benchmark German wholesale 2021 power price hit a two-year low of EUR 33.50/megawatt hour (MWH) at the end of March. With many factories of the automotive sector closed, the German industrial demand for power could drop by up to a fifth this year according to Enervis energy consultancy. Other analysts see a price fall of 5-10% when the lockdown ends. Trying to make estimations about the rebound, analysts have their eyes fixed on China's economic emergence after the confinement measures. Economists say that the rebound is progressing slower than expected, tracking indicators such as electricity demand and power generation capacity which may be positive (abt. 10% up comparing to February) but the recovery is lagging way behind from what was expected.

The Oil industry in survival mode

As the virus wreaks havoc in several markets around the globe the Oil and Gas industry seems to be in survival mode in need of a 'life vaccine'. For the next four months at least the depressed demand for oil and gas is no good news for the industry companies. Oil futures have dropped more than 50% since the beginning of the year and more than 20% or 20 million barrels per day of oil demand may be lost as the demand slows down even more according to the International Energy Agency. This number corresponds to the total of US consumption. Saudi Arabia and Russia have been increasing production the past two months in order to regain aggressively market share from American companies that increased their exports in the recent years. This has led the oil markets facing extremely low prices and the shale boom that turned US into the world's largest oil producer is unravelling fast. By the end of March, the country's production fell to 600,000 barrels a day from a record of abt. 13 million shale rigs remain idle in the Permian Basin of West Texas and in other parts of the country. Shale producers cannot stay afloat with prices below USD 30/barrel.

Saudi Arabia's Minister of Energy Prince Abdulaziz bin Salman Al Saud speaks via video link during a virtual emergency meeting of Opec and non-Opec countries, following the outbreak of the coronavirus disease, in Riyadh, Saudi Arabia, April 9, 2020. | Saudi Press Agency

Rihad and Moscow have created a fierce oil battlefield around the COVID19 pandemic and US president's Donald Trump proposal with a tweet – to cut about 10% of the worldwide crude production- was actually a realistic thought, capable of saving thousands of crude oil producers and millions of jobs. The Members of the Organization of Petroleum Exporting Countries, and allied producers led by Russia, since 2017 are part of a coalition known as OPEC+. All members were willing to curb their output so they could keep the market in a balance, facing the pandemic threat and buying time for more effective measures if needed. The holdout in this deal now is Mexico despite the fact that Russia considers this plan as a done deal. Examining the sudden positive reaction of Russia and Saudi Arabia we can easily understand that in this rally for oil production, Moscow risked having no place to store the crude and Rihad needed higher prices to be able to fund the Kingdom's budge, which is shaped considering higher oil prices. The G20 meeting on Friday 10/04/2020 committed to find a balance between oil producers and consumers but without specific measures for production cuts.

Mexico via its Energy Minister Rocio Nahle insisted on cutting only 1/3 of the oil production which is about 100.000 barrels per day instead of abt. 300.000 barrels per day which is their fair share corresponding to the proposed 23% reduction. President Trump has agreed to help Mexico in making a deal with Saudi Arabia and Russia. On the other hand, Russia considers the deal 'very positive'.

Finally, after several negotiations and marathon video conference calls, the OPEC+ members and the G20 decided to proceed to a historical deal to decrease the global oil production to fight the impact

of the global pandemic on demand. Ed Morse, a veteran oil watcher of Citi Group commented: "Unprecedented in historical discussions of production cuts, the US played a critical role for the new OPEC+ accord." OPEC+ will cut 9,7 million barrels per day. Canada and Brazil will also contribute another 3.7 million barrels per day on paper as their production declines. The deal was closed and finalized on Catholic Easter Sunday, just four hours before the oil market reopened. Mexico won for sure a big diplomatic victory managing to maintain its initial position firmly, cutting only 100.000 barrels as mentioned above, but this move may be a reason to leave the alliance over the next two months. President Trump, the man who was historically OPEC's hardest critic, managed to bring together Saudi Arabia and Russia and actively press for the largest supply cut in history, becoming the first American President to push for higher oil prices in more than 30 years.

Copying a model implemented also by banks, the production restraints will last for about two years and be reduced over time. The deal will be implemented starting from May 1st, which means that for three weeks the members of OPEC will be able to continue production and flood the oil market. Amrita Sen, chief analyst of Energy Aspects Ltd estimates that "With the issue of Mexico taking so long, so sort, the credibility of the group has taken a hit". Even if the deal is poorly implemented, the agreement will make a difference to the market according to Ann-Louise Hittle, vice president of macro oils at consultant Wood Mackenzie Ltd.

However, the savage truth of 20 to 35 million barrel per day losses – result of the decrease of the estimated global demand- is too much to bear and could have devastating impact on the global oil and gas market. After the Easter holidays, oil inventories according to analysts are expected to rise sharply with demand facing a minus 20% this quarter.

Considering the above, it seems that the above historic deal, will only be a temporary medicine rather than a vaccine, as this production cut seems unable to counterbalance the extremely low demand formed by the global pandemic situation.

Coal struggles to keep up in a difficult battle

As mentioned, electricity demand is hammered by the novel COVID19 and this is also reflected in coal generation that declined 36% in March in the US, compared with the same month last year according to an E&E News review of federal figures. Also, the U.S. Energy Information Administration (EIA) expects coal generation to decline 20% in 2020.

The result of the declining coal demand in both sides of the Atlantic, has been a steady build-up in utility coal stockpiles. Analysts estimate that power companies will most probably run out of space to store any additional coal shipments in the next few months.

In Europe, EU carbon prices reached a 22-month lows at 15 euros a tone in while European coal 2021 futures, at USD 56.4, are only USD 1.9 about the contract low. The result of the declining coal demand in both sides of the Atlantic, has been a steady build-up in utility coal stockpiles. Analysts estimate that power companies will most probably run out of space to store any additional coal shipments in the next few months.

Joe Aldina, a coal analyst at S&P Global Platts said that "We could test the physical constraints of coal stockpiling this summer. You may be in a situation where inventories are high in order to burn through them regardless of fleet economics." EIA is estimating coal production to fall abt. 153 million tons, or 22%, to 537 million tons in 2020. Also, Jim Thompson, an analyst at IHS Markit said that "The greater threat to the industry is that the current downturn could impair coal's projected recovery".

During these challenging times for the coal industry worldwide, many mining firms are having difficulty in accessing capital and as a result, companies cannot reopen mines or ramp up production. If the stockpiles start to affect the supply chains the industry could be in a situation where demand will rebound in 2021 but miners will not be able to meet it.

As estimated from the Institute for Energy Economics and

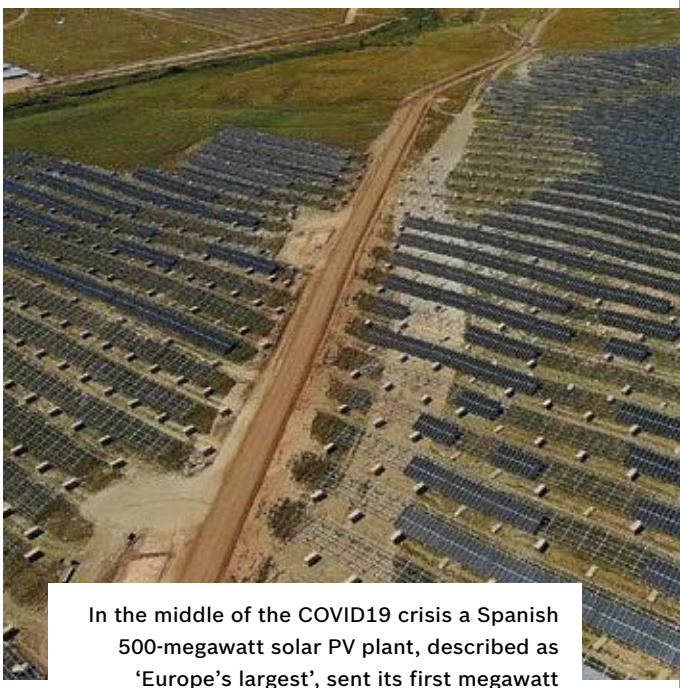
Financial Analysis, (a research group that supports a transition to clean energy) wind, solar and hydro combined, produced more power than coal during the first three months of the year. On the contrary, coal use has been diminishing in Europe but it could be considered as a cheap and reliable source of energy to rebuild economies after the pandemic, said Steve Hulton, Rystad Energy's head of global coal research. However, the increasingly falling demand means that fewer power plants are needed to operate to cover the energy needs and with gas prices in historic low levels and RES generating zero fuel costs, this could leave coal out of the equation, as a higher-cost electricity generator.

Renewables battle fiercely with the unprecedented pandemic

Coming to RES, in 2019 according to figures from International Energy Agency, the global renewable energy capacity hit 2,537 gigawatts (GW) at the end of last year, an increase of 176 GW compared to 2018. Additionally, the new additions last year were slightly lower than the revised total of 179GW added in 2018. The coronavirus pandemic seems to cast a shadow in 2020 forecasts for renewables, impacting supply chains and manufacturing facilities, but will this virus be sufficient to stop RES growth?

Renewables in 2019 accounted abt. 72% of all power expansion, with solar and wind growing by 98GW and about 60 GW respectively. Combined, they reached a total of 90% RES additions last year. Hydropower on the other hand, had very low growth las year and according to IRENA's General Director Francesco La Camera this was due to a number of projects that missed the actual completion deadlines. This year, with many factories programmed to stop their activity and supply chains being weak, huge challenge for renewables is depicted on the energy horizon. As already mentioned above, oil prices are hammered down facing extremely low demand and this could potentially make renewables less attractive to some markets. On the other hand, many structural parts needed for completing RES projects are cheaper due to their low raw material prices this period, so for many manufacturers this could be translated as a business opportunity, especially considering the part of RES in the future energy mix. The estimations form research and consulting firm Wood Mackenzie are that global solar installations for 2020 had been revised down from 129.5 gigawatts (GW) to 106.4 GW, which represents an 18% drop compared to pre-coronavirus levels.

However, in early April, in the middle of the COVID19 crisis a Spanish 500-megawatt solar PV plant, described as 'Europe's largest', sent its first megawatt hour of energy to the grid, being a light in the darkness for the RES industry. The Nunez de Balboa facility is located in Extremadura, a region in the west of Spain. The facility has over 1.4 million solar panels and will be able to supply energy to 250,000 people per year. Coming to news from the windfarms sector, the Danish wind turbine manufacturer Vestas — a major player in the sector — suspended guidance for 2020 because of disruptions to installations, manufacturing and its supply chain caused by the global spread of COVID-19 and national measures taken to contain it.



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The latest estimations coming also from the other side of the Atlantic, are that the renewable-energy business is expected to withstand the pandemic storm better than fossil fuels - which have been hammered from low oil and gas prices- and keep growing but more slowly. If we take a look at the United States, renewable energy sources are set to account for nearly 21 percent of the electricity the uses for the first time in 2020.

In many parts of the world, including California and Texas, wind turbines and solar panels are able to generate electricity with lower cost than natural gas and coal and this is very attractive to electric utilities and investors. We should also consider the fact that while oil prices have dropped more than half, the same doesn't apply to coal and natural gas prices, at least for the moment. Even the depressed demand for electricity may boost renewables, according to Raymond James & Associates. This possibility emerges, due to the fact that while revenues suffer, utilities might try to get more electricity from solar

and wind farms which have significantly lower operational costs than power plants with fossil fuels.

However, looking in short term predictions the future might not be so bright, as according to the Solar Energy Industries Association, in the US half of the workers in the solar industry (250,000 in total) might temporarily lose their jobs. Considering that it is early for such estimations, Wood Mackenzie say that these predictions could be overly pessimistic because this situation changes in daily basis. They believe that this sector will continue adding capacity.

Considering another aspect of the pandemic, it is a fact that renewable projects might require multiple meetings in person at government and community levels. The social distancing measures are an obstacle to this situation and this may result to delayed permission processes if there is no alternative solution. Also, large utilities and power companies are not the only participants in RES growth during the past years. An estimated 20% of renewable capacity added globally in 2019 consisted of individuals and medium to small companies installing solar PV panels on their roofs in homes and businesses. These installations are known as distributed solar PV, and last year accounted over 40% of global solar PV deployment according to IEA. Renewables help reduce carbon dioxide (CO2) emissions and improve energy security. The so-called RES industry is a significant global employer and a big investor in new projects as well. The costs of generating electricity from hydropower, solar PV and wind are now comparable or lower than those from newly built fossil-fuel alternatives in many countries around the globe.

The growth of renewable capacity additions this year may slow down for the first time in their history. Governments have the ability to change this trajectory with targeted economic countermeasures that can enable renewables to grow sustainably the following years. Right now, the whole world has its eyes fixed on dealing with the huge public health challenge and take measures to battle a widespread economic crisis. As governments will continue to work on repairing the economic damage there are a number of actions that could help in this direction and also in the deployment of RES projects.

Firstly, governments can create specific financing measures and incentives for renewable projects in upcoming stimulus packages. Additional economic incentives such as investment grants, loan schemes and tax credits are be necessary to shape a strong future demand for the distributed solar PV sector which will suffer the most.

Secondly, deadlines for commissioning projects beyond 2020 could be extended helping this way renewable project developers to avoid any financial penalties and allow them to keep incentive in investing to existing or new projects.

Third, trying to visualize the future of clean energy, the short-term actions need to align with the medium- and long-term ones in terms of policy. Funding for new not yet commercialized energy technologies with high cost reduction potential should be secured, such as hydrogen production and floating offshore windfarms.

The COVID19 pandemic can become a vital threat to our energy future and a very big setback in the world's energy transition if we do not recognize the threat early and act accordingly. Governments that will take the proper measures promptly may emerge from this crisis with renewed momentum and their countries could play an important role not only to the global energy scene but also to the global economic recovery.

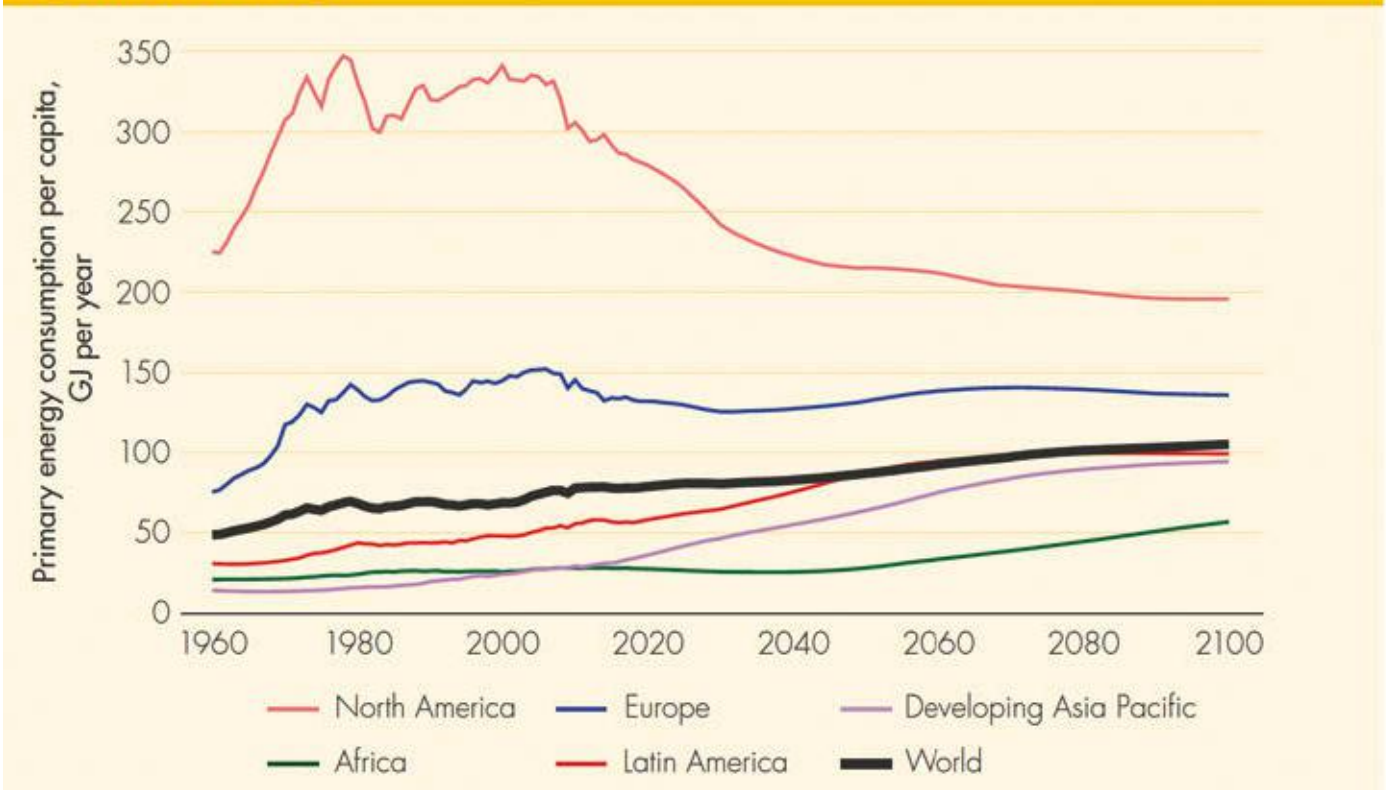
Conclusion: Fighting tomorrow?

One word before we start wrapping the article up: Evolution.

According to Wikipedia, "It is the change in the heritable characteristics of biological populations over successive generations. Evolution occurs when evolutionary processes such as natural selection (including sexual selection) and genetic drift act on this variation, resulting in certain characteristics becoming more common or rare within a population. It is this process of evolution that has given rise to biodiversity at every level of biological organization, including the levels of species, individual organisms and molecules".

Given that we are not exactly talking about the biological notion of evolution, the analogies are pretty clearly framed and apparent. Natural selection is taking care, as we speak, of the weak links of our global Energy mix. Regulators will continue trying to stop or delay evolution (and 'natural selection') through policies but they will not be eventually able to stop it. What we are witnessing is the 'natural'

A BETTER LIFE FOR ALL



Note: Today, a better life for all can be achieved for an average of 100 GJ per capita. Later in the century, efficiency gains mean that a better life can be achieved at still lower figures.

Source: Shell analysis, IEA (historical data)

or artificial 'biodiversity' of the Energy landscape, which is being put to the test by actually natural evolutionary forces. "Nature will find a way" to push evolution forward and even if humans have been actively trying to stop it, COVID19 came to prove that it might be time to move on.

Whether renewable energy sources are the natural evolutionary step towards the future, it remains to be seen. It looks like it though; it also seems to be making lots of sense.

While obscured, the renewable transition is ongoing on a global scale. It also seems that falling costs of renewable electricity are making it more attractive compared with other types of fuel per unit energy. This makes it possible to start a second replacement process, where low cost renewable electricity replaces oil, fossil gas and even coal in other sectors.

Oil is clearly outcompeted on price already, and fossil gas is challenged. Coal is still cheaper per unit energy, but with technical advantages or carbon emission pricing schemes may be outcompeted by renewable power.

One of the top players in the Energy sector, Shell, is already trying to approach the matter and 'predict' or shape the evolutionary path; they also have a name for it: Sky Project. Their latest energy scenario, requires a complete re-wiring of the global economy in just 50 years. However, even in 2070, when Sky achieves the societal goal of net-zero emissions, oil, coal and gas are still in use. According to Shell "The Sky scenario pathway illustrates a technically possible, but challenging pathway to achieve the Paris Agreement. In it, renewable energy surpasses fossil fuels for electricity generation shortly after 2030. Renewable energy then dominates electricity generation by the 2050s, but even with an outlook that stretches to the end of the century, electricity doesn't pass 60% of 'final energy' use. The remaining 40% comes in the form of hydrogen and hydrocarbon fuels, such as petrol. And hydrocarbon – oil or gas based – feedstocks are also required to supply a growing chemicals industry."

All in all, even in one of the brightest scenarios, fossil fuels are still in the mix around 2100. It seems that this transition is going to require a lot of time. That's ok though: evolution takes time. The first humanoids appeared between five million and seven million years ago, probably when some apes began to walk habitually on two legs. They were flaking crude stone tools by 2.5 million years ago. Then some of them spread from Africa into Asia and then Europe after two million years ago.

If it took 2.5M years for stone flaking apes to rise into what we are today, a couple of hundreds of years seems like tomorrow; even more while we seem to be fighting it. ■

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Coronavirus Rattles Commodity Markets

As countries around the world contend with the health emergency of the COVID19 pandemic, the economic effects of suspending almost all activity have immediately impacted the world's commodity markets and are likely to continue to affect them for months to come.

The pandemic has affected both demand for and supply of commodities, the April edition of the Commodity Markets Outlook reports. Those effects are direct, resulting from shutdowns to mitigate the spread of the virus and disruptions to supply chains, and also indirect, as the global response slows growth and leads to what is anticipated to be the deepest global recession in decades.

The full impact of the pandemic on commodity markets will depend on how severe it is, how long it lasts, and how countries and the world community choose to respond to it. The pandemic has the potential to lead to permanent changes in the demand and supply of commodities, and especially to the supply chains that move those commodities from producers to consumers around the world.

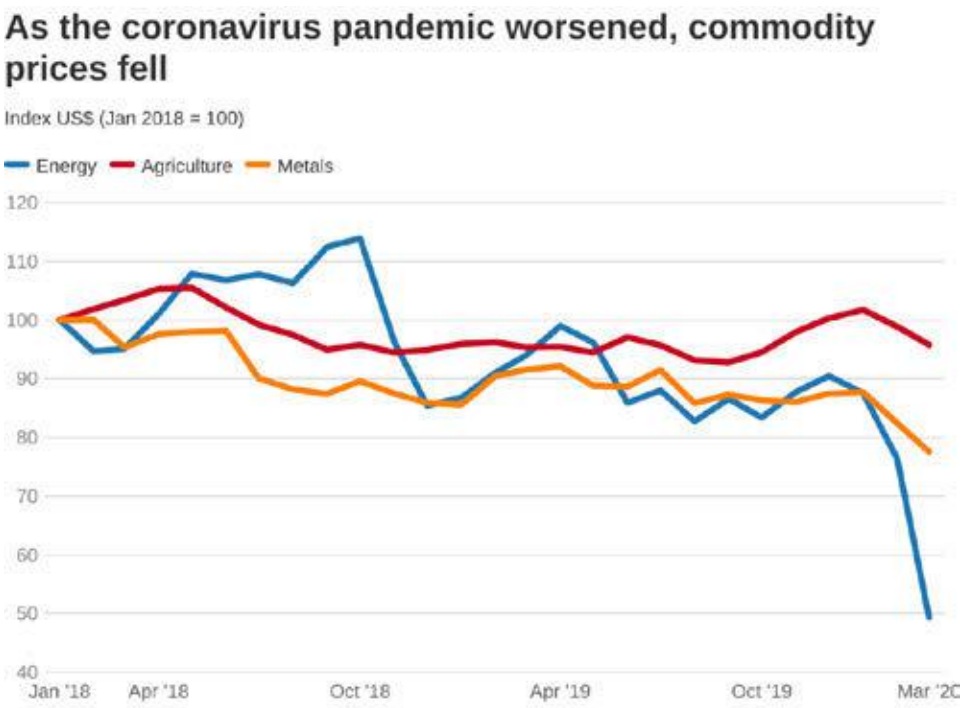
The effects have already been dramatic, particularly for commodities related to transportation. Oil prices have plunged since January, and prices reached an historic low in April with some benchmarks trading at negative levels. Declines reflect a sharp drop in demand and have been exacerbated by uncertainty around production levels among major oil producers. Due to mitigation efforts that have limited most travel, oil demand is expected to fall by an unprecedented 9.3 million barrels per day this year from the 2019 level of 100 million barrels per day. Oil prices are expected to average USD 35 per barrel in 2020, a sharp downward revision from the October forecast and a 43 percent drop from the 2019 average of USD 61 per barrel. Prices for natural rubber and platinum, both heavily used by the transportation industry, have also tumbled.

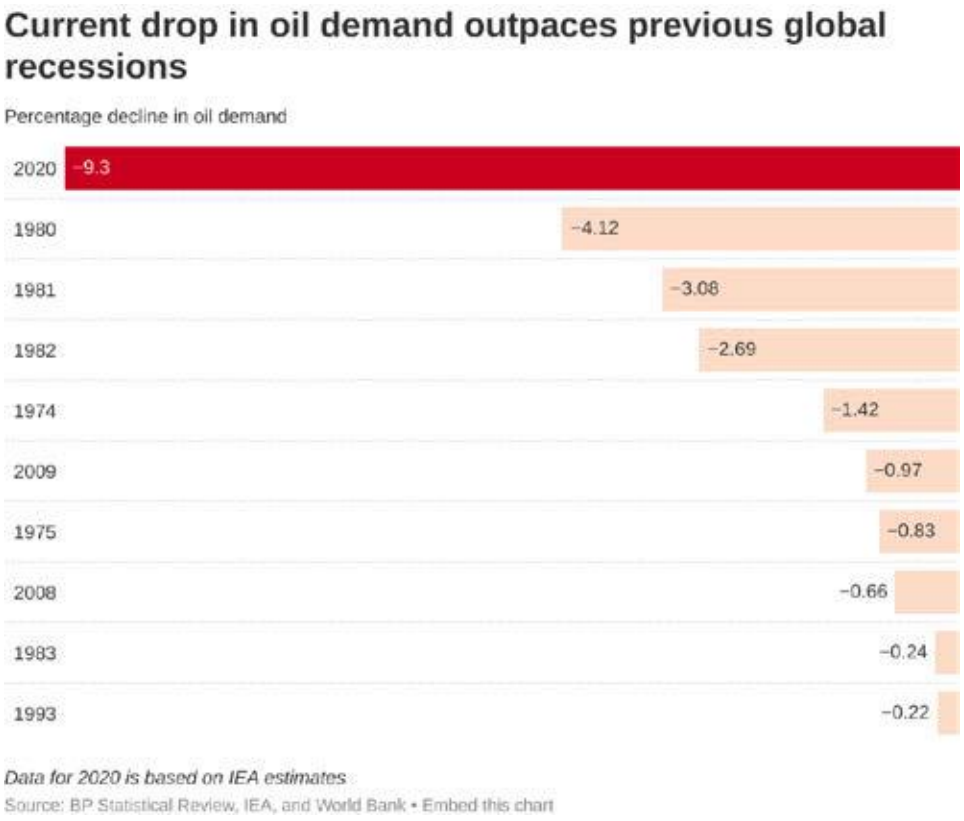
Recent efforts by the Organization of the Petroleum Exporters and other oil producers to cut production in response to the plunge in demand will ease some of the pressure on oil markets. However, over the longer run, the current arrangement, to the extent it supports prices, will be subjected to the same forces - the emergence of new producers, as well as substitution and efficiency gains - that led to the collapse of previous OPEC arrangements and other commodity pacts. A section of the report looks at OPEC in the context of the history of previous coordinated efforts to manage the prices of certain commodities.

Energy prices overall - which also include natural gas and coal - are expected to average 40 percent lower in 2020 than in 2019, although a sizeable rebound is anticipated next year. Natural gas prices have fallen substantially this year but coal prices have been less affected, since the demand for electricity has been less affected by mitigation measures.

The halt in economic activity has taken a toll on industrial commodities such as copper and zinc, and metal prices overall are expected to fall this year. A deceleration of economic growth in China - which accounts for half of global metal demand - will weigh on industrial metal prices. Gold prices, on the other hand, have risen as buyers have sought safety amid financial market turbulence.

Agriculture prices are less tied to economic growth and have undergone only minor declines over the first months of the year, with the exception of rubber which fell sharply, and of rice, which rose due to worsening





crop conditions and some trade restrictions. Overall global agricultural prices are expected to remain broadly stable in 2020 as production levels and stocks of most staple foods are at record highs.

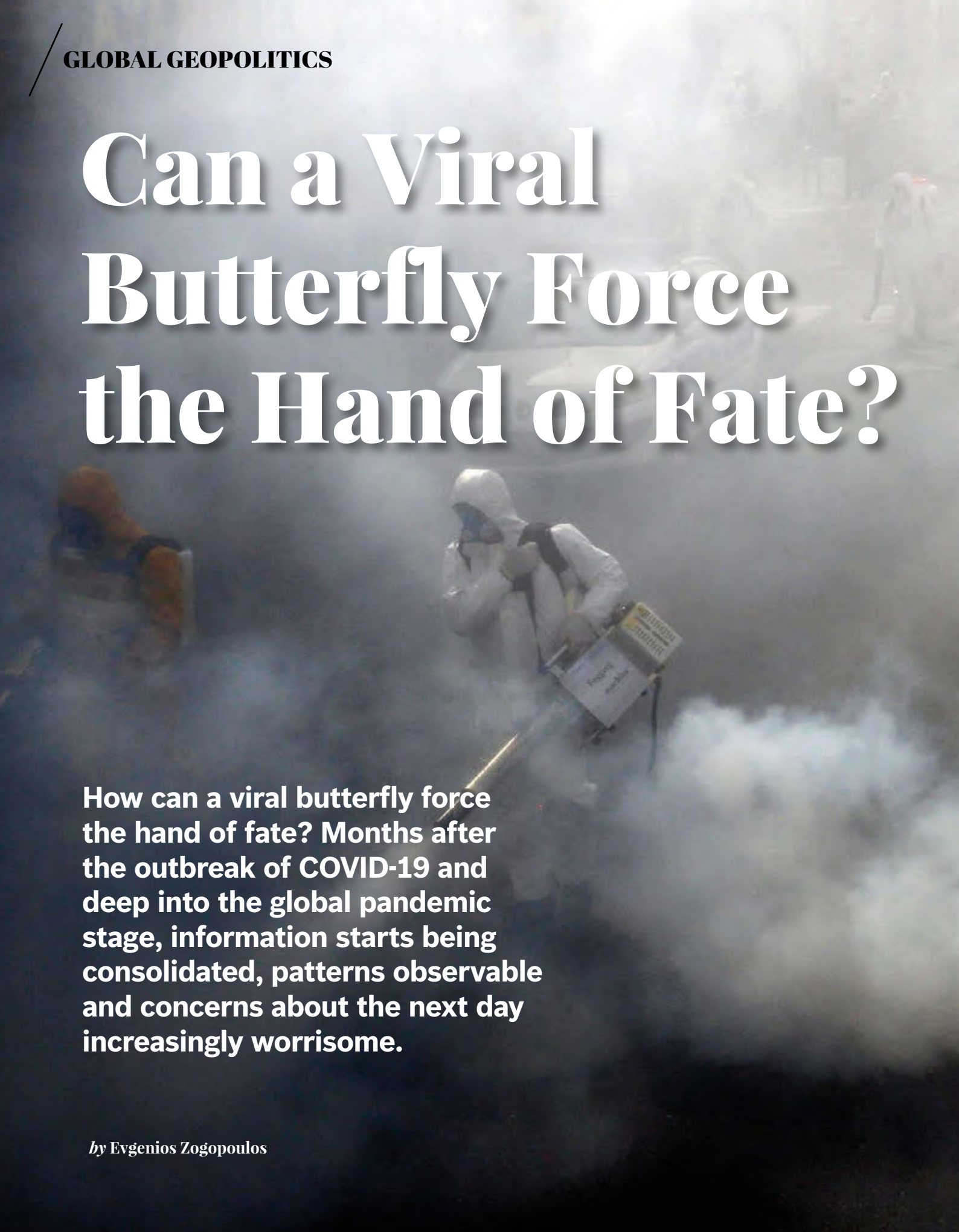
Most food markets are well supplied. However, concerns about food security have escalated as countries announce trade restrictions that include export bans on certain commodities and engage in excess buying. Similarly, agricultural commodity production, especially next season, could be affected by disruptions to the trade and distribution of inputs such as fertilizer, pesticides, and labour. Snags to supply chains have already affected to the exports from some emerging market and developing economies of perishable products such as flowers, fruits and vegetables.

Despite well supplied markets, export restrictions could hurt food security in importing countries. The World Bank has joined other organizations in calling for collective action to keep food trade flowing between countries.

The impact of the COVID19 pandemic on commodity markets more broadly may result in longer-term changes. Transport costs may be higher due to additional border-crossing requirements. Higher trade costs will in particular affect agriculture and food commodities and textiles. Decisions to stockpile certain commodities could affect trade flows and have an effect on global prices.

Commodity-dependent emerging market and developing economies will be among the most vulnerable to the economic impacts of the pandemic. In addition to the health and human toll they face, and the effects of the global economic downturn, reduced demand for exports and disruption of supply chains will take a toll on the economies of these countries. ■

Can a Viral Butterfly Force the Hand of Fate?



How can a viral butterfly force the hand of fate? Months after the outbreak of COVID-19 and deep into the global pandemic stage, information starts being consolidated, patterns observable and concerns about the next day increasingly worrisome.

by Evgenios Zogopoulos

Iranian firefighters disinfect streets in Tehran in a bid to halt the spread of the coronavirus on March 13. AFP VIA GETTY IMAGES

In Europe and the United States, the restrictive measures and namely the lockdown of the population, seem to be leading with great accuracy to the largest quarterly decline in economic activity since 1933. What we did as a species has not been tried or done before: locking down billions of humans, asking them not to work, urging them to avoid other humans and all that without guaranteeing the next day or at least a solid plan.

There has been a great public battle regarding how to control the spread but no estimation about when we return to 'normal' or what 'normal' should look like from now on. Additionally, the constant flow of data is almost inconsistent, out of context or in the worst cases being weaponized for political purposes. We have cases like the one of South Korea which handled the crisis without heavily restrictive measures, we have Greece who handled the crisis with restrictions really early on and we have the curious case of Sweden who pretty much advised its people to respect individual safety guidelines (and seems to be managing very well so far). There are no predominant common underlying denominators between these countries and that is just an indicative example of our incapacity to see connecting patterns and formulate a flowchart for containing the virus. It also produces indivertibly the next big question: "and now what?"

McKinsey & Company estimates that 40% to 50% of discretionary consumer spending will probably not occur. In every recession, people reduce risk, reduce spending and cut back on the non-essential costs that can easily be postponed, increasing precautionary savings while expecting worse news or deterioration. What is new to the situation, and pretty much unprecedent in such a scale, is the fact that people must now avoid people; they must not go out, must not dine out, must not travel, must not move. This is not just an impact for whole pillar industries (like automotive, travel, entertainment etc.) but catastrophic. The above-mentioned estimation of 50% drop in discretionary spending could roughly be transformed into a 10% (or more) reduction in GDP directly; this is without including the aftermath and secondary-domino effects. That's not only unprecedented in modern history, it has been historically almost unimaginable.

And all that because someone ate a bat in China? That might be a little bit stretched, even for the chaotic Butterfly Effect theory where flying butterflies in Tibet cause hurricanes in Mexico. Or not?

To describe it briefly, the phenomenon 'assigns' the power to cause a hurricane in China to a butterfly flapping its wings in New Mexico. It may take a very long time, but there is a real matrix of interwoven (potentially causal) connections between the flap of the wings and its contribution to the hurricane. If the butterfly had not flapped its wings at just the right point in space/time, the hurricane would not have happened. Of course, the butterfly is just an example; could arguably be replaced by a sick bat who got trapped and eaten in Wuhan, causing the financial collapse in wall Street or you not being able to go out and enjoy dinner in your favorite restaurant.

Could it be the hand of fate? Could it be some sort of cosmic force bringing these apocalyptic events upon us? Is it our destiny?

Well, we humbly suggest that it is probably a combination of these factors, along with some others. The cosmic force is real and it is called 'Evolution' and yes, it does happen due to- or along with- 'random' or 'divine' (if you want to go that way) intervention of a simple happening which alters reality and shapes history. But let's start putting things in line first and try to scratch the surface of how viruses have been shaping, like cosmic butterflies, human history from the very beginning.

Viral humans

Viruses are little more than strings of genetic material, usually in the form of a molecule called RNA, packaged in a protein coat, and they all appear to operate in very similar ways. Once they infected a host cell, it hijacks the cell's own molecular machinery to copy its genes and copy itself all in all. New viruses are assembled from these freshly manufactured parts, which eventually burst out in search of new cells to attack. It is still debated whether viruses exhibit signs of intelligence and that's remarkable because they are not considered to be even living organisms. That, of course, has to do with how we define 'life' or 'intelligence' apparently.

For most viruses, such as the flu, the story ends there – spread, hijack, copy, die. But a handful of retroviruses – including HIV or HPV – are even sneakier, smuggling their way into our DNA. They insert themselves randomly into the genome of an organism, lying low (almost 'dormant') for a very long time until "the time is right" to pop up again. The genetic instructions can be 'read' from the embedded virus, converted into DNA and then pasted into another location in the genome. Repeat this cycle again and again, and multiple copies of the viral DNA quickly build up. Viruses hijack nearly every function of a host organism's cells in order to replicate and spread, so it makes sense that they would drive the evolution of the cellular machinery to a greater extent than other evolutionary pressures such as predation or environmental conditions.

Over millions of years, these viral DNA sequences randomly mutate and change, losing their ability to break free from their host cells. Trapped inside the genome, some of these

'endogenous' retroviruses can still jump around while others are stuck forever where they last landed. And if any of these events happen in the germ cells that make eggs and sperm, then they will be passed down the generations and eventually become a permanent part of an organism's genome.

David Enard, Ph.D., a postdoctoral fellow at Stanford University specifies that: "When you have a pandemic or an epidemic at some point in evolution, the population that is targeted by the virus either adapts, or goes extinct. We knew that, but what really surprised us is the strength and clarity of the pattern we found".

Around half of the human genome is shaped by an immense number of DNA sequences that can be traced back to long-dead viruses or 'transposable elements' or 'transposons'. Some researchers claim and raise this figure up at 80%, as ancient sequences are now degraded beyond the point of being recognizably virus-like, weathered within the genome like fossilized remnants.

Eventually, and as our technological capacity increases, we are able to see patterns more clearly. We are slowly figuring out that as well as being our genetic enemies, some of the viruses embedded in our genome have become our friends or even slaves. Research findings suggest that 30% of all protein adaptations since human divergence from apes have been caused by viruses. Furthermore, it is also suggested that brain cells are prime candidates for reactivating jumping genes, increasing the diversity of nerve cells and enhancing our cognitive capacity.

Previous research on the interactions between viruses and proteins has focused almost exclusively on individual proteins that are directly involved in the immune response - the most logical place you would expect to find adaptations driven by viruses. Proteins perform a vast array of functions that keep our cells ticking. By revealing how small tweaks in protein shape and composition have helped humans and other mammals respond to viruses, the study could help researchers find new therapeutic leads against today's viral threats.

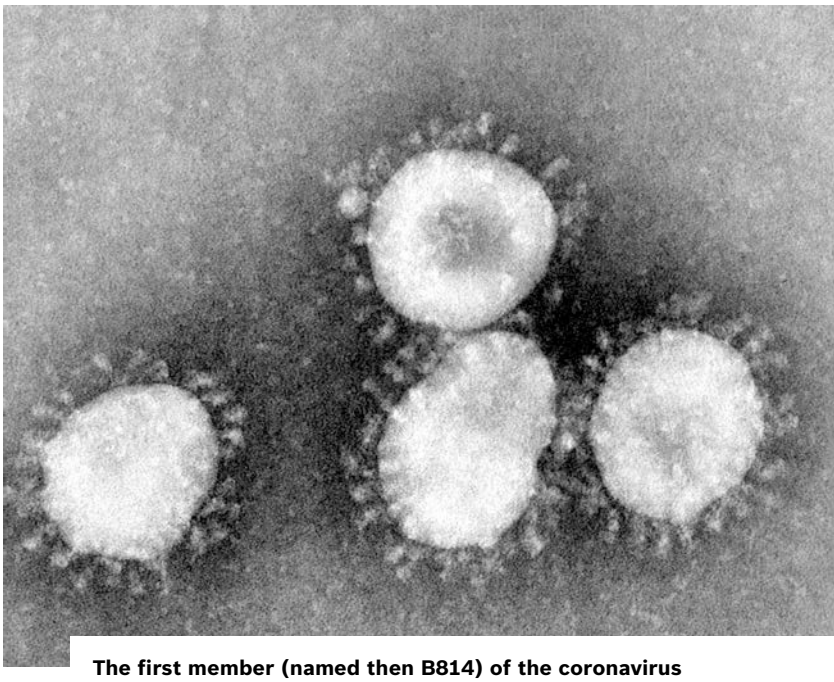
"The big advancement here is that it's not only very specialized immune proteins that adapt against viruses," said Enard. "Pretty much any type of protein that comes into contact with viruses can participate in the adaptation against viruses. It turns out that there is at least as much adaptation outside of the immune response as within it."

"We're all interested in how it is that we and other organisms have evolved, and in the pressures that made us what we are," Dmitri Petrov, Ph.D and part of leading research team on the subject says. "The discovery that this constant battle with viruses has shaped us in every aspect - not just the few proteins that fight infections, but everything - is profound. All organisms have been living with viruses for billions of years; this work shows that those interactions have affected every part of the cell," he adds.

COVID-19's identity

Coronaviruses or coronavirinae are a large family of RNA viruses that are able to infect both humans and animals; 'corona' is derived from the ancient Greek word 'κωρόνη', meaning crown. This is apparently an effort to depict the envelope of the virus which is consisted by protein and glycoprotein projections seen by electron microscopy - similar to the image of a crown. This type of virus (named then B814) was firstly identified in humans in the 1960s by Tyrrell and Bynoe, in human embryonic tracheal organ cultures obtained from an adult patient with respiratory symptomatology. It's a pleomorphic particle, measured 80-150nm, with a lipid double layer outer structure (membrane and envelope) and club-shaped spikes on the surface of it and the single-stranded RNA genome in the interior.

Historically SARS-CoV-1 (beta-coronavirus) was the first severe outbreak of this kind of virus in South China in 2003; after that event, in 2004, HCoV-NL63 (alpha-coronavirus) was identified in



The first member (named then B814) of the coronavirus family that belonged to the SARS-CoV-2, which caused the disease of nearly 2 million people in the world, to be infected in 1964. It was viewed and detected by June Almeida.

Netherlands in a pediatric patient with bronchiolitis. In 2005, HCoV-HKU1 (beta-coronavirus) was the next type discovered in a male patient from Hong-Kong and the last one before the most current pandemic crisis was MERS-CoV (beta-coronavirus) in 2012, firstly isolated from Saudi Arabia patient. All of them, were associated with respiratory symptoms, like common cold, the transmission of the virus in most of the cases was likely to be airborne, via human-to-human or animal (camels, palm civet)-to-human, food transmission being unlikely though.

"Revenons à nos moutons", COVID-19 or SARS-CoV-2 or Wuhan coronavirus (beta-coronavirus) has left its mark most possibly not only to the current year. It is considered by many that the virus made its first presence at a market near Wuhan (China) located at a 30km distance. Epidemiologists have approximated that the first case was back in November 2019. Its molecular structure is the same to all strains of coronavirinae. The transmission is possible through human-to-human interaction and via respiratory microdroplets (cough, sneeze, talk, direct/indirect contact), which explains the protection measurements taken with masks (N95/FFP2/FFP3), social distancing (more than 2m) and frequently hand washing with soap and alcohol-based solutions (ethanol 80% formula, 2-propanol 75% formula).

Mean incubation period is about 2-7 days, but cases with an incubation period of 27 days have been presented, explained by intrinsic properties of the virus being undetectable by the immune system at the early stages. The principal problem of the extremely high rate of transmission, is due to the spreading from asymptomatic humans. Studies made regarding spike proteins, demonstrated the usage of ACE2 (angiotensin converting enzyme 2) as cellular entry, neutralizing the antiviral effect of interferon leading to an excess of inflammation and continuous viral replication considering early stages. Asymptomatic and mild symptomatic patients sum up the majority (70%-80%) of the cases, presenting fatigue, dry cough, sore throat, fever, shortness of breath and less often diarrhea. Susceptibility of severe infection, is increased to those with subsequent pulmonary and cardiovascular disease, diabetes and obesity.

Huanan Wholesale Seafood Market in Wuhan, China, on January 12, 2020. NOEL CELIS/AFP via Getty Images

Various types of medications have been presented, regarding treatment modalities for the running disease, depending on the severity of the disease: lopinavir/ritonavir, oseltamivir, hydroxychloroquine, methylprednisolone, remdesivir, favipiravir, tocilizumab which until now used to have utility in other pathologies like HIV, juvenile rheumatoid arthritis, lupus erythematosus and other viral infections (Ebola virus, Influenzae virus) with a positive outcome in many of the COVID-19 cases.

The principal treatment for severe COVID-19 patients is symptomatic, meaning oxygen therapy and mechanical ventilation. Many pharmaceutical companies are trying to develop the prophylactic vaccines since the first days of the outbreak, by analyzing target antigens (ex. recombinant protein, mRNA, DNA), immune system paths, suitable and safe vectors (viral vector vaccine- S protein) and satisfactory antibody response preventing immediate reinfection.

Global response and societal shifts

The pandemic is moving like a wave and we can either ride it or get crashed under it. There is no way to stop it. It is a formidable natural force and not a new one as mentioned above. COVID19 is beginning to be much more than just a health crisis. By invading every one of the countries it reaches it is leveling social, economic and political structures and this will leave potentially irreparable scars of war in our way of life.

We are deep into uncharted waters; they are murky and dangerous too. Many of our communities are now beyond recognition; empty streets, closed shops and weird looks in the super markets towards anyone who dares to cough. Dozens of the world's greatest cities are deserted as people stay indoors, either by choice or by government order. Every day, people are losing jobs and income, with no way of knowing when normality will return. Small island nations, heavily dependent on tourism, have empty hotels and deserted beaches. The International Labor Organization estimates that 195 million jobs

could be lost. UNDP Administrator, Achim Steiner commented that "we are already hard at work, together with our UN family and other partners, on three immediate priorities: supporting the health response including the procurement and supply of essential health products, under WHO's leadership, strengthening crisis management and response, and addressing critical social and economic impacts."

The IMF has already set up a webpage mapping the governmental responses to COVID19 globally, country by country, from Afghanistan to Vanuatu and Zimbabwe. They also have the disclaimer: "The information included is not meant for comparison across members as responses vary depending on the nature of the shock and country-specific circumstances."

But how is it possible not to compare?

We have cases of leaders that acted preemptively and with great anticipation and cases like the one of Boris Johnson who underestimated COVID19 and its impact, ending in the ICU (intensive care unit) himself, after contracting it. We have cases of states with extreme lockdowns and others without. We have cases of totalitarian regimes succeeding and democratic ones failing and vice versa. We also have cases of weaponization of COVID19, like the one of Turkey, which seems to be selectively pushing the infected refugees into Greece as a means to obtain political and strategic gains for its expansive regional foreign policy. We also have the United States and president Trump accusing the World Health Organization for mismanagement and stating they will cut the funding down. They also considered deployment of military forces at the joint borders with Canada (!) to "help fight the spread of coronavirus". Russia seems to be eerily quiet and China is trying to recover; the curious case of China, and a very good paradigm, is that the citizens are now allowed to go out, dine out and do activities but they are not willing to. It seems that COVID19 is shaping us behaviorally.

Daily wage workers and homeless people eat food inside a government-run night shelter during a 21-day nationwide lockdown to limit the spreading of coronavirus disease (COVID-19), in the old quarters of Delhi, India, March 26, 2020.

At the same time India is crumbling, failing to contain the virus, failing to monitor it and even worst failing to support its confined population; sources onsite claim that people will "start dying from hunger before the virus gets them". Millions of unregistered workers cannot go out and earn their day's food, highlighting a stark societal reality. It is also reported by local sources that if someone "coughs or exhibit any signs of illness (any illness) is being thrown out of common living spaces, to survive on their own, in fear of transmitting the virus"; little they know that the virus – if it was ever present – would have already spread by the time the initial host exhibited any observable symptoms.

Meanwhile, and just to highlight the strange times we live in, PwC reports that IPOs (initial public offerings for companies who enter the public markets) Q1 IPOs raised 35.7 Billion Dollars from 207 transactions, an increase of 78% compared with last year's Q1, amidst the global crisis.

It is becoming evident that without a change of global narrative, combined with the discovery and massive administration of vaccines, these changes are here to stay. Maybe they are spasmodic reactions to a newly found situation or an evolutionary step – or both; only time and history will reveal it.

Recovery scenarios

Early on in the article we reached the question of "now what"?

One if the predominant patterns observable right now (mostly South East Asia and Europe) is countries being at a stalemate with the virus; they have managed to monitor it, control it and flatten the curve. They are not absolutely sure what happens next though; how to relaunch their economies but first and foremost their societies upon which the economies are shaped.

Global consulting firms are already working on different scenarios to approach the roll out. Regions with significant ongoing transmission rates should expect that restarting economic activity will only lead to more infections. Case numbers and, more importantly, hospitalizations need to be low enough for a health system to manage individually rather than through mass measures. An apparent important factor is the level of the local/national health system and its capacity to support the infected population.

A makeshift emergency ward set up to ease pressure on a hospital in Brescia, northern Italy | © Claudio Furlan/LaPresse/AP

Some strategic sectors of the economy will need to operate even in lockdowns like healthcare, security, and procurement of essential goods and services such as food, medicine, energy and communications. Others could open later, once risk has been mitigated, through strict protocols that have been created to account for the activity's higher risk factor.

When sectors start operating again, leaders must establish and enforce health and behavioral protocols to lower the potential for further transmission. In almost every sector, businesses will need strict protocols for physical distancing: remote work, hygiene- and health-oriented guidelines, frequent monitoring of people's temperatures, immediate reporting of relevant information to the health authorities, and other measures to guarantee compliance. The future starts to seem weird. Technology will definitely play a very important factor in reinforcing these protocols and measures.

Of course, it is still very possible that we will be eventually not effective in containing the virus, or in mitigating the economic impact. In this case, economic outcomes in 2020 and beyond would be of apocalyptic magnitude. In a more pessimistic scenario, China will not recover fast enough (as it is already showing) and would perhaps will need to lockdown again parts of its territory, maybe due to new outbreaks. It would also be hurt by falling exports to the rest of the world (which is also already happening).

Additionally, the United States and Europe could also fail to contain the virus within one quarter and be forced to implement some form of physical distancing and quarantines throughout the summer (which seems totally realistic now, especially for the US). McKinsey estimates that his could end up producing a reduction of GDP at an annualized pace of up to 40% in Q2. Economic policy would fail to prevent a huge spike in unemployment and business closures, creating a far slower recovery even after the virus is contained.

Conclusion

Bill Gates has been talking about his for a long time; he 'predicted' that this next viral outbreak would happen sooner or later. Probably not because he is part of an elite conspiracy cult, aiming at causing dyslexia to our children through their vaccines; it was most probably because he saw the ever-repeating viral outbreaks. He said it was only a matter of time before the next one; and here it is.

Viruses, there immensely small strings of RNA, have been with us since the dawn of time; admittedly, it was not even an exclusive relationship – viruses have been around since the dawn of life probably, infecting anything living. By infecting any life form, it pushed it through evolutionary boundaries forcing it to evolve or perish. That is a cornerstone of what is called natural selection: evolve or go extinct.

Winter has come and we are being called upon to evolve as a species; and we will. It was always our 'fate' to evolve and survive until we cannot anymore. Maybe the flap of a butterfly's (or bat's) wings in Wuhan can force the hand of fate after all.

Haris M. Rigas MD contributed to the article with COVID's identity

HIGH INNOVATIVE MIND
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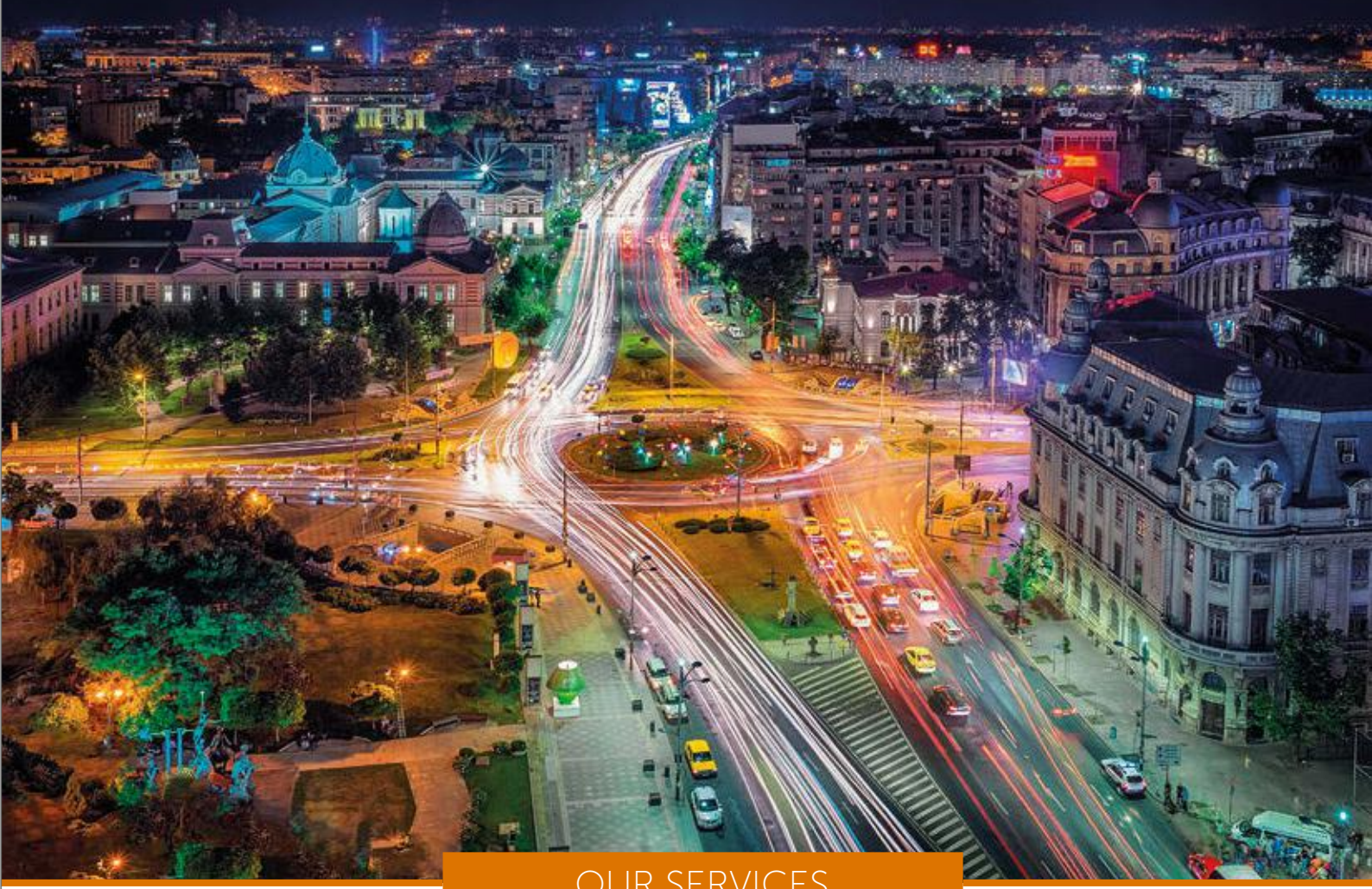

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The Impact of the Covid-19 Crisis on the European Green Deal

A FOCUS ON ROMANIA AND SOUTHEAST EUROPE

The Energy Policy Group analysis by Radu Dudau and Mihnea Catuti focuses on the adversarial impact that the coronavirus crisis can have on the recently launched European Green Deal.

The COVID-19 outbreak prompted governments worldwide to impose unprecedented restrictions on travel and economic activity. Coupled with a drop in global oil prices, which it largely caused, this crisis is producing imbalances in the energy sector, affecting both investments and the transition to decarbonisation.

Efforts are being made to ensure that the economic recovery measures adopted at EU and national levels are in line with the long-term climate efforts. In this regard, particular attention should be given to the Southeast European member states that are both more vulnerable to such economic shocks and face distinct challenges in the energy transition.

In Romania, a drop in energy prices threatens further investments in the sector, while potentially ill-conceived governmental interventions risk creating lasting and unforeseen imbalances. In transportation, the renewal rate of vehicles is discouraged by low oil prices, while an influx of second-hand vehicles from Western Europe will further disincentivise the replacement of internal combustion engine cars. In the buildings sector, facing stricter and more costly energy performance standards, and largely dependent on shrinking public funds, the renovation rate of buildings could also be negatively affected.

In order to address this multifaceted crisis, an economic recovery plan should be designed to take into account both the more limited resources for countries in the Southeast Europe and the need to safeguard long-term climate objectives. Emergency short-term solutions for combatting the immediate social and economic risks of the coronavirus crisis should be combined with a set of policy and regulatory revisions that can ensure a smooth and sustainable post-crisis recovery.

Case study: Romania

As a case study, this section focuses on the effects that COVID-19 crisis has on Romania's energy, transport and buildings sectors, and the way these are, in turn, likely to impact the early phases of the European Green Deal.

You may read the full analysis at https://www.enpg.ro/the-impact-of-the-covid-19-crisis-on-the-european-green-deal-a-focus-on-romania-and-southeast-europe/ ■

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Sinaii Street, № 3, Floor 1-3
Ploiesti, Prahova, 100357
ROMANIA

Phone: +40 244 595940
+40 244 406616
+40 244 406621
Fax: +40 244 595942
E-mail: office@habau.ro