

BLACK SEA REGION | EUROPE | MIDDLE EAST

FEBRUARY '21

# ENERGY

INDUSTRY REVIEW

## **DRILLING ON OFFSHORE PLATFORMS**

Quo Vadis?

## **EU ACCELERATING DECARBONISATION**

Romania to Miss the Start

## **NEW ENERGY POLICY**

Government to Upgrade  
the Energy Sector within 4 Years

# **Christina Verchere, CEO and President of OMV Petrom Executive Board**

## **Black Sea Gas to Underpin Key Attributes for Romania**

**clean energy** since 1909



The background of the entire page is a photograph of an industrial facility, likely a gas processing plant, during a sunset. The sky is a mix of orange, yellow, and red, with the sun low on the horizon. In the foreground, there are several levels of metal scaffolding and walkways with railings. Various pipes, valves, and industrial equipment are visible throughout the scene. The overall atmosphere is industrial and dramatic due to the lighting.

# **S.N.G.N. ROMGAZ S.A.**

**The company is listed on Bucharest Stock Exchange and GDRs are transacted on London Stock Exchange.**

Romgaz undertakes geological exploration in order to discover new gas reserves, produces methane by exploiting the reservoirs included in the company portfolio, stores natural gas in the underground deposits, interventions, workover and special operations on wells and technological transport. Starting with 2013, Romgaz extended its scope of work by taking over the Iernut thermoelectric power station, and thus it became also electric power supplier.

**Romgaz is the largest natural gas producer and the main supplier in Romania.**

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# Coal and the Economy of the Future



**E**nsuring energy resources is an economic issue of vital importance for any state in the world, so that their rational exploitation can be considered, without fear of being wrong, even a matter of national security. We see that, boosted by environmental activists and programs financing sustainable energy (but also, especially, by the economic interests of some countries that can sell or use such energy), green energy has increasingly taken over a market that, until not many years ago, was monopolized by oil, gas, or coal.

Europe has started a crusade against mining industry, especially in the last two decades, trying to eliminate coal as much as possible. Vocational retraining programs, financial aids for closing production capacities, all to make room for less polluting industries.

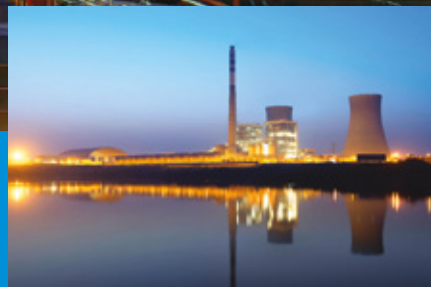
Romania owned some of the most important coal resources in this part of Europe and even in the EU. But, one by one, entire exploitations were closed, with social repercussions difficult to

quantify. Not to mention the economic ones. The only University in Romania that trains specialists in the field, the one in Petrosani, has adapted faster than the Romanian authorities to the new situation. Therefore, from the end of last year, the institution is part of a European consortium consisting of 7 universities that have joined forces to create a powerful and united European University in the field of responsible consumption and production: EURECA-PRO. Moreover, in partnership with the Bucharest University, the Petrosani University is implementing the project SMART 2020 - a multidisciplinary System for practical training, project with non-reimbursable financing within which the consolidation and development of 39 partnerships with employers are targeted, in order to support the professional competences and skills of 284 students in various fields in the process of transition from the educational environment to the labour market, through an integrated, intensive and consistent system of career counselling and guidance services and the organization of practical training internships. Within this consortium, the achievements, and collaborations of the University in Petrosani targeting sustainability refer to technologies for the superior capitalization on non-energy mineral substances; capitalization on renewable energy resources in the area (hydro, bio, wind); promoting measures of inter-regional fairness in terms of resources, reorientation of mining skills in the field of non-energy mineral resources (quartz, building materials, salt, copper). Therefore, Romania is adapting on the go and fully uses its mining specialists in industries currently sought after.

Instead, China, one of the biggest polluters of the world, has announced that it would build coal-fired power plants in all major cities that will be milestones of the New Silk Road. Not to mention the fact that, in the latest report, from September 2020, President Xi Jinping announced that by 2030 China would strive to reduce carbon emissions and before 2060 it would reach carbon neutrality.

Therefore, how important will coal be in the economy of the future and who will be the beneficiary of using/eliminating it?

Daniel Lazar  
Senior Editor



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ACER published on January 4 its Decision on the Methodology for the Use of Congestion Income, which represents the congestion revenue transmission system operators (TSOs) collect when allocating electricity cross-border capacity. The Decision has been taken in accordance with the EU Regulation on the internal market for electricity and approves the TSOs' proposed methodology submitted to ACER on 3 July 2020.

The methodology provides the following elements: It sets the conditions under which congestion income resulting from the allocation of cross-border capacity may be used according with the EU Regulation on the internal market for electricity; It sets the conditions under which congestion income may be placed on a separate internal account line for future use for those purposes, the process of the congestion income allocation and details on handling the separate internal account line; It determines for how long congestion income may be placed on such an internal account line.

In the Agency's view, the submitted proposed methodology duly meets the procedural and substantive requirements laid down in the EU Regulation, and therefore deemed appropriate to approve it.

## Azerbaijan-Turkmenistan Agreement on Caspian Sea Energy Field

Azerbaijan and Turkmenistan have reached a preliminary agreement on the joint exploration of a once-disputed section of an undersea hydrocarbons field in the Caspian Sea believed to hold lucrative energy reserves.

The Azerbaijani Foreign Ministry said on January 21 that President Ilham Aliyev and his Turkmen counterpart, Gurbanguly Berdymukhammedov, supervised the online signing of a memorandum on the mutual intention to jointly explore and develop the Dostluq (Friendship) undersea field. The field used to be called Kapaz by Baku and Serdar by Ashgabat. The undersea field was discovered by Soviet explorers in 1986. Experts estimate that the Dostluk hydrocarbons field contains natural gas and at least 50 million tons of oil.

For many years after the collapse of the Soviet Union, Baku and Ashgabat were at odds over the ownership of the undersea field. The settlement of the issue will help pave the way for a trans-Caspian pipeline - a multibillion-dollar plan to link Turkmenistan's giant gas fields to Europe via Azerbaijan.

## First M&A Made by a State-owned Company in Romania

The General Meeting of Hidroelectrica Shareholders approved the transaction for the purchase of 100% of the shares held by Steag GmbH and Steag 2 Beteiligungs GmbH in Crucea Wind Farm S.A. and Flag Energie Romania S.R.L. (Arizona project perimeter), in accordance with the submitted offer and the negotiated sale-purchase contract (SPA). Developed by STEAG and made operational in 2014, Crucea Wind Farm is one of the most modern onshore wind farms in Romania, with an installed capacity of 108 MW.

"The decision taken by the

shareholders makes Hidroelectrica the first state-owned company to mark a successful M&A. It is a success for both the Romanian state and the company, a moment that changes perspectives and demonstrates that when there is interest and involvement, Romanian energy companies can be at least as competitive in the development area as private ones. The acquisition of Crucea Wind Farm confirms the success of the objective we set out to reach when we discussed the Hidroelectrica strategy - that of diversifying the company's production portfolio and making

green energy a unique development priority," said Bogdan Badea, the company's Director. "We remain in the area of renewable energies through everything we propose, and we want Hidroelectrica to keep its status as a 100% green company," he added.

Hidroelectrica is the largest green energy producer in Romania and the main provider of technological services required in the National Energy System, a vital company for a strategic sector, with implications for national security. The company currently operates 209 plants, with a total installed capacity of 6,482 MW.



## World's Largest Low-carbon Hydrogen Membrane-based Production Unit in Canada



Air Liquide has completed the construction of the world's largest PEM (Proton Exchange Membrane) electrolyser. Supplied with renewable energy, this unit is now producing up to 8.2 tonnes per day of low-carbon hydrogen in Bécancour, Québec. With this large-scale investment, the group confirms its long-term commitment to the hydrogen energy markets and its ambition to be a major player in the supply of low-carbon hydrogen.

The new 20 MW PEM electrolyser, equipped with Cummins technology, is the largest operating unit of its kind in the world and will help meet the growing demand for low-carbon hydrogen in North America. The commissioning of this electrolysis unit increases by 50% the capacity of Air Liquide's Bécancour hydrogen production complex. Compared to the traditional hydrogen production process, this new production unit will avoid the

emission of around 27,000 tonnes of CO<sub>2</sub> per year, which is equivalent to the emissions of 10,000 cars per year. The choice of Bécancour is based on two attributes of the site: the access to abundant renewable power from Hydro-Québec and the proximity to the hydrogen mobility market in the northeast of the continent.

"The fight against climate change is at the heart of the Air Liquide Group's strategy. The inauguration of the Bécancour site in Canada marks an important step in the implementation of this strategy. With this world's first, Air Liquide confirms its commitment to the production of low-carbon hydrogen on an industrial scale and its ability to effectively deploy the related technological solutions. Hydrogen will play a key role in the energy transition and the emergence of a low-carbon society," Susan Ellerbusch, CEO, Air Liquide North America and Group Executive Committee Member, said.

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## **Romanian Companies to Spend 14% of Their IT Budgets on Cybersecurity**

Romanian companies are inclined to increase their spending on enhancing the cybersecurity of their business, indicates a study commissioned by Safetech Innovations, a Romanian cybersecurity company. Despite the significant increase in the number and sophistication of cybersecurity attacks, only four out of 10 companies are concerned about the possibility that their company could be a victim of an attack while three out of 10 businesses consider it highly

unlikely and therefore are not concerned about cybersecurity.

62% of the Romanian companies consider cybersecurity a key priority for their business. Large companies with over 250 employees pay higher attention to cybersecurity as 76% consider it important, compared to 58% of SMEs. Despite awarding high importance to cybersecurity, only a third of the companies have implemented policies and procedures against cybersecurity attacks and less than half has dedicated person

within the company who oversees cybersecurity. Half of surveyed companies is willing to outsource cybersecurity to an external company. 20% of companies that participated in the survey indicated that they do not consider cybersecurity sufficiently important to appoint a dedicated employee.

When it comes to the weight of the expenditure in the IT budget, assigned budget for cybersecurity solutions in 2020 amounted to 11% of the total IT budget.

## **First Foreign Investment Based Independent Wind Power Project in Azerbaijan**

Following the signing of the implementation agreement for the USD 300 million Independent Power Project in January 2020, ACWA Power executed the official agreements for the 240 MW wind power project that will be in the Absheron and Khizi regions.

Key agreements signed by ACWA Power included the signing of the Investment Agreement with the Government of the Republic of Azerbaijan, represented by the Ministry of Energy. ACWA Power also signed the Power Purchase Agreement and Transmission Connection Agreement with 'Azerenerji' OJSC, the national electrical power company and off-taker for the project. Though Azerbaijan has relied largely on natural gas to meet its energy needs, the focus is now on diversification and boosting of alternative energy resources. Renewables offer the most prominent solution to meeting Azerbaijan's ambitious climate targets. The country has committed to reducing its greenhouse gas (GHG) emissions by 35% by 2030, under the Paris Agreement, which emphasizes the use of alternative and renewable energy sources to achieve this target.

## **DTEK to Establish Ukrainian Energy Investment Hub in UK**

DTEK is amplifying its presence in London, the capital of the United Kingdom. As outlined in the company's recently presented corporate strategy, DTEK plans to expand existing and invest in new RES projects in European energy markets. Additionally, the company seeks to create an ecosystem to attract investment and innovative technologies in new Ukrainian energy projects.

"We are establishing a hub to attract investment in new energy projects in Ukraine. This primarily concerns renewable energy sources, energy storage systems and hydrogen energy projects. In addition to increasing gas production and improving the country's grids, these areas have been identified as the priority in our strategy presented in December 2020," said DTEK CEO Maxim Timchenko.

DTEK has had a corporate presence in the UK since 2013. The commencement of the investment hub is scheduled for the end of the first half of 2021.



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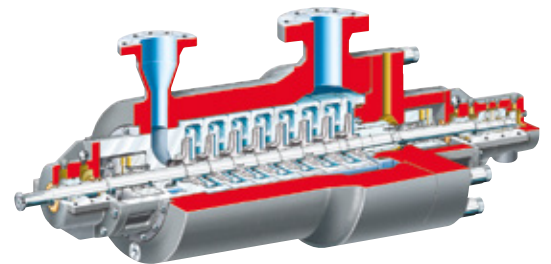
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### Inspet, 30 Years of Excellence in Oil and Gas Infrastructure

Inspet Ploiesti this year marks 30 years of activity in the oil and gas industry.

Inspet Ploiesti is a company specialized in construction and maintenance of oil and gas equipment that spun-off in 1990 from the long lasting traditional 'Oil Field Construction and Mounting Enterprise'. Company's roots are historically set 60 years ago, whilst during its modern history going back over 20 years it successfully grown and adapted its range of services to become a complete construction provider in its sector.

"Excellence in Oil and Gas Infrastructure means for Inspet team hundreds of projects carried out for the oil and gas industry in Romania and the neighboring countries, plus other construction-assembly works for important beneficiaries. We are proud of all these projects completed in a sustainable manner, part of them being premieres in terms of energy infrastructure in Romania, and we are aware that we succeed thanks to dedicated, loyal and passionate people in Oil & Gas, the team that has invested in total over 57,000,000 hours of work to successfully built the tradition of performance in this area of activity," say company representatives.

In 2020, Inspet ranked 1st in the National Top of Companies in the chapter 'Construction of utility projects for fluids'.

### Moftinu-1008 Well Spudded

Serinus Energy announced that the Moftinu-1008 well was spudded in Romania on 16 January 2021. Moftinu-1008 is planned to be drilled to a total depth of 1,000 metres and is expected to penetrate five gas-bearing sand formations, three of which are producing zones of the Moftinu-1007 well.

Moftinu 1008 is located approximately 1.4 kilometres to the northeast of the Moftinu Gas Plant and if drilling is successful, the well will be completed, tested, and brought on-production through a flowline connection to the Moftinu Gas Plant.

The company and its contractors have worked diligently to ensure that proper protocols are in place to deal with the uncertainty regarding the COVID-19 pandemic and Serinus remains confident the well can be drilled while maintaining safe protocols for all employees and contractors during the drilling programme.

### EBRD Supporting Green Investments in North Macedonia

The European Bank for Reconstruction and Development (EBRD) is supporting green investments in North Macedonia with a EUR 1 million loan to Komercijalna Banka Skopje under the EBRD's Green Economy Financing Facility (GEFF). The funds will be available for green investments in the country's residential sector. This will include investments in high-performance green technologies, materials and solutions undertaken in privately-owned residential dwellings or buildings.

Komercijalna Banka Skopje is the largest bank in North Macedonia

and the fifth bank in the country to join GEFF. The programme in North Macedonia is part of the EBRD's EUR 85 million Western Balkans Green Economy Financing Facility launched in 2017, a joint initiative by the European Union (EU), the Austrian Federal Ministry of Finance and beneficiary countries cooperating under the Western Balkans Investment Framework (WBIF).

As of the end of November 2020, GEFF in North Macedonia has reached almost 1.600 households and provided loans of more than EUR 11 million for almost 1.600

individual projects that contributed to savings of over 7 million kWh of energy and a reduction of over 3,000 tons of CO2 emissions per year.

GEFF is implemented under the umbrella of the Regional Energy Efficiency Programme for the Western Balkans (REEP Plus), funded by the EU, and implemented in partnership with the Energy Community Secretariat. REEP Plus has also delivered policy support for harmonising North Macedonia's law on energy efficiency and regulations for energy efficiency in buildings with the relevant European directives.

## Bulgartransgaz Shareholding in Liquefied Gas Terminal in Alexandroupolis Finalized



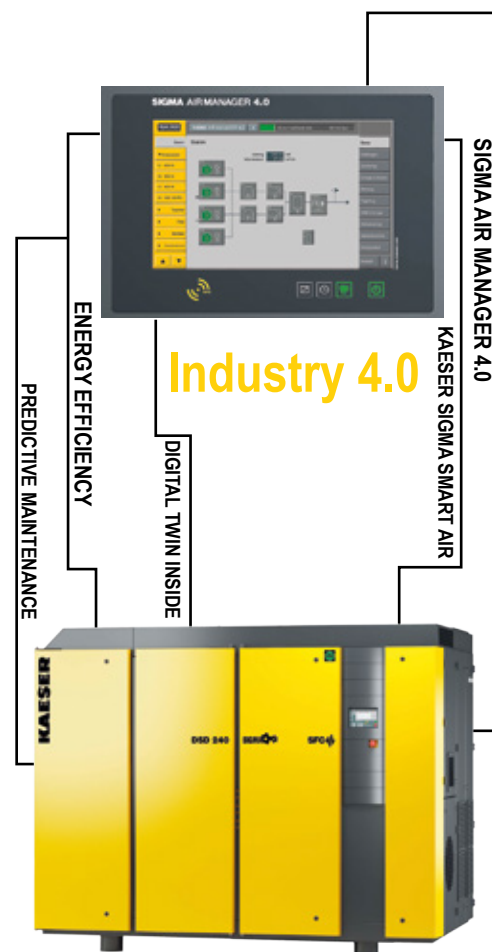
The deal for participation of the Bulgarian gas transmission operator Bulgartransgaz EAD in the project for construction of a liquefied gas terminal in Alexandroupolis is being finalized. The company was entered in the shareholders' book of Gastrade S.A. as a full shareholder with all arising rights and obligations under the signed Agreement between shareholders.

The Alexandroupolis Independent Natural Gas System (INGS) is a modern, cutting edge technology project for an offshore floating unit for reception, storage, and re-gasification of LNG. The planned capacity of the terminal for re-gasification and supply to the Greek gas transmission system amounts to 6.1 bcm/y. The storage capacity is 170 thousand m<sup>3</sup>. The project contributes to implementing the overall Balkan Gas Hub concept, which envisages to connect the natural gas markets of the countries in Central and

East Europe by construction and development of the necessary gas transmission infrastructure. It is being fully implemented in pursuit of the policy and priorities for establishing a single interconnected pan-European energy market.

The terminal is in synergy with other infrastructure projects in the region, such as the Interconnection Greece-Bulgaria (IGB) and the Expansion of Chiren underground gas storage. These projects, along with Bulgartransgaz existing infrastructure, will improve the access of Bulgaria and the countries in the region to liquefied natural gas. The main LNG suppliers to the terminal in Alexandroupolis are expected to be companies from the USA, Qatar, etc. Natural gas can be supplied to consumers in Bulgaria, Northern Macedonia, Serbia, Turkey, Romania, Hungary, Moldova, and Ukraine along IGB and other existing and future gas pipelines in Bulgaria and the region.

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## EBRD and EU Strengthen Support to SMEs in Georgia

Small and medium-sized enterprises (SMEs) in Georgia will benefit from enhanced advisory services offered by the European Bank for Reconstruction and Development (EBRD) to advance their digitalisation and access to capital markets against the backdrop of the coronavirus pandemic. Backed by EUR 1.8 million in EU funding, the EBRD will help local firms with their digital transformation to avoid interruptions to their operations because of the pandemic and rebuild

their businesses with a focus on sustainable and green practices. The EBRD is delivering its support with Team Europe to increase the resilience and agility of the private sector.

In parallel, the EBRD will assist the National Bank of Georgia with the design and implementation of support mechanisms facilitating access to capital markets – both debt and equity – for local corporates, including SMEs. Targeted support will enhance Georgian companies' preparedness for

capital markets, broaden their funding sources and help attract financing from domestic and international investors. Companies can receive tailor-made advisory services and technical support to improve their corporate governance, transparency, and credit rating to source investments across capital markets.

The new funding builds on the successful implementation of a previous phase that supported strengthening the competitiveness of the country's SME sector.

## Enel X Romania Installs Over 1,200 PV Panels for Mega Image

Enel X Romania, part of Enel X, the advanced energy services division of the Enel Group, implements two projects to develop photovoltaic systems for the retailer Mega Image in Popesti Leordeni and Sibiu, with an installed capacity of over 500 kWp.

The project in Ilfov County involves the turnkey delivery of a photovoltaic system consisting of over 1,008 photovoltaic panels located on a canopy-type metal structure, specially designed for the parking lot of the Mega Image warehouse, as well as the construction of the related electricity infrastructure. In Sibiu, Enel X Romania will implement a photovoltaic system that involves the installation of 260 photovoltaic panels on the roof of the Mega Image shop.

The system installed on the roof of the Mega Image warehouse in Popesti Leordeni ensures an annual electricity production of over 527 MWh, reducing the carbon dioxide emissions by 246 tons/year. The projects developed together with Enel X bring the Mega Image retailer annual electricity savings estimated at over EUR 65,000.

## Eni gas e luce and Be Charge to Accelerate Transition to Electric Mobility

In accordance with Eni's decarbonisation and energy transition strategy, through which it aims to become a leader in the sale of low carbon impact of products by 2050, Eni gas e luce announced the signing of an agreement with Be Charge dedicated to the development of charging infrastructures for electric mobility. The company is part of the Be Power Group S.p.A.

The agreement with Be Charge provides for the nationwide installation of co-branded public charging stations for electric vehicles. The charging station will be powered by renewable energy, supplied by Eni gas e luce, certified by guarantees of European origin, fed into the grid, and produced by plants powered 100% by renewable sources. The joint commitment, the growth of the charging network and the increasingly cutting-edge services aim to accelerate the transition to increasingly sustainable and electric mobility.

From March 2021, all electric car owners in Italy will benefit from a 50% discount on the first charge at one of these stations using the Be Charge charging app. Further benefits will be given to Eni gas e luce customers. Be Charge is currently the second largest national operator of the charging network in Italy in terms of size and power.

## Gazprom and TMK Deal on Innovative Pipe Solutions for Field Development



Pipes with threaded connections of latest generation | © Photo: Gazprom

Alexey Miller, Chairman of the Gazprom Management Committee, and Dmitry Pumpyansky, Chairman of the Board of Directors of TMK, discussed, during a work meeting, the state and prospects of their cooperation. Particular attention at the meeting was paid to TMK's unique technological solutions, including import-substituting ones, developed in the interests of Gazprom. Among these solutions are premium-class pipe products – namely, pipes with high-tech threaded connections of the latest generation – that ensure the safety and efficiency of hydrocarbon production in extreme conditions. Batch production of these pipes was undertaken by TMK at the initiative of Gazprom under a special contract for the amounts equal to guaranteed future purchases. The pipes are currently in use at the Kovyktinskoye and Chayandinskoye fields.

Over the past five years, TMK has carried out comprehensive research, development, and engineering works, upgraded its production base, and

started to manufacture more than ten new types of pipe products thanks to its cooperation with Gazprom. These products include import-substituting casing and pump & compressor pipes made of corrosion-resistant nickel-chromium alloys and 13Cr steel resistant to carbon dioxide corrosion. Both the pipes and pipe stock are being manufactured entirely in Russia for the first time in history. As a result, the company's demand for premium-class pipe products has been fully met using the capacities of the domestic industry.

Alexey Miller and Dmitry Pumpyansky also discussed the plans for further joint efforts between the companies. To develop Gazprom's new fields, it is planned to manufacture products that have no equivalents in terms of their characteristics, such as pipes with quick couplings for offshore production, high-strength H<sub>2</sub>S-resistant pipes, and pipes with high-torque connections for building wells up to 15 kilometres in length.



30  
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# Clean Hydrogen, Part of Our Future

When the Hydrogen Council was launched in Davos, four years ago, it was the first global initiative of its kind. You understood that hydrogen should have a central place in the transition to climate-neutrality. And you called on policymakers to do their part. You were ahead of the times.

Today the crucial role of hydrogen is widely recognised, including by the European Green Deal, which we launched just over a year ago.

Clean hydrogen is a perfect means towards our goal of climate neutrality. It can power heavy industries, propel our cars, trucks, and planes, store seasonal energy, heat up our homes. All of this with almost zero emissions.

Clean hydrogen demonstrates that we can reconcile our economy with the health of our planet. And this is precisely the spirit of the European Green Deal.

Our Hydrogen strategy makes hydrogen a key asset for the European Green Deal. The focus in the Strategy is on clean hydrogen produced from renewable energy sources. Low-carbon hydrogen can be part of the transition, but only renewable hydrogen will bring us to climate neutrality.

We also want to make clean hydrogen the best choice in economic terms. The good news

is: with enough commitment, we can reach the tipping point, where clean hydrogen becomes more competitive than its alternatives. With the right investment and the right policies, clean hydrogen can go mainstream.

And this will create new markets for Europe, new economies of scale, new business opportunities. We aim at an annual production capacity for renewable hydrogen of one million tons by 2024 and 10 million tons by 2030. It is an ambitious yet realistic goal.

We can achieve it if we join forces – public and private sector, all together.

I would like to tell you what the European Union is doing in concrete. Let me focus on four practical actions.

- First, we have set clear targets for cutting our emissions, and made them legally binding. We want to cut our emissions by at least 55% by 2030, on the way to climate neutrality by 2050. This is something YOU have been asking for years. Clear, credible, and certain targets, to give industry the predictability you need to plan your investment.
- Second, we are investing in clean hydrogen like never before. Our recovery plan, called NextGenerationEU, is worth 750 billion euros. Over one third of this will finance the goals set in the European Green Deal, including on clean hydrogen. For instance, we want to create Hydrogen Valleys and Hydrogen Islands: We want to have hydrogen produced where it is most economical. And then build strong distribution grids to transport it where it is needed. A true European clean hydrogen market. With hydrogen priced in euros. So, we have asked Member States to identify the right places for this. Places where clean hydrogen creates growth and jobs in full respect of the environment.
- Third, we are changing the rules of the game to facilitate the deployment of clean hydrogen. We are well aware of the regulatory obstacles you face in your daily work. European energy regulations were written at a time when hydrogen was less part of the picture. So, we are changing them. For instance, last month we proposed a revised regulation for the Trans-European Networks for Energy. With it, we will facilitate a quick integration



of hydrogen in our energy system of the future.

- And fourth, we have created a new alliance with the private sector. Our success will depend entirely on cooperation with companies like yours.

This is why we have launched the European Clean Hydrogen Alliance. And I am glad that over one thousand companies have already joined it.

Let me invite those of you who are based in the EU to also join and endorse its objectives.

Through the Alliance, we want to look at the entire hydrogen value chain – from production to distribution, from seasonal storage to refuelling stations, from heavy industries to all areas of mobility. Together we can synchronise investments in all these sectors, bringing together demand and supply at European and even international scale.

We can activate a self-feeding circle – that cuts production costs, while boosting demand. And in this way, we can reach our goals, starting with the production of one million tons of renewable hydrogen by 2024.

Your contribution will be crucial. You hold the key to a successful transition to clean hydrogen. Because the final investment decisions are for the private sector to take. And these decisions need to be taken, right now.

We MUST achieve climate neutrality by 2050. There will be no extra time, no second chance. There are four billion tons of CO<sub>2</sub> that still separate us from our goal. Four billion tons of CO<sub>2</sub> that we still produce every year, here in the European Union. To get rid of them, we need bold decisions.

We need to fully de-carbonise hydrogen production.

We need out-of-the-box solutions to transform how we produce, how we heat and how we travel.

I know that many of you have already embarked in this transformation. Thanks to you, hydrogen aircrafts, clean steel and hydrogen trucks are not science fiction any longer. You made this a reality!

In the coming years, we will need all your ingenuity and entrepreneurial spirit. On my side, I can assure you that Europe is serious about clean hydrogen. Clean hydrogen - is part of our future.

And you will find in the European Union a reliable partner and an ally on the path towards climate neutrality. 2050 is not that far away. But the future has already begun. We need your leadership and support. ■

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# It's Not Just CO<sub>2</sub>

## OIL AND GAS SECTOR TO URGENTLY ADDRESS ITS METHANE PROBLEM

**T**he oil and gas industry is facing increasing demands to clarify the implications of energy transitions for their operations and business models, and to explain the contributions that they can make to reducing greenhouse gas emissions and to achieving the goals of the Paris Agreement.

The increasing social and environmental pressures on many oil and gas companies raise complex questions about the role of these fuels in a changing energy economy, and the position of these companies in the societies in which they operate.

But the core question, against a backdrop of rising GHG emissions, is a relatively simple one: should today's oil and gas companies be viewed only as part of the problem, or could they also be crucial in solving it?

No energy company will be unaffected by clean energy transitions. Every part of the industry needs to consider how to respond. Doing nothing is simply not an option.

Methane emissions do not always get the attention that they deserve in the discussion on climate change. But let there be no mistake,

methane makes a major contribution to global warming – it is a much more potent greenhouse gas than carbon dioxide (CO<sub>2</sub>). And early action on methane emissions will be critical for avoiding the worst effects of climate change, alongside action on CO<sub>2</sub>. There's never been a greater sense of urgency about this issue than there is today.

However, efforts to reduce these emissions have often been held back by a lack of reliable data. And that is one of the key reasons why the IEA is paying special attention to the issue. We have committed ourselves to produce the best available set of numbers for methane emissions around the world, focusing on oil and gas. Launched in 2019, our Methane Tracker has filled a gap and quickly become the global reference.

I am very pleased to report that this year, for the first time, we have included full-year satellite data in our latest update, which covers 2020. For the moment, this satellite data detects only the largest leaks and does not cover all parts of the world, but this is a very dynamic area where more and more details are likely to be filled in soon.

Overall, we estimate that there were around 70 million tonnes of methane emitted to the atmosphere from oil and gas operations in 2020. This is broadly equivalent to total energy-sector emissions from the whole of the European Union.

The 2020 number for methane emissions indicates a decline of around 10% from our estimate for 2019. Some of this was due to efforts from leading countries and companies to tackle methane leaks from their operations. But, in our view, most of this drop occurred not because companies were taking more care to avoid leaks, but simply because they were producing less oil and gas.

As such, there is clearly a risk that this downward trend will be reversed by an increase in production to fuel a rebound in global economic activity.

The immediate task now for the oil and gas industry is to make sure that there is no resurgence in methane emissions, even as the world economy recovers, and that 2019 becomes their historical peak. There is no good reason to allow these harmful leaks to continue, and there is every reason for responsible operators to ensure that they are addressed.

Moreover, our analysis highlights that reducing methane emissions is very cost-effective. Unlike CO<sub>2</sub>, there is already a price for methane everywhere in the world – this is the price of natural gas. So, the costs of reducing leaks can often be paid for by the value of the additional gas that is brought to market.

## A roadmap for addressing methane emissions

The focus of the IEA is not just on defining problems, but finding solutions – in particular, solutions that governments can implement. That brings me to the second element of our announcement: a clear ‘how-to’ guide that governments and regulators can use to bring down methane emissions from oil and gas operations.

We believe that the industry must act to reduce these emissions, but also that there is a strong role for government policies – to incentivise early action by companies, push for transparency and improvements in performance, and support innovation in getting results.

However, in our discussions with countries round the world over the last few years, governments would frequently tell us that they understood the importance of acting to reduce methane emissions but lacked some of the information and tools that they needed to do so. In particular, they lacked information on what other countries were doing and what their own options were.

That is why we chose to put together this Methane Roadmap. Over the last year, we looked all around the world for examples of how countries, states and provinces have tackled this issue. We collected examples of regulation from more than 50 jurisdictions – from the United States to Nigeria and Iraq, from Mexico to Russia and China.

We are making all this information freely available and accessible in our IEA Policies Database. And we used this information to build up our step-by-step guide for anyone trying to develop or to update regulations on methane.

No single solution will work for everyone. But we discuss the advantages and disadvantages of different approaches, using examples and case studies. In doing so, we provide policy makers with the tools that they need to take action.

## Stepping up action in a critical year

In this crucial year for climate action and culminating in COP26 in Glasgow in November, this is the moment for governments to raise their ambitions for cutting emissions not only of CO<sub>2</sub> but also of methane. One important avenue, especially for countries with large oil and gas sectors, will be to include methane whenever they update their pledges.

This is also the moment for companies to put all their weight behind this effort and make sure that 2019 goes down as the peak in oil and gas methane emissions.

The case for action is not just environmental or reputational. There are increasing signs that consumers are starting to look carefully at the emissions profile of different sources of gas when making decisions on what to buy. A gas producer without a credible story on methane abatement is also one that is taking commercial risks.

We believe that urgent action to drive down methane emissions should not be an option but an obligation for oil and gas producers. I can assure you that this area will continue to be a high priority for the IEA's work as we lead global clean energy transitions. ■



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# Nuclear Power and Climate Change

**I**t may be axiomatic that nuclear power is not the only solution to the fight against climate change, but it is certain that without it no solution will emerge.

The statement was made by the International Energy Agency (IEA) since 2019 and recently revisited in October 2020. But, slowly, things seem not to change in an obvious way, meaning that the geopolitical, climate and nuclear rules of the world do not define any better future from what is currently known. Two questions emerge immediately.

1. Will the environment, with the full support of Western industry, succeed in ensuring international geopolitical balance? It has been mentioned for a long time and there are still discussions in this regard about the fact that nuclear power would be one of the solutions to stopping the rise in temperatures to only 2 degrees Celsius, following the decision of the Paris Conference, in 2015.

2. Will the full carbon neutrality, a process that could be achieved in the following 30 years, remain as a unique opportunity, as the European Commission has proposed?

Both questions previously formulated are,

without a doubt, geopolitical-economic carats of international scale. The experts' answers will therefore be extremely important!

The reasons of explaining the exit of the 'radar technology' from the issue of Western policies are already known, such as: social acceptability, after the Chernobyl and Fukushima tragedies; bankruptcies in the nuclear power market; the difficulty of companies in investing huge amounts to develop the new generation of reactors; the impossibility of accessing state aid schemes and, not least, politics and ideology.

The truth exposed and supported by some of the experts of the nuclear sector according to which "Europe has sacrificed continental excellence" appears very clear. European policies have basically sacrificed continental excellence, pressing only the pedal of the principle of teleological neutrality, insisting with meticulousness on the reconversion of energy systems based on renewable sources.

Therefore, thanks to the support of European energy, the state aid schemes have always been supported by the residence countries of renewable producers.

In OSCE countries, nuclear power generation increased by around 30 times during 1965-1990, a development which has slowed down, with a visible sluggishness in the last decade compared to the rest of the world, especially Russia and China, using the technological autonomy bought in 2006 from Japan's Toshiba. Let's recall that Russia holds the position of global leader of nuclear industry.

While for some time, in the West, the political leverage of choosing nuclear power production was under the umbrella of national safety, before cutting costs, today the fight against climate change leads to the application of advanced nuclear technologies.

Importantly, the United States do not have a favourable opinion on the double nuclear pole Russia - China, a duet that has led to the development of new, 'advanced' reactors, as they are named by specialists.

From the moment when Vladimir Putin took over full power in 1999, Moscow has built most of its nuclear power plants, more than the United States, France, China, South

Korea, and Japan have done together. This achievement gave Russia an important geopolitical power over that of the countries where, analysing from a commercial point of view, Russia would have the intention to penetrate. The beneficiary of this expansion of Russia was Rosatom, the national champion born in 2007, where more than 250 thousand engineers, researchers, sellers etc. are employed.

Therefore, Russia's energy depends on three national companies: Rosatom, Gazprom for gas and Rosneft for oil, companies owned 100% with contracts worth trillions of dollars.

Economic support, financing, insurance policies from the Kremlin to Rosatom make it possible for the commercial power to be recognized on the world energy market and, hence, for both Rosatom and the other two Russian energy companies to wind major tenders. The immediate example could be the

tender won by Rosatom in Hungary for the installation of two reactors for the amount of USD 11 billion, an amount guaranteed by Putin, following the long-term political and economic alliance with Viktor Orban.

Other European Union countries, such as Slovakia and Bulgaria, also have agreements for the installation of reactors with Russian technology.

Another example is the agreement with Egypt, a former US ally, which signed a contract with Russia for the installation of four reactors worth USD 30 billion. Turkey, a NATO member country, is expected to join the alliance.

It goes without saying that in the long run these types of agreements, technological alliances have a political umbrella, or rather a geopolitical one, given that these commercially high-level businesses are dominated by Russia-China bipolarity. ■

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# **Black Sea Gas to Underpin Key Attributes for Romania**

## **Interview with Christina Verchere – Chief Executive Officer and President of the Executive Board of OMV Petrom**

OMV Petrom is the largest energy company in South-Eastern Europe, with an annual hydrocarbon production of 152 thousand barrels per day in 2019. The company has a refining capacity of 4.5 million tons annually and operates an 860 MW high-efficiency power plant. The company is present on the oil products retail market in Romania and neighbouring countries through 798 filling stations, at the end of 2020, under two brands – OMV and Petrom. Overall, OMV Petrom

provides up to 40% of the fuel and gas market and up to 10% of electricity market in Romania. The energy transition is a pathway toward transformation of the global energy sector from fossil-based to zero-carbon by the second half of this century. We had a conversation with Christina Verchere - Chief Executive Officer and President of the Executive Board of OMV Petrom, about Romania's role during this process, the company's approach to sustainability and top business goals for 2021.

*by* LAVINIA IANCU

*Photographs by* OMV PETROM

**Christina Verchere holds a Master degree in Economics Science from the University of Aberdeen, Scotland. She started her career in 1993 and has spent over 20 years with oil and gas supermajor BP, where she held numerous leadership positions in the UK, the US, Canada, and Indonesia. During 2012-2014, she was the Regional President Canada of BP based in Calgary and during 2014 - 2018, she was the Regional President of the Asia Pacific region for BP, located in Jakarta, Indonesia. She became Chief Executive Officer and President of the Executive Board of OMV Petrom on May 1, 2018.**

**Dear Mrs. Verchere, you are having rich experience of serving the oil and gas industry for many years. During a time of transformation of the global energy sector from fossil-based to zero-carbon we are facing now, what role can you see Romania playing in the energy transition process?**

Starting with the Paris Agreement, the energy landscape is undergoing a profound transformation, driven by new emerging technologies, public policies designed to encourage the reduction of carbon emissions and by the changes in the consumers' expectations, who demand energy to be affordable, clean and without interruptions.

At the same time the oil and gas sector is of critical importance for the well-being of people and society by providing energy, as well as being a key contributor to the objectives of sustainable economic development particularly in Romania. The Romanian economy relies heavily on its natural resources and the energy industry generates a significant share of Romania's GDP, with thousands of employees, with high scale investments as well as taxes and its spill over effects.

And it is the balance of both of these roles that are fundamental for Romania. To find the win-win of both economic prosperity as well as contributing towards the Green Deal and climate change agenda.



Giving the need to address the 2030 and 2050 climate targets and to stimulate a sustainable post-pandemic economic growth, natural gas can be the fuel of choice to reshape the Romanian energy system and to generate a sustainable welfare. For this reason, I believe that Romania is in a unique position to become a best-case scenario in order to use natural gas to turn vulnerabilities into opportunities in energy production and road transportation.

According to the Romania's National Energy Strategy, by 2030, the country expects to shut down a large chunk of coal-fired electricity generation capacity. Natural gas is the most efficient solution to ensure the necessary electricity and to ensure the flexibility of the energy sector and security of supply with a low carbon energy production.



**OMV Petrom gas fired power plant from Brazi** ▶

In addition, Romania has the oldest passenger car park in EU and is placed among the top 3 EU countries with the oldest fleet of light commercial vehicles and heavy transport. CNG and LNG can be a viable fuel in terms of cost efficiency for all types of transport, as long as the premises for developing the refuelling infrastructure will be in place.

**The issue of the decarbonisation of the gas sector in Europe poses great challenges for traditional players across the gas industry in the region, as it has been made clear that gas has a limited future in the EU unless it can show how it will contribute to achieving a net zero emissions target by 2050. What is OMV Petrom's approach to this subject?**

We want to be part of the solution and believe it will take a mix of energy sources and technological solutions to make the transition possible. Natural gas can play a key role - generating quick wins by replacing other more carbon intensive fossil fuels in the energy production, as well as partnering with renewable sources to ensure uninterrupted power supply. In addition, natural gas is a sustainable fuel option for heavy transportation when covering considerable distances.

Natural gas is the most versatile fossil fuel - it can be stored, compressed, liquefied, or separated into hydrogen and carbon, with multiple applications in all the sectors that are the backbone of the EU economic competitiveness. The energy sector, transportation, agriculture, construction, and the heavy industry will pursue a major structural transformation in the coming years, and, in terms of costs, range, eco-efficiency and infrastructure, gas is the most cost-affordable solution.

Looking beyond the 2030 climate objectives, natural gas also provides a realistic pathway to decarbonisation via conversion to hydrogen. This can, on the one hand, ensure a long-term market share for natural gas and,



on the other hand, allow the development of other hydrogen production technologies based on renewables.

**The European Commission placed exploiting Black Sea reserves among its priorities in the first EU Energy Security Strategy. BRUA is pivotal among the projects that Brussels is supporting to carry gas along a route from Bulgaria, Romania, and Hungary to the Baumgarten hub in Austria. How do you evaluate and select the most efficient route to market?**

Two key factors play a role in energy security for a country – firstly access to one's own natural resources. Moreover, for Romania, the Black Sea gas is an opportunity that few other countries have. This resource can



◀ **Modernized Petrom filling station, with fast lane and direct payment option at the pump**

underpin the energy security for Romania and fuel the growth of many other industries, horizontally.

A second key part of energy security is access to markets – either to access product or to sell it. Traditionally Romania has been an isolated gas market with very limited pipeline links to other countries.

In this context, the BRUA pipeline enables further diversification of sources of natural gas supply for the region. The completion of BRUA shows that Romania can implement and complete strategic energy infrastructure projects, essential not only for the country's energy security, but also for the Central and Eastern European region. BRUA gives for Romania the possibility to have a wider regional presence by playing a lead role in integrating the Eastern and Central European natural gas markets and thus increasing the security of supply. It strengthens the regional competition and enables, for consumers, a multitude of supply sources, while decarbonizing the economies dependent on the coal production.

**Romania is currently the EU's second-largest gas producer after the Netherlands. In case of development, offshore Black Sea production is also expected to play a strategic role in Romania's future energy mix. If Black Sea gas will be exploited do you think Romania could become the EU's number one gas producer?**

Romania definitely has the potential to become the largest producer of natural gas in the European Union and this is a reason for national pride. To do this, Romania must take a step forward towards a new stage of energy sector growth with development of gas from the Black Sea.

Most importantly, the Black Sea can underpin three key attributes for Romania.

Firstly, it has high potential to lead Romania's post-pandemic economic recovery. We are talking about new revenue streams for the Romanian state budget valued by Deloitte at 1.2 billion USD per year during production stages.

Secondly, as mentioned earlier, it provides the opportunity to use a national resource to contribute to Romania's efforts to fulfil its carbon reduction targets.

And thirdly, it underpins Romania's energy security turning it from a net importer to ensuring its own energy needs are met.

**The new Offshore Law amendments, long awaited by operators in the oil and gas industry, have given rise to countless contradictory debates. What are, in your opinion, the mandatory provisions of a legislation that would encourage investors?**

Investors look for several traits in the legislative environment of a country. The most commonly discussed is stability and predictability and this is particularly the case for the Black Sea investors given the large scale of the projects, with a long investment cycle.

Another is competitive fiscal terms. Investors need to see that Romania is a place that is open for business by offering terms that are in line with other markets they are considering. Currently, comparing with the EU average level of taxation, Romania's fiscal terms are 3 times higher for onshore and 5 times higher for the offshore production. Romania has to compete as part of a global capital market and at a time where oil and gas companies are reducing their investment levels worldwide. And thirdly, investors look at the right to freely market their products in line with EU legislation.

These are some of the key factors for evaluating projects all over the world.

**The investments in the campaign of exploration of the Black Sea resources have reached impressive figures, not to mention the amounts necessary for exploitation and the extensive range of assumed risks. How are all these justified?**

Oil and gas exploration and development is a very capital-intensive industry, with a high



investment risk.

Just to give you an example, in onshore exploration only one out of three wells is successful. Deep-water offshore development involves multi-billion investments because the operations take place in more complex environments by being, firstly offshore, but also the water depth, triggering utilization of very specific equipment and technology and skilled work force.

Until present, over 1.5 billion USD were invested just in exploration and appraisal activities in the Neptun Deep block. In order to get the resources out of the ground, additional multibillion USD investments are required in the development phase for the offshore and onshore facilities, pipelines and wells.

**To be successful, government and industry must work together to find effective ways to expand supplies while increasing energy efficiency and reducing environmental impact. As industry needs to innovate, what**

**are OMV Petrom's most significant accomplishments in this respect? Is it difficult to introduce digital culture across a large company like yours?**

Reaching carbon neutrality by 2050 will require structural transformations for the energy system and implies fundamental changes in our life, as consumers. We believe that innovation, digitalization, and new technologies are the driving forces to become more agile and face any kind of challenges, while reducing the carbon footprint.

At OMV Petrom we want to be part of the solution and, through sustained investments, the intensity of carbon emissions from our operations has decreased by 22% in 2019 compared to 2010.

In the last years, we commissioned several large projects which, using innovative and state-of-the-art technologies, have contributed to improving the environmental footprint. These include the Polyfuels unit at the Petrobrazi refinery and the Hurezani gas hub in Asset Oltenia, with total investments of EUR 115 million.

Our sustained efforts continued this year. We increased our upstream operational efficiency, we installed photovoltaic panels in over 70 filling stations to increase the share of green energy used in our stations and we have concluded two partnerships with Eldrive and Enel X to install 40 recharging points for electric vehicles, in order to have a mix of fuels in our filling stations.

Though the pandemic has been very challenging, I believe it has accelerated some of the digital skills and tools that we are now using. With around 5,000 of our employees working at home we quickly had to move to a more paperless work environment with digital signatures and virtual meetings. We had been working on these projects, but the pace of adoption became lightening in speed once we were remote. And the digital acceleration is not just internal – we are also now installing a pay at the pump option in some of our newly modernized Petrom filling stations.

**The improvement of safety performance continues to be a major challenge for the oil and gas companies. What are the 'best cards' of OMV Petrom in this regard?**

The oil and gas industry is a high hazard industry and the safety of our people is our number one priority.

Our HSSE vision is zero harm - no losses and that means that we believe that all accidents and losses can be prevented, with a strong safety culture, by having the right processes in place and by nurturing a culture of learning.

Safety is a state of mind; therefore, a matter of organizational culture and one we look to instil in all our employees and contractors in both the front line and those that are office based. At the heart of safety is truly caring for each other, being prepared to say when you see something that is not correct and recognizing people for their increased attention for the safety rules.

We have had a big focus on road safety with monitoring systems in all our vehicles, defensive driving training and big campaigns on raising awareness around wearing seatbelts (in the front and the back seats of the vehicle).

Overall, we have made important improvements in our safety performance. Safety is a continuous journey that you can never stop focusing on and learning from incidents to improve.

We are continuously monitoring the HSSE performance to support the development of a strong and mature HSSE culture.

**What are OMV Petrom's main challenges and top goals for 2021? How do you expect to face these challenges?**

Our foremost role in society is to provide Romania with the energy it needs, without interruption.

We provide 40% of Romania's demand for fuels and gas and up to 10% of the electricity domestic production, so we play a significant role in the energy landscape.

2020 has been a challenging year for all of us and I am pleased we ensured energy supply for all our customers without interruption. And this of course will be our goal in 2021. We hope, like all, with the discovery of anti-Covid vaccines, we will have the chance to get out of this dark period.

Secondly, the economic landscape will be shaped by the climate objectives that we must achieve in 2030. The restart of the economic engines depends on this and Romania is in the position to benefit from both private investment and European funds to achieve its sustainable development goals.

We strongly believe that Black Sea projects can be one of the engines for Romania's post CoVid-19 recovery. It is a unique opportunity, one of the few big private sector investment projects, which is ready to start, also contributing to the reduction of carbon emissions from the energy sector and from heavy long-distance road transport.

Despite the fact that the oil and gas industry faces the biggest crisis in 100 years, it still has a high potential to become an engine of economic recovery, with the appropriate measures in place.

**COVID-19 has dramatic impacts on the energy industry, as well as the severely depressed oil price environment accompanied by a weakening economic situation. What measures do you envisage to deal with these issues?**

OMV Petrom had to face an unprecedented crisis that unfolded on three layers: dealing with the pandemic and the isolation measures while continuing to ensure energy supply, rapid oil price decline and drastic drop in petroleum products demand. As a sector we have faced drops in oil price before but never at the same time as such a dramatic drop in demand.

Therefore, our priorities during this period focused on protecting our employees that are working in key assets, to ensure the fuel production and continuous flow of energy that Romania needs.

At the same time, we reorganized the way we work for our employees now working at home, in order to rely on online communication tools.

At the business level, we made a number of decisions to protect the company's health, reducing our investment levels by postponing activities.

These measures, which ensured the protection of employees and the health of our company, remain a priority, allowing us to supply fuels, electricity, and natural gas without interruption.

**In your opinion, how will the international energy market change, given the high energy demand but also the decrease of the world hydrocarbons resources? Is renewable energy a solution for the world economy during this time of crisis? Is it a solution for the future?**

A low carbon energy system requires an optimal blending between low carbon mature technologies (ex: gas to power, CHP) and new technologies expecting to be deployed, in the next ten years, on a large scale in the energy system. (e.g.: Carbon Capture and Storage, battery storage, electrolysis, and pyrolysis for hydrogen production etc.)

Renewables and gas go hand in hand; they are no longer just an alternative in the electricity production. They are a mainstream source and, ramped up with smart energy management systems (e.g. smart grids, smart metering etc.), will shape the energy system in the coming years. ■

The background of the entire page is a photograph of an industrial facility. It features large, white, curved pipes and several valves with prominent red handwheels. The scene is set against a clear, bright blue sky. In the lower-left corner, there is a semi-transparent blue graphic overlay that contains technical drawings and blueprints, which partially obscures the main text.

# Challenging applications and tough environments

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

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# Net Zero Facilities for the Upstream Oil and Natural Gas Market

McDermott International, Schneider Electric and io consulting announced a collaboration to advance the research and design of Net Zero Facilities for the upstream oil and natural gas market. The three companies will combine their capabilities and resources to explore and develop a proof of concept based on an offshore platform reference case. The result of the collaboration will be published in a joint study on Net Zero Facilities—Upstream before the end of the year.





The study defines a hierarchy of emissions-reduction technologies, ranked by maturity, investment, and impact to help enable operators to make more informed decisions when prioritizing areas for emissions reduction.

The program is designed to directly support a significant carbon footprint reduction within the production and transformation of oil and gas, which, according to the International Energy Agency, is about fifteen percent of the entire oil and gas carbon footprint.

The companies expect the collaboration to demonstrate what is achievable with current technology, what new technologies are required and identify break-even carbon pricing to make the net zero facilities viable now and in the future. The team will adapt this proof of concept to any geographical region and project, considering local infrastructure and environmental policies regarding carbon pricing.

The ground-breaking universal, legally binding global climate change agreement, adopted at the Paris climate conference in 2016, aims to keep the increase in global average temperature to well below 2°C (3.6°F) above pre-industrial levels; and to pursue efforts to limit the increase to 1.5°C (2.7°F).

In the four years since the Paris Agreement was ratified, societal pressure has grown for all industries to take action to meet these targets. This has resulted in new sustainability targets being set by institutional investors, like BlackRock who announced in January 2020 they would put sustainability at the heart of every investment decision, and energy companies, like Equinor, BP and Shell who have set a target of net zero by 2050 or sooner.

The energy companies acknowledge there needs to be an energy transition, one where we transition to more renewable energy sources over the coming decades; however, this will require ongoing hydrocarbon production; and the International Energy Agency (IEA) tells us that 15% of energy related greenhouse gas emissions come from hydrocarbon production. If energy companies are to meet their net zero targets, the sector, collectively, needs to address this 15%.

“No energy company will be unaffected by clean energy transitions. Every part of the industry needs to consider how to respond. Doing nothing is simply not an option,” Dr Fatih Birol, IEA Executive Director, stated.

Taking the lead, McDermott, io consulting and Schneider Electric have collaborated to bring their combined expertise to solve this problem.

In doing so, the team identified a methodology to develop Net Zero Upstream Facilities which, when applied to a reference case, identified more than 70% reduction in operational emissions. The methodology also includes a ground-breaking assessment of CAPEX emissions, that is embedded carbon in the materials and equipment, and the emissions associated with EPCI; when this was applied to the reference case, a >15% reduction was achieved. Economic evaluation shows this solution comes at a minimal increase in total expenditure, ~ 2%, and when the offsetting of the remaining emissions was considered, the solutions performed significantly better than the reference case. In fact, it would only take

a carbon price of USD 13/tCO<sub>2</sub>e for the solution to match the economics of the reference case.

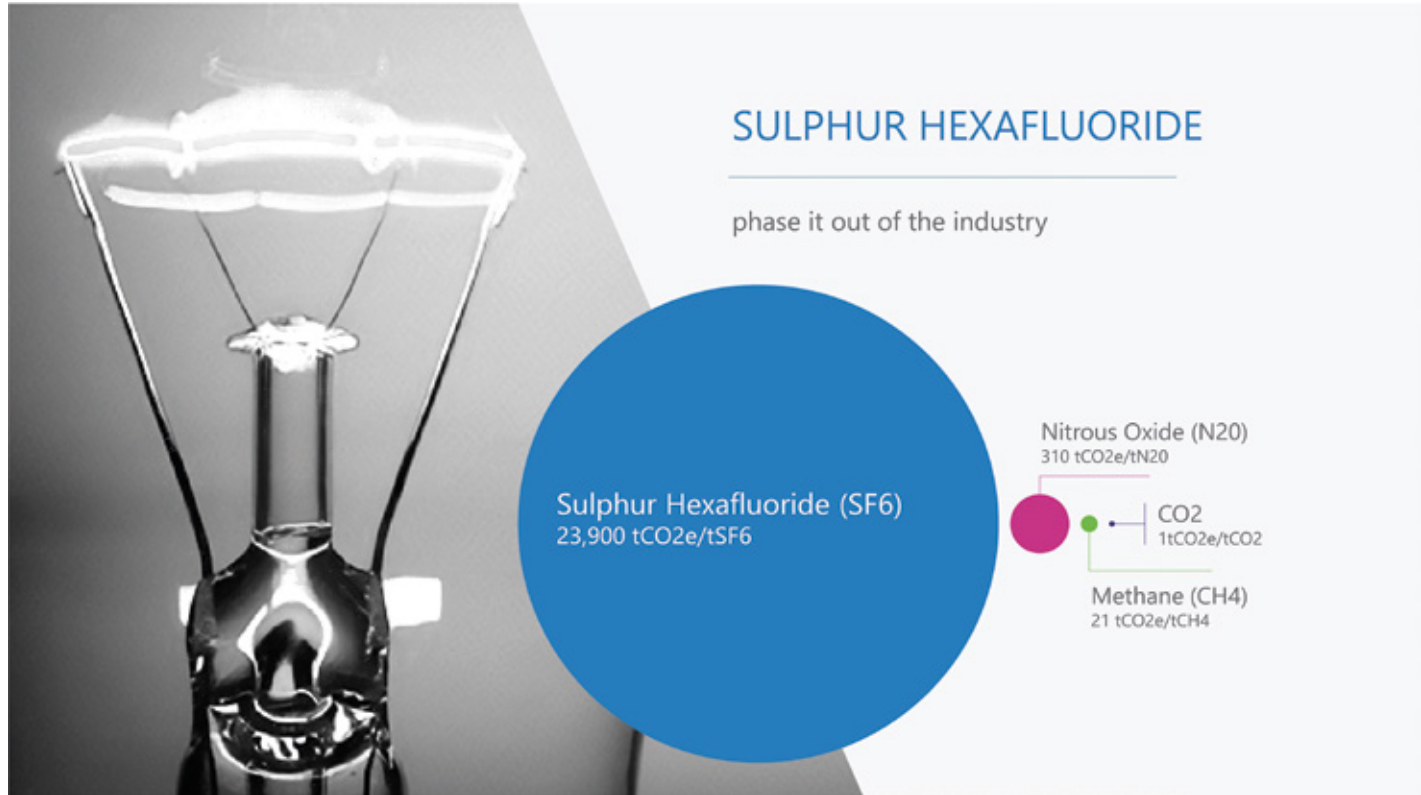
This was achieved by approaching an offshore compression facility reference case with io's Decision Quality framework and systems thinking expertise, supplemented by deep domain expertise from McDermott and Schneider Electric.

Working collaboratively, the team evaluated four alternative concepts to achieve the functionality of the reference case. Each concept was designed to test the limit of the solution space and ensure the evaluations were mutually exclusive and collectively exhaustive. This allowed the team to identify an alternative solution for the specific reference case; extrapolate this solution to other offshore compression facilities; and create a methodology that can be used to identify the emission reduction pathways for all upstream facilities – both offshore and onshore.

Analysis of the reference case identified that power was responsible for 94% of operational emissions, with 5% attributable to fugitives and the remaining coming from flaring and logistics. Each concept evaluated methods to decarbonise power and remove fugitive emissions. The solution identified power from shore, imported using a HVAC cable from a high renewable mix grid as the best means of decarbonising power. It was acknowledged that for some locations, with stable renewable energy industry, a 'green' power purchase agreement (PPA) will be optimal.

It was also acknowledged, at distances beyond 150km, HVAC is technically challenging and alternative carbon free power, such as hydrogen or renewables, should be considered. The study also identified that 99% of fugitive emissions in the reference case was related to the LP compressor package, and that 89% of this 99% was due to dry compressor seals. By selecting a seal-less compressor technology, like the Baker Hughes Integrated Compressor Line, fugitive emissions were all but eliminated.

Simplifying the process to reduce the energy consumption reduces both the emission volume and intensity. This simplification also reduces embedded carbon, removes sources of emissions, and minimises operation and maintenance activities and the manning requirements. Digital technology has advanced such that many facilities can be designed to be unmanned, or with a greatly reduced level of attendance, which allows the reduction of logistic related emissions and removal of structures like the helideck and living quarters,



reducing the embedded carbon. Less equipment also reduces the associated power demand for the facility, increasing the viability of renewable power sources. Finally, by utilising remote operations expertise of Schneider Electric, the likelihood and impact of non-routine events that may result in emissions will be reduced.

For all concepts studied, the process system can be configured to eliminate the flare completely. While the calculations show a relatively small quantity of emissions derived from flaring (<0.01%), it is recommended that flare systems are designed out of facilities wherever possible due to their high visibility and public perception.

Sulphur hexafluoride (SF<sub>6</sub>) is used as the insulation gas in electrical switchgear; it is 23,900 times as potent a greenhouse gas as CO<sub>2</sub>. While there is minimal leakage during normal operations, SF<sub>6</sub> is of concern due to its high potency and the handling of switchgear during the manufacturing and decommissioning process. It will require expert intervention to ensure no leakage, particularly during the end-of-life phase. Companies such as Schneider Electric have developed SF<sub>6</sub>-free MV Switchgear and it recommended the industry moves to these solutions to phase SF<sub>6</sub> out of the industry.

In traditional developments, like the reference case studied, CAPEX emissions are a small fraction of the lifecycle emissions (<4%, depending on the assumed life of the facility). However, as operational emissions are reduced, CAPEX emissions become increasingly

significant. Supply chain emissions from CAPEX projects may also factor into future 'green' financing and offer the opportunity to transition a low carbon economy and any development of net zero facilities needs to consider the carbon embedded in the materials and equipment, and the emissions from EPCI. Embedded carbon is best removed through design, reduction of equipment and weight, but challenges remain to reduce the carbon footprint in this phase.

Marine vessel activity accounts for the majority of CAPEX emissions in the upstream offshore case. Current reduction measures are limited, and decarbonisation of this sector may take much longer than onshore activities. With the right government support and industry coordination, however, marine decarbonisation can be accelerated.

In terms of embedded carbon, the study revealed that many equipment suppliers are not yet calculating their embedded carbon, requiring proxies for equipment data not available. ■



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# *Talking to Experts*

## Professor Dr. Eng. Lazar Avram, PhD

### DRILLING ON OFFSHORE PLATFORMS: QUO VADIS?

**We are talking with Professor Dr. Eng. Lazar Avram, PhD, Dean of the Faculty of Petroleum and Gas Engineering within the Petroleum-Gas University of Ploiesti, about the beginnings of drilling on offshore platforms and major changes in the drilling paradigms caused by the pressure to develop new resources, due to the inherent domestic depletion and increasingly challenging drilling areas.**

*Text by Daniel Lazar*

*Photo by Justin Iancu*

**T**he first offshore drilling rig, in the conventional sense, was built in the Gulf of Mexico, in 1947, at depths of only several meters (of course, the beginning of offshore drilling dates way back: in 1897, only 38 years after colonel Edwin Drake had drilled the first onshore well, H.L. Williams was credited for drilling a well from a wooden pier in the Santa Barbara Canal in California; in the early 1930s a well was drilled in the swamps of Louisiana, with the help of barges etc.). In the decades that followed, thousands of offshore drilling rigs started to operate around the world.

“Of course, offshore drilling processes, as recovery operations, are fundamentally the same as the onshore ones, except that special types of rigs are used, and their selection depends to a great extent on water depths and location of drilling and recovery operations,” says Professor Eng. Lazar Avram, PhD.

Offshore drilling rigs, built in a wide variety of types and variants,

are most often classified according to the possibility of changing the location during working hours. Therefore, we have drilling islands, stationary platforms (fixed and gravitational) and mobile platforms (self-elevating, submersible, semi-submersible and drillships).

“Widespread, self-elevating mobile platforms (jack-ups), such as the Romanian ones, are generally used in shallow waters, with depths, most often, up to 200 meters. Instead, when it comes to greater water depths (of over 300 meters), semi-subsea drilling platforms or drillships are used,” adds Dean Lazar Avram.

And if we remember the history of early drilling at great water depths, then the most eloquent landmarks must be sought in the Gulf of Mexico and

off the coasts of West Africa and Brazil.

But once an area with great potential has been identified, a huge, fixed platform will be built, from which 40 or more wells will be drilled, together with the outbuildings and facilities related to ancillary works and drilling teams. A typical example in this regard is the Troll Adin platform (one of the largest platforms in the world), in the North Sea, belonging to multinational company Statoil Hydro, which operates in waters with depths of 300 meters.

“Despite so many common elements of onshore and offshore drilling, the latter are much more challenging, so that the multitude of inventions and innovations revolve around overcoming these challenges (I said before and I think I wasn’t very wrong, that performance in offshore drilling is greater than in sports!). It’s about, among other things, facilities related to the personnel on the platform and the multitude of subsea operations that must be carried out in various working conditions.

As regards oil and gas extraction from offshore fields, we should point out that the current trend is that a large part thereof be carried out on the bottom of the sea, as a result of facilities related to sand separation and its reinjection before being pumped to the platform. Or, moreover, it can be pumped onshore, without visible installations above the sea. Subsea installations promote the objective of exploitation of resources in the so-called ultra-deep waters which, until recently, were entirely inaccessible.

On the other hand, although most offshore structures concern oil and gas exploration and production, we should not forget that there are also some major similar structures, sometimes complementary, which concern capitalization on offshore energy (offshore bases, offshore airports etc.)” Professor Eng. Lazar Avram, PhD, also says.

In other news, an offshore petroleum platform can be considered, at a different scale, a small society, with all the support functions necessary to maintain the personnel comfortable at sea.

For example, in the North Sea, the personnel are transported by helicopter, the shift taking place every two weeks (the employees of Romanian Black Sea platforms also commute with helicopter every two weeks; but they can remain even one month on the platform if the helicopter cannot fly due to the weather).

Supplies and waste are transported by ships and they must be properly mapped, given that the surfaces of the platform, for work and the auxiliary ones, are limited. For this purpose, efforts are made continuously to move as much personnel as possible onshore, where management experts or experts from certain technical sectors can keep in touch with the platform through videocalls or other performing telecommunication systems.

However, the coin has a flip side... Offshore petroleum production involves great risks for the environment, especially in terms of oil spills from both carriers from the platform to onshore facilities and pipelines, or accidental leaks from the platform. Also, there is an important impact of water produced during the drilling or well production processes, water which contains variable amounts of oil or chemicals used in or resulting from oil production. Not to mention the fact that only a certain amount of water produced is usually allowed, which can then be returned to the ocean.

“The platforms, in themselves, pose environmental problems when they are decommissioned. Because, in order to extract oil, a platform will

have to cope not only with problems related to its conditioning, but also with the management of various activities related to the action of the marine environment, seismic uncertainty etc. At each corner of the drilling installation there are huge engines to keep the working systems stable. When the ocean pulls in one direction, the propellers push in the opposite one...

Other inherent problems, to which all attention must be paid, are related to the drill bit and the assembly above it; the floating drilling strings, which reduce part of the tension transmitted to the platform; drilling that must cross several areas with different pressures; the technical challenges and the enormous costs of searching for oil at these great depths of water etc.

On the other hand, the success rate of teams working in the field of exploration drilling must be neither probable nor possible, but visible and certain that oil will be found, given that drilling a test well in the deep oceans could cost more than USD 83 million. It’s a lot of money even for an oil major! Of course, the rewards for those prepared to take the risk are huge, as are the limits of technology in extreme environments in the fierce struggle to maximize efficiency and minimize time on site. In this sense, with the advent of deepwater operations, concepts such as ‘parallel operations’ or ‘reduction of flat time’ have become familiar areas focused on new technologies,” says the Dean of the Faculty of Petroleum and Gas Engineering within the Petroleum-Gas University of Ploiesti.

Also, with the emergence of ‘unconventional resources’ and the fracturing of ‘sweet spots’ as the main targets of exploration, technology must also provide a capacity for ‘smart drilling’ to optimize access to the target in a way that maximizes production. And technological advances in the last decade are not just random evolutionary processes, but a radical change in well drilling technologies. They often represent a major change in the drilling paradigms caused by the pressure to develop new resources, due to the inherent domestic depletion and increasingly challenging drilling areas. It’s about dual gradient drilling systems, extensible piping, column drilling, deep rock dislocation, resin and metal composite systems, microsystems, smart drilling etc.

Therefore, offshore platforms are a permanent challenge for specialists in the oil and gas industry, concludes the expert. ■

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# Global Gas Demand Largest Drop on Record

**A**ccording to IEA's Gas Market Report, Q1-2021, global gas demand fell by an estimated 2.5% or 100 billion cubic metres (bcm) in 2020 – its largest drop on record. Amid this slowdown, gas demand for power generation remained resilient owing to fuel switching, while the whole supply chain showed strong flexibility in adjusting to demand variations. Gas trade globalisation progressed with increasing liquidity, while prices experienced historical lows and extreme volatility. The Covid-19 crisis and a well-supplied market put investment on hold, whereas gas market reforms and clean gas policy initiatives gained momentum in major consuming markets.

2021 opens with price rallies in Asia and Europe as rising winter demand tightened supply, but the price spikes are not expected to last beyond the short-term cold snaps given that market fundamentals for 2021 remain fragile. Global gas demand is expected to recover its 2019 level but with uncertainties regarding the recovery trajectory of fast-growing markets compared with more mature regions. Sectoral demand, on the other hand, is subject to a variety of risk factors including fuel switching, slow industrial rebound or milder weather.

After an unprecedented drop in natural gas demand 2020 closed with a rapid recovery in gas prices as a rise in winter demand tightened supply. A similar pattern held in the first weeks of 2021 with cold snaps bumping gas prices in Europe to their high winter levels and spot LNG prices in Asia broke historical records. This tight market episode was driven by short-term factors, whereas the fundamentals remain uncertain and potentially challenging for global gas demand recovery in 2021.

Global gas markets experienced their largest recorded drop in 2020, with an estimated 2.5% year-on-year (y-o-y) decrease in consumption (about 100 bcm). This was triggered by exceptionally mild weather in the early months and the onslaught of the Covid-19 pandemic; impacts were concentrated in the first half of the year which saw a 4% y-o-y decline in global gas demand. Progressive recovery was observed in Q3 as lockdown measures eased, seasonal electricity demand

pushed up demand along with competitive gas prices. However, the beginning of the heating season in the northern hemisphere was less supportive with very mild temperatures in Europe and North America in October and November.

Colder temperatures in December 2020 marked the start of a gas price rally amid tightening LNG supply. Spot LNG prices in Asia more than tripled to above USD 30/MBtu by the start of January 2021, with some cargoes reportedly awarded close to USD 40/MBtu; breaking the record price levels in the aftermath of the Fukushima nuclear accident in 2011. Rather than a single event, the recent spike reflects a combination of supply and demand factors. LNG demand in northeast Asia increased 10% y-o-y between mid-December 2020 and early January 2021 due to colder than average winter temperatures, exacerbated by lower nuclear availability in Japan and limits on coal-fired generation in Korea. The rise in LNG demand in Asia coincided with several outages at regional liquefaction plants, which increased the call on more remote suppliers. Longer voyages and congestion at the Panama Canal spiked spot charter rates to historical highs of more than USD 230 000/day – reportedly one prompt vessel was contracted at USD 350 000/day. These price spikes are not expected to last beyond the short-term cold wave, as market fundamentals for 2021 remain fragile.

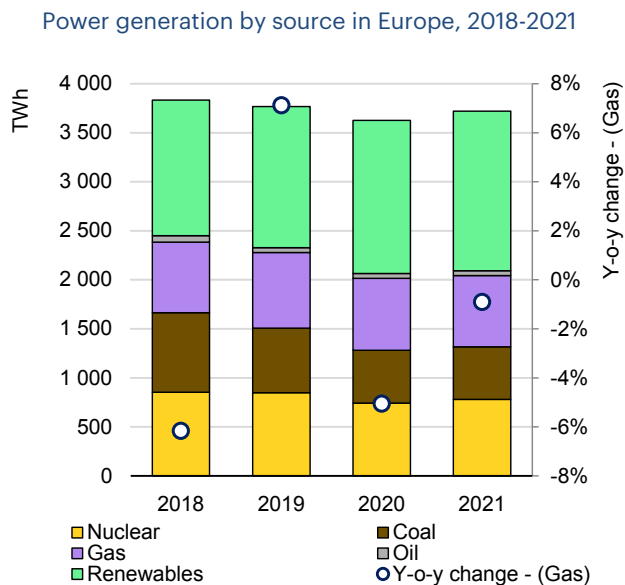
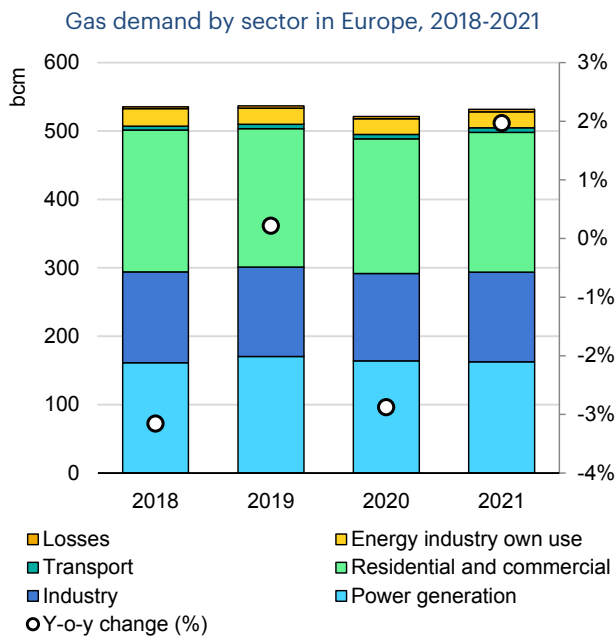
This forecast expects global natural gas demand to grow 2.8% in 2021 (about 110 bcm), slightly above the 2020 decline, thus enabling a recovery to the 2019 level. This is a far cry from the 7.5% y-o-y post-2009 financial crisis rebound observed in 2010.

This projection comes with two main caveats:

- All regions are not equal when it comes to gas market recovery. Mature markets bore the brunt of demand drop in 2020, while emerging markets will be the main drivers of demand growth in 2021. Fast-growing markets in Africa, Asia, Central and South America and the Middle East are projected to account for about 70% of global demand growth in 2021. Mature markets are likely to see a more gradual recovery though some may remain below their 2019 demand levels.

- The sectoral pillars of growth are all subject to major uncertainties. Gas burn in power generation is expected to be hampered by slow electricity demand growth and increasing inter-fuel competition as gas prices recover from their 2020 lows. Gas consumption in the industry is strongly dependent on economic recovery, especially for Asia's export-driven industries. Residential demand received

## Gas demand in Europe in 2021 is expected to remain below pre-crisis levels



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Sources: IEA analysis based on ENTSOE (2021), [Transparency Platform](#); ENTSOE (2021), [Transparency Platform](#); Gaspool (2021), [Consumption Data](#); NCG (2021), [Consumption Data](#); EPIAS (2021), [Transparency Platform](#); IEA (2020), [Electricity Market Report](#).

support from cold temperatures so far but would be negatively impacted in case of a return to milder weather conditions.

Global gas demand recovery in 2021 is uncertain. Demand is subject to a variety of risk factors including fuel switching, slow industrial rebound and mild weather which can moderate consumption.

### Gas demand in Europe

Gas demand in Europe proved to be rather resilient in the wake of the unprecedented macroeconomic shock related to the Covid-induced lockdowns. Estimates suggest that gas demand in Europe fell by close to 3% in 2020.

Gas markets in Europe faced a perfect storm through the first half of 2020 with gas consumption plummeting by over 7% y-o-y, due to a combination of mild winter temperatures in Q1 and pandemic-related lockdowns through Q2. European gas demand started to recover in June and rose by 2% y-o-y in Q3 driven by increased coal-to-gas switching in the power sector.

European gas consumption rose by an estimated 3% y-o-y in Q4 2020 despite restrictive measures imposed amid another wave of the pandemic. Several factors explain the resilience of natural gas demand and why it was not impacted similarly as during the lockdowns in Q2: The confinement measures imposed across Europe in Q4 were less restrictive and disruptive for economic and industrial activities; Companies were able to adapt more quickly and smoothly to the (re)-

introduction of regulatory measures related to social distancing and teleworking; The bulk of natural gas is consumed during Q4 for space heating in the residential and commercial sector is typically more sensitive to weather conditions and depends less on economic activity.

Heating degree days in Q4 2020 edged 3% above 2019 levels across Europe's main gas consuming regions. This pushed higher space heating demand requirements in the residential sector and outpaced some of the demand lost due to the temporary closure of commercial establishments. Overall, gas distribution network consumption rose by an estimated 4% y-o-y in Q4.

Gas demand for power generation in Europe rose 2.5% in Q4. This was primarily driven by a 50% increase in gas-fired power generation in Turkey reflecting lower hydro availability and environmental restrictions imposed on lignite-fired power plants. In contrast, demand for gas for power generation in the European Union and the United Kingdom fell by 3%. This reflects a combination of higher renewables output, restarts of nuclear power capacity and reduced cost-competitiveness of gas-fired power plants (due to a sharp recovery in gas prices through the second half of 2020). ■

# Investments of EUR 32mn in A New Drilling Campaign in the Black Sea

**OMV Petrom, the largest energy company in Southeastern Europe, initiated a new offshore drilling campaign in the shallow waters of the Istria block in the Black Sea. The first drilling operations started at the end of December 2020 and the drilling of the second well will start at the beginning of this year. The investment for this campaign is approximately EUR 32 million.**

**O**MV Petrom has had an active presence in the Black Sea for over four decades and, during this period, OMV Petrom demonstrated its important role for the economic development of Romania. Using modern technical solutions, we seek to unlock additional resources that can compensate for the decline of the domestic production from mature fields. The Black Sea has a strategic importance for Romania's gas production, which currently covers almost 10% of the country's annual gas consumption," said Chris Veit, Member of the Executive Board responsible for Upstream.

The two development wells are being drilled at depths of over 2,500 meters below the seabed, in waters with a depth of around 60 meters.

This drilling campaign continues the series of investment projects for offshore production in the shallow waters of the Black Sea: over EUR 500 million were invested between 2014 and 2019, including the drilling of 16 exploration and production wells and

sidetracks as well as modernization of the production facilities and gas compression system.

## OMV Petrom in the Black Sea

Exploration in the Romanian continental shelf of the Black Sea started in 1969. The first hydrocarbon discovery was in 1980, and the first production in the Black Sea started in 1987.

Currently, OMV Petrom has exploration, development, and production operations in the shallow waters (Istria block) and exploration operations in partnership with ExxonMobil in deepwater areas (Neptun Deep). Oil and gas production in shallow waters (Istria block) amounts to approximately 25,000 boe/day. In 2019, it accounted for around 17% of the Group's domestic production.

## Total production, dropping in Q4/2020

OMV Petrom's Total hydrocarbon production fell, in the fourth quarter of 2020, to 140.2 kboe/d, compared to 151.8 in Q4/2019, according to the report with key performance indicators of OMV Petrom Group for the quarter ended December 31, 2020. Crude oil and NGL production fell to 67.2 kboe/d in Q4, from 72.2 kboe/d in the same period of 2019. Natural gas production amounted to 73.0 kboe/d, compared to 79.5 kboe/d in Q4/2019, and the total hydrocarbon sales volume stood at 133.3 kboe/d, compared to 143.1 kboe/d in Q4/2019. ■



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- Pipeline and bracket corrosion protection
- Insulation
- Scaffolding



# How Will Crude Oil Price Evolve in 2021

Oil price estimates depend on how the coronavirus pandemic will evolve. 2020 has been an extremely difficult year for the oil sector at global level. For the first time in history, oil was traded at a negative price, in the context of traffic restrictions imposed by the coronavirus pandemic. Moreover, 2021 does not promise to be a very good year in the sector. Estimates by oil market analysts foresee for this year a crude oil price between USD 40 and USD 65/bbl. The International Monetary Fund or the World Bank have less optimistic forecasts, in the context in which it is not known yet what evolution the COVID-19 pandemic will have.

by Adrian Stoica



S Energy Information Administration (EIA) shows that, on average, in 2020 oil was traded at USD 41.42/bbl, while for 2021 the estimate would be USD 49.53/bbl, amid an increase in oil demand.

## Moderate optimism at the IMF and World Bank

The International Monetary Fund, in its report on the World Economic Outlook at the end of 2020, estimated a price of USD 39.5 for 2021. In turn, the World Bank estimates for 2021 an average oil price of USD 44/bbl. Therefore, despite the declining oil production, oil price recovery has stopped, against the backdrop of concerns related to the second coronavirus wave and impact on oil consumption at global level.

## Goldman Sachs estimates a price of over USD 60/bbl

Instead, estimates by Goldman Sachs are more optimistic. The oil market will witness a recovery in 2021, as the decrease in demand caused by the pandemic will be stopped by the fact that there will be more anti-COVID-19 vaccines on the market since the beginning of the year. Bank analysts say that in 2021 oil will be traded even at USD 65/bbl, but the price around which the market will stabilize will be around USD 58/bbl.

## S&P Global Platts Analytics cuts 2021 oil demand forecast

Global oil demand will rebound by more than 6 million b/d in 2021 and return to 2019 levels a year later despite the sharp acceleration in COVID-19 infections and new lockdowns which have hit energy consumption from the end of last year, according to S&P Global Platts Analytics.

Oil demand is expected to average 99.3 million b/d this year following a contraction of 8.8 million b/d to 93.1 million b/d in 2020, Platts Analytic said in its latest monthly oil market forecast. The 2021 forecast is a 280,000 b/d downward revision to its previous estimate, reflecting the surge in COVID-19 infections at the end of 2020 which continue to crimp global mobility levels.

For the first quarter of 2021, the oil demand forecast was cut by 700,000 b/d to 95.1 million b/d due to renewed lockdowns and scaled-back Lunar New Year celebrations in China, Platts Analytics said. During the second quarter, however, the impact of vaccination roll-outs are expected to be widely felt with global demand rebounding by as much as 11.7 million b/d year on year.

“After stalling in the early part of 2021, the world economy is expected to turn stronger starting from spring, as the wider availability of vaccines will lift consumer sentiments,” Platts Analytics said.

Further out, oil demand is expected to grow by

2.8 million b/d in 2022 when global oil demand will largely return to 2019 levels at 102.1 million b/d.

“Growth continues to bear the feature of recovery from 2021 which is still affected by COVID-19,” Platts Analytics said.

The estimates come a week after the International Energy Agency cut its estimate of the recovery in global oil demand this year for a third month in a row, also citing renewed COVID-19 lockdowns and the scale of the global vaccination challenge. The IEA estimates oil demand will recover to average 96.64 million b/d this year, a 5.5 million b/d recovery from 2020 levels.

In its own monthly oil market report a week earlier, OPEC slightly raised its oil demand forecast for 2021 to 95.91 million from 95.89 million b/d, a 5.9 million b/d recovery from 2020.

With demand levels expected to recover sharply, continued production cut discipline by OPEC+, and the overhang in global oil stocks narrowing over the year, Platts Analytics raised its 2021 average Brent oil price forecast by USD 6.65/b to USD 56.30/b. Dated Brent

is seen rising from current levels to USD 59/b in July and August before dipping back to USD 55/b by year-end.

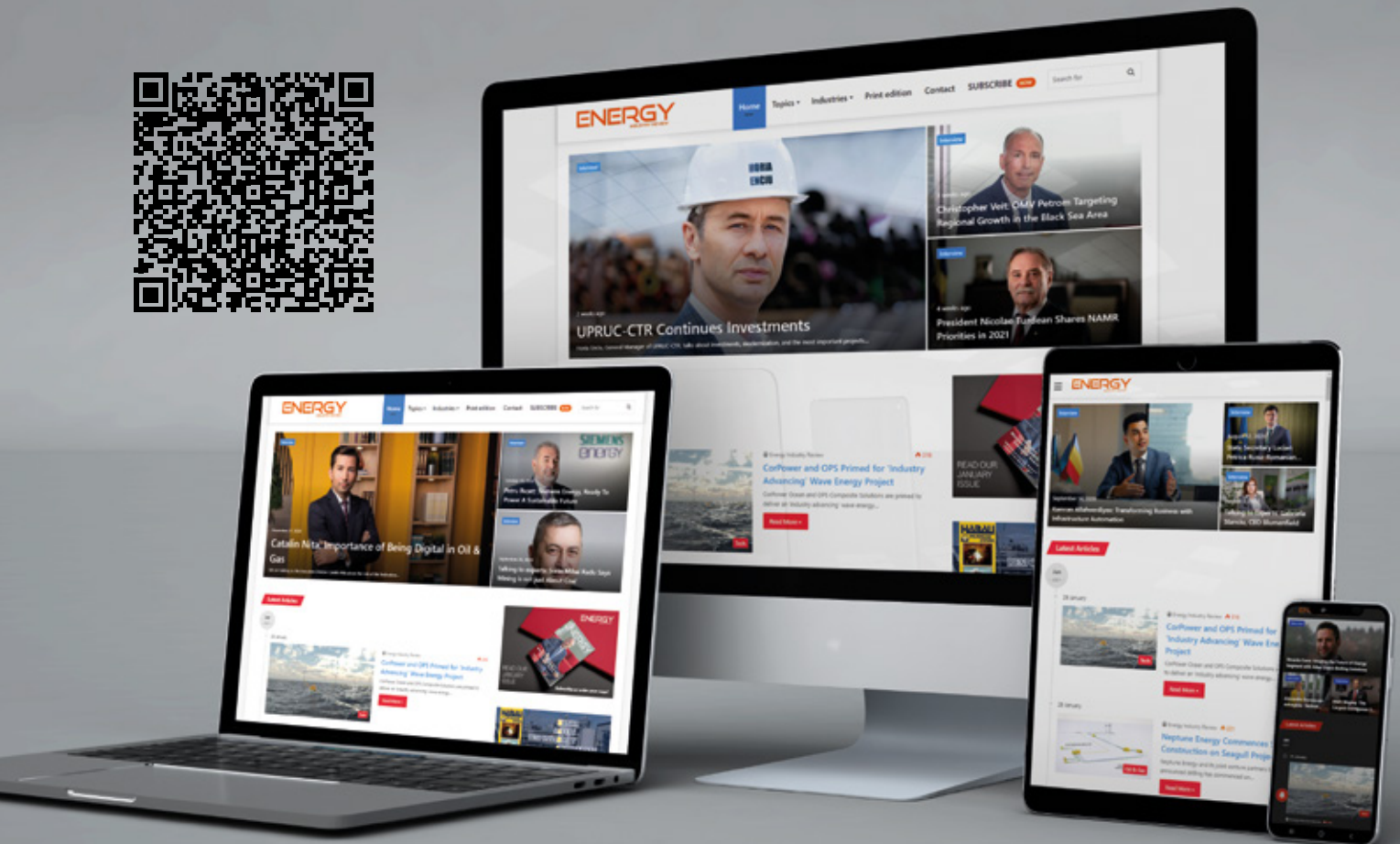
“Oil balances tighten heading into Q3 with a seasonal summer demand boost, higher refinery runs, and an improving outlook for the COVID situation amidst ongoing vaccinations,” Platts Analytics mentioned. Oil market watchers have been raising their 2021 price forecasts in recent weeks following Saudi Arabia’s surprise decision to slash another 1 million b/d from its crude production in February and March.

On January 25, Barclays raised its average Brent oil price forecast for this year by USD 2/b to USD 55/b citing ‘transitory factors’ including the impact of frigid winter temperatures in Asia on oil demand and a weaker US dollar. ■

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# Oil & Gas Industry to Maximise Energy Transition Opportunities

**Enhancing collaborative culture within the offshore oil and gas industry is not only key to maximising the potential of its existing world class supply chain but could also unlock future activity in the UK Continental Shelf (UKCS) and be key to delivering a successful Net-Zero future.**

**I**mproving commercial models which support cost reduction whilst incentivising the supply chain could re-energise collaboration, according to the findings of the annual Deloitte and OGUK Collaboration Report, published on January 28.

Deloitte and OGUK's industry-wide Collaboration Index (CI), which measures the effectiveness of companies as partners in projects, is part of the annual UKCS upstream supply chain collaboration survey. The report showed a slight increase in the collaboration index to 7.1 in 2020 from 7.0 in 2019, highlighting the flexibility and support the supply chain showed during an exceptionally challenging year.

On top of this, collaboration success rates hit a record high in 2020 with more than 50 per cent of survey respondents saying over half of their efforts were successful. In what also marked a first in the survey's six-year history, the overall proportion of 'successful' efforts was higher than 'unsuccessful' ones.

However, while COVID-19 saw many businesses work together to address the challenges, respondents said the pandemic and consequent economic downturn also led to disadvantageous commercial behaviours such as cancelled or modified contracts.

"OGUK has been encouraging industry to do business in a sustainable way to protect the supply chain. This includes finding innovative ways of working that deliver value for both sides, ensuring that industry has the skills and resources needed when activity

rebounds, as well as using the Supply Chain Principles as a mechanism to improve behaviours. We redesigned the questions in our 2020 Collaboration survey to understand how well these Principles have been embraced since we launched them. Greater collaboration will be a key factor in unlocking future industry developments and to strengthening our basin, our versatility, and our resilience. The ability to work together well across companies, industry and the wider energy sector will be critical to delivering a successful energy transition which supports jobs and the communities we work in. Collaboration needs to be part of our DNA; while it is not a silver bullet, it is good for business," OGUK Supply chain and Operations Director, Katy Heidenreich, said.

Deloitte's Office Senior Partner (Aberdeen), Graham Hollis, added: "In what is an extremely challenging environment, the industry must assess new opportunities and challenges as it addresses the year ahead. Organisations need to reimagine their businesses and models and focus on the right set of collaborative behaviours because as the report highlights, working closely with suppliers and customers to support one another will be vital. As part of this, Deloitte has produced a Framework for Action which details six building blocks that organisations should consider helping develop and continue building successful collaborative relationships - ones which deliver greater value for both operators and suppliers."

Deloitte's Framework for Action supports the OGUK Supply Chain Principles, and both will be key to stimulating collaborative behaviours. OGUK will also be issuing a call to action to promote adherence to its Supply Chain Principles and to communicate the benefits after the survey received a broad mix of views. ■

# Geodis Expand Project Logistics Operations

**Leading logistics services provider GEODIS is widening its range of worldwide project logistics services. At the same time, GEODIS is positioning this specialized offer with a new name in the market, changing from GEODIS Industrial Projects to GEODIS Project Logistics.**

## Project logistics

Innovation is one of GEODIS' key values. This value is especially important when it comes to Project Logistics – each complex and challenging project comes with its own set of unique requirements. Our industry focus is vital in this area, and innovative engineering logistics are a key success factor for these mega infrastructure projects.

GEODIS' Project Logistics serves customers with complex, oversized, extra-heavy transport requirements. Its dedicated network of more than 550 specialists located in 30 countries provides expert Project Logistics services across all major industries, with a specific focus on seven industry segments: Oil & Gas, Rail, Nuclear, Mining, Power, Infrastructure, Renewables, and Petrochemical production and Refining – to which has now been added the Aid and Relief sector as well as the Government and Military sector.

GEODIS serve the Oil & Gas segment through its own up-, mid- and downstream supply chain experts. These specialists in Project Logistics management and logistics are also highly qualified to deal with the large components and products in the Nuclear Fuel Cycle, both front and back end. GEODIS also provides dedicated logistic solutions for the Power, Mining and Renewable Energy segments, On- and Offshore wind farms, and the Rail Industry, where the company covers rolling stock, signalization, civil works and more.

GEODIS' global network of Project Logistics experts can plan, engineer and execute your projects – wherever they are

in the world, and under the most challenging climate (green logistics) and infrastructure conditions.

## About GEODIS

GEODIS is a top-rated, global supply chain operator recognized for its commitment to helping clients overcome their logistical constraints. GEODIS' growth-focused offerings (Supply Chain Optimization, Freight Forwarding, Contract Logistics, Distribution & Express, and Road Transport) coupled with the company's truly global reach thanks to a direct presence in 67 countries, and a global network spanning 120 countries, translates in top business rankings, #1 in France, #6 in Europe and #7 worldwide. In 2019, GEODIS accounted for over 41,000 employees globally and generated EUR 8.2 billion in sales.



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# Mission Innovation Hydrogen Valley Platform



32

Hydrogen Valleys



18

Countries



30,776

Total investment (M€)

**The European Commission unveiled the Mission Innovation Hydrogen Valley Platform, which highlights 32 large-scale hydrogen flagship projects around the world. The platform will present these advanced projects as ‘Hydrogen Valleys’, with the intention of promoting collaboration between hydrogen project developers and awareness for policy makers.**



The Hydrogen Valley Platform is a Global Information Sharing Platform, developed by the Fuel Cells and Hydrogen Joint Undertaking to support the Mission Innovation IC8 Member States.

Its objective is to promote the emergence and implementation of hydrogen flagship projects (‘Hydrogen Valleys’) and raise awareness among policy makers, thus advancing the clean energy transition.

The platform will offer up to date information regarding existing hydrogen valley projects, while providing various support tools for project development, implementation, and facilitating interaction.

Among the “most advanced H2 projects in the world” is one developed by one of Europe’s fastest growing green hydrogen companies – Enapter’s Phi Suesa House in Chiang Mai, Thailand. The multi-house residence in 2015 became the world’s first self-sustaining development

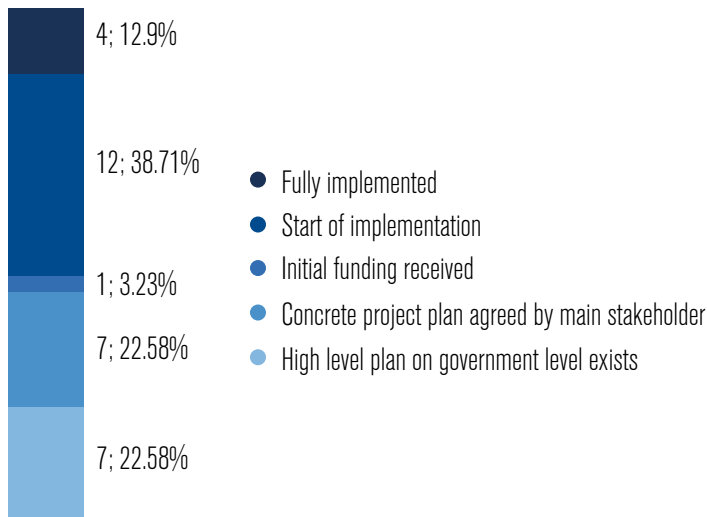
fully powered by a clean energy system based on hydrogen energy storage, making it one of the fully operational Hydrogen Valleys presented on the platform alongside Hydrogen Valleys in development.

The Mission Innovation initiative started at the COP21 in Paris in 2015 to reinvigorate and accelerate global clean energy innovation. The platform launch kicks off one of eight Innovation Challenges, led by the Renewable and Clean Hydrogen co-leads, Australia, Germany, and the EU.

“Realising the huge potential of green hydrogen in the clean energy transition requires accelerated efforts across all sectors of society.

## Current project status status (number (share) of Valleys)

This question provides insights into the current project status of a Hydrogen Valley displaying both the number of Valleys as well as the share of all Valleys characterized by the respective project status. Use the filter options to find out information on Hydrogen Valleys based on more specific characteristics.



The many flagship projects featured on the Mission Innovation Hydrogen Valley platform can help build bridges between cutting-edge technologies and deployment of green hydrogen systems at scale,” Patrick Child (Deputy Director General for Research & Innovation, MI Steering Committee Chair), stated.

Mission Innovation is a global initiative working to accelerate clean energy innovation.

The power of innovation – driven by sustained public investment coupled with business leadership – can make clean energy widely affordable and bring fledgling ideas into the mainstream.

Mission Innovation (MI) is a global initiative of 24 countries and the European Commission (on behalf of the European Union): Australia, Austria, Brazil, Canada, Chile, China, Denmark, European Union, Finland, France, Germany, India, Indonesia, Italy, Japan, Mexico, Morocco, Netherlands, Norway, Republic of Korea, Saudi Arabia, Sweden, United Arab Emirates, United Kingdom, United States.

The Phi Suea House is a sustainable residence project fully powered by photovoltaic panels harvesting the sun’s energy.

Its innovative hydrogen energy system is a central solution for community solar power and storage. This may be the answer to energy needs of the future and the solution that stores energy in the most effective and ecological way.

“We have combined strategies to minimize our impact on the land we live on. We designed and built a water collection system to save and reuse as much of the rain and irrigation water as possible. We directly harness heat provided by the sun to heat water with specifically engineered panels. We also integrated home automation for its potential in energy saving and carbon footprint reduction,” the authors of the project underlined. By utilizing wind flow and growing a permaculture garden,

they aim for a holistic approach to sustainable living.

The Phi Suea House project is a modular concept. It is ideally suited for residential or other developments in remote locations; or where complete independence from the grid is desired.

The Phi Suea House, the only Hydrogen Valley featured from South-East Asia, is a multi-building development powered solely by solar power, a hybrid hydrogen-battery storage system and hydrogen fuel cells. The project was developed by Sebastian-Justus Schmidt, the German co-founder of electrolyser producer Enapter, to showcase combined solar and hydrogen tech feasibility – and uses Enapter’s own electrolyser systems to create green hydrogen from water and electricity.

Enapter is the world’s only manufacturer of Anion Exchange Membrane (AEM) electrolysers, and its highly efficient, modular hydrogen generators are used in more than 30 countries. It has chosen Saerbeck, Germany for its first mass-production facility, with construction planned to begin early this year and finish in 2022, with annual production capacity of more than 100,000 electrolyser modules.

“Phi Suea House was an excellent testing ground for developing such a world-first hydrogen system, one which gave Enapter an early chance to prove the success of our AEM electrolysers. That’s why we’re excited to see it selected for the Mission Innovation platform, joining others in inspiring faster green hydrogen rollout and with it, the cost reduction needed to replace fossil fuels globally,” Sebastian-Justus Schmidt, Enapter Co-Founder and Chairman, said.

## About Enapter

Enapter is an award-winning company manufacturing highly efficient, modular hydrogen generators based on Anion Exchange Membrane (AEM) electrolysis technology. Its patent-protected core technology has a 10-year proven track record and allows for the creation of unique, low-cost, and compact electrolysers. They are used in more than 30 countries, in industries like energy, mobility, telecommunications, heating and more. Enapter has offices in Italy, Germany, Thailand, and Russia. ■

# Strategic Collaboration to Develop Global Applications for Hydrogen Power Generation

AFC Energy, a leading provider of hydrogen power generation technologies, announces the signing of the Company's first strategic engineering collaboration agreement with Ricardo, a global leader in the creation of innovative engineering and design solutions with strong credentials across the transportation and energy sectors.

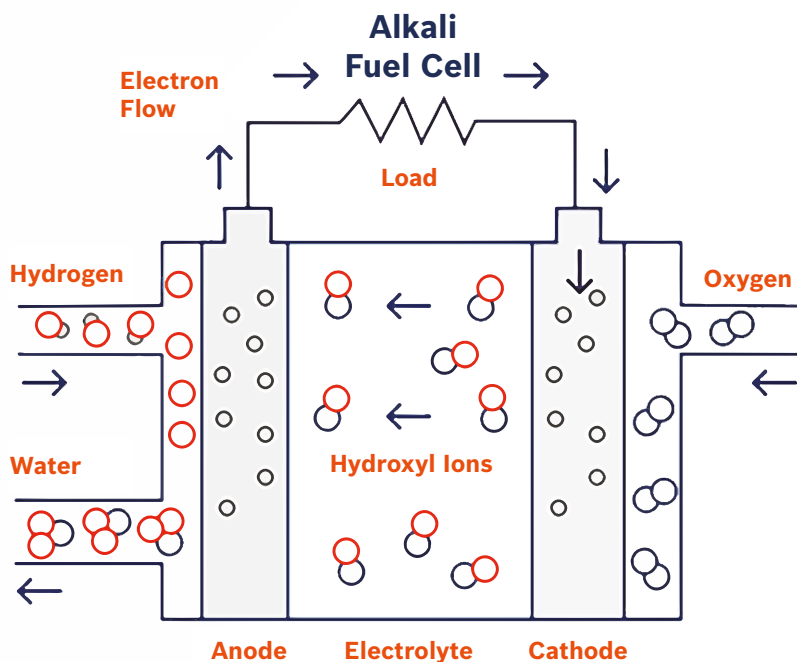


The agreement will focus on the joint creation of hydrogen fuel cell products and service offerings, with an initial focus on three key areas: marine, rail and stationary power generation. The collaboration will develop products and services that will directly support global efforts to decarbonise transport, energy, and critical national infrastructure.

The collaboration will create opportunities for AFC Energy to grow the number of products that utilise the company's fuel cell and validate its technical and commercial viability in the growing global market for hydrogen fuelled power and propulsion systems.

Both parties will consider the benefits achieved through the use of low cost, readily available, and high energy dense green ammonia fuel (rather than hydrogen gas) as a fuel of choice in off-grid or remote power needs, including international shipping and distributed power generation.

"The role for AFC Energy's alkaline fuel cell in supporting the decarbonisation of e-mobility and off-grid power systems through the use of zero emission fuels such as green







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RELIABLE

Whenever we are required we have the expertise to get it right first time.

ammonia is becoming ever clearer and relevant,” Adam Bond, Chief Executive of AFC Energy plc, said.

“We are delighted to be collaborating with one of the world’s leading engineering houses in Ricardo to fully explore new and innovative ways in which our alkaline fuel cell system can be deployed across a range of industries where traditional reliance on combustion of fossil fuels is no longer seen as a viable or acceptable means of remote power generation. We look forward to furthering our collaboration with Ricardo in our key markets of focus, with each providing enormous opportunities in their own right,” he also mentioned.

“Ricardo has a world leading pedigree in the energy transition towards sustainable and green power, working with many of the world’s leading Original Equipment Manufacturers and industrial partners in pursuit of engineering solutions that support Net Zero aspirations. We also recognise AFC Energy’s specialist expertise in alkaline fuel cell technology, which has highlighted the potential for low cost, high efficiency alkaline systems in off-grid and remote power environments. We are very pleased to be collaborating with AFC Energy is exploring new opportunities for fuel cell deployment across sectors such as marine and rail where the alkaline technology has the potential to play a key role decarbonisation and sustainability,” Mike Bell, Group Strategy and Transformation Director at Ricardo plc, added.

Following several months of engagement, the two companies have already jointly submitted proposals to Ricardo clients, addressing particular client needs pertinent to grid instability and the need for zero emission alternative power. Further opportunities will be identified in 2021 for joint collaboration across key markets.

## About AFC Energy

AFC Energy plc is commercialising a scalable alkaline fuel cell system, to provide clean electricity for on and off grid applications. The technology, pioneered over the past twelve years in the UK, is now deployable in electric vehicle chargers, off-grid decentralised power systems and industrial gas plants as part of a portfolio approach to the decarbonisation of local electricity needs.

## About Ricardo

Ricardo plc is a global strategic engineering and environmental consultancy that specialises in the transport, energy, and scarce resources sectors. Ricardo’s work extends across a range of market sectors – including passenger cars, commercial vehicles, rail, defence, motorsport, energy, and environment – with a client list that includes transport operators, manufacturers, energy companies, financial institutions, and government agencies. In addition to technical consultancy services, Ricardo has in-house engineering capabilities that enable the Company to design and deliver high-quality prototypes and low-volume manufacturing of complex products and assemblies, including engines, transmissions, electric motors and generators, battery packs and fuel cell systems. ■



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www.algeco.ro

# Road Freight Sector to Decarbonise Faster Than Many Expect

Shell and Deloitte published a joint study on how to decarbonise the road freight sector, which is based on the views of road freight executives and experts from around the world. More than 70% of the 158 interviewees consider decarbonisation as the leading or top 3 priority for their organisation. Over 150 global road freight leaders shared their views in this report on an aligned technology pathway and solutions roadmap.





**T**he ‘Decarbonising Road Freight: Getting into Gear’ report offers a detailed 10-year roadmap with 22 solutions aimed at addressing the economic, technical, regulatory, and organisational factors influencing the sector’s ability to decarbonise. The report shows that more than 70% of study participants view hydrogen fuel cell electric vehicles and battery electric vehicles as the most viable long term zero-emission heavy duty truck technology, and many believe these trucks will become commercially viable in the next 5 to 10 years.

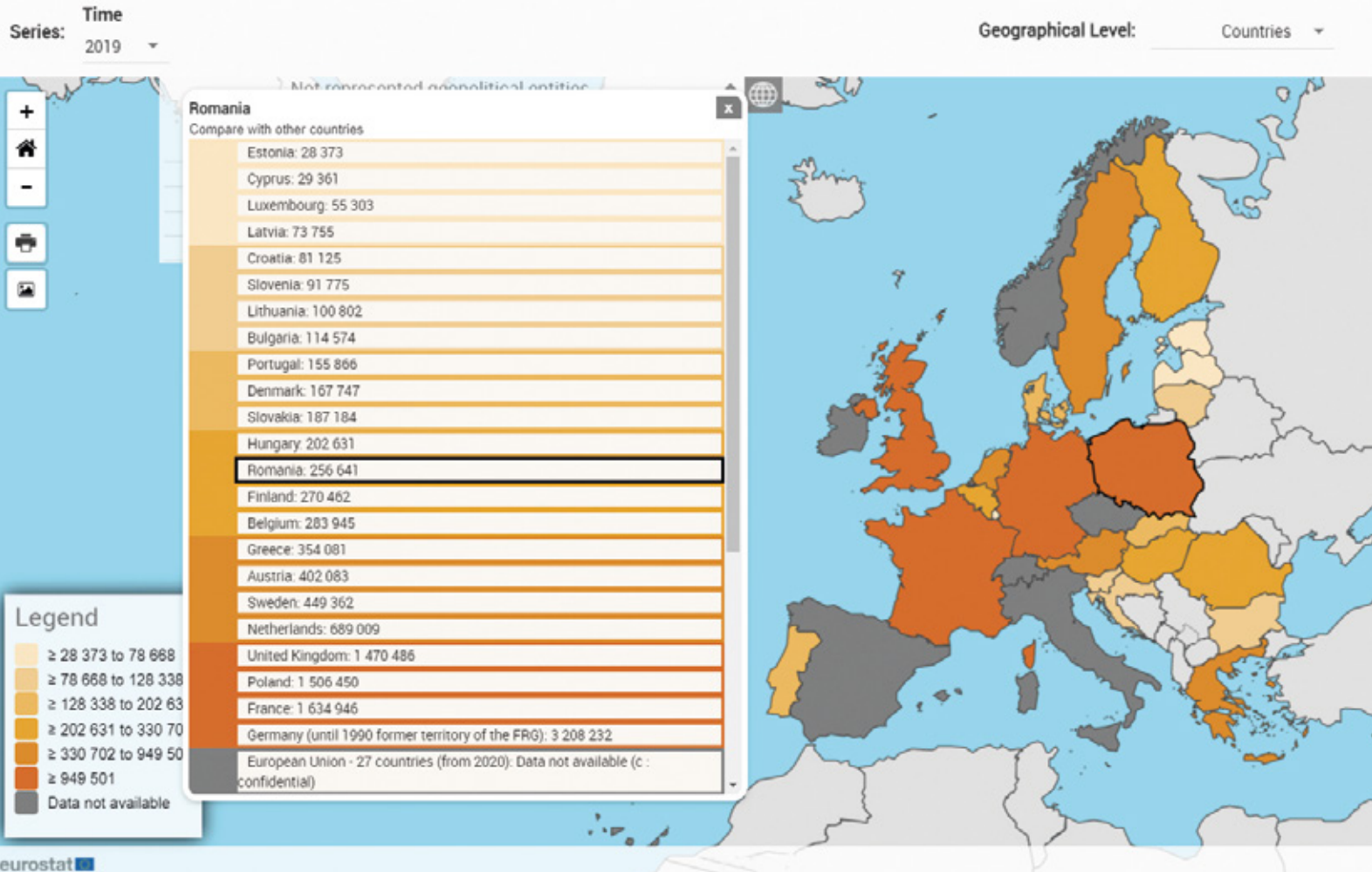
“Trucks move virtually everything modern society depends on for daily life and during the current COVID-19 crisis, society has experienced just how critical road freight is in delivering essential goods,” said Huibert Vigeveno, Downstream Director at Shell. “However, road freight is currently responsible for around 9% of global CO2 emissions and with demand for road

freight services set to double by 2050, urgent action must be taken now to put the sector on a pathway to net zero emissions by then. Fleet companies, truck manufacturers and energy providers have already started investing in low and zero emission solutions, but the sector requires a more robust set of policies and regulations to accelerate change.”

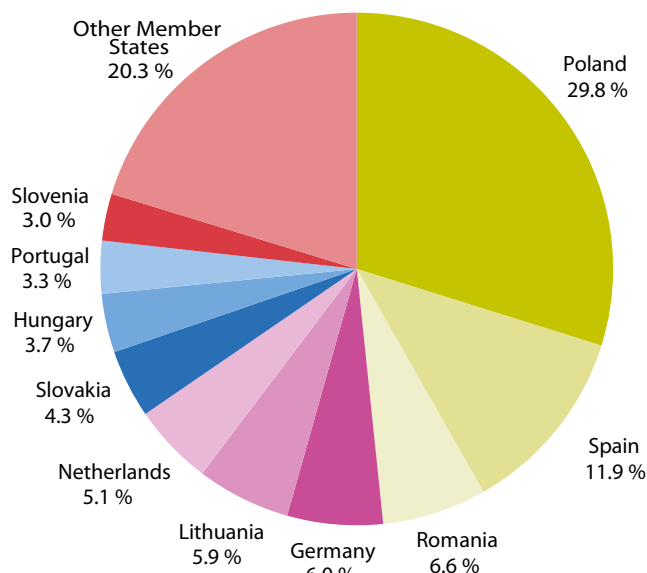
The key highlights from the industry perspectives report include:

- To meet the goal of the Paris agreement, absolute emissions from road freight need to decline almost 60% by 2050 versus a 2018 baseline, despite an expected doubling of road freight volume over the same period.
- 80% of study participants perceive a lack of regulatory incentives and the complexity of

Summary of annual road freight transport by type of operation and type of transport (1 000 t, Mio Tkm, Mio Veh-km)  
 (online data code: ROAD\_GO\_TA\_TOTT)  
 Source of data: Eurostat



**International road freight transport, 2018**  
(% share in tonne-kilometres)



Source: Eurostat (online data code: [road\\_go\\_ta\\_tott](#))

infrastructure replacement to be major barriers to decarbonisation, while 70% see limited demand from customers as a major barrier.

- Although not yet commercially viable, most study participants agree that the technologies to decarbonise road freight exist, and truck manufacturers are already developing hydrogen fuel cell electric vehicles and battery electric vehicles.
- Companies should begin prioritising the replacement of trucks and buses in viable short-range and urban duty cycles using available zero emission hydrogen fuel cell electric vehicles and battery electric vehicles.
- Through coalitions and partnerships, industry players should increase the deployment of zero-emission trucks and fuels in regional clusters and along high-traffic corridors.
- Low emission fuels such as liquified natural gas (LNG), bioLNG, compressed natural gas and biodiesel should be commercialised quickly around existing points of supply, but not where they could disrupt the deployment of zero-emission solutions.
- Immediate emission reductions can be achieved for fleets with diesel powered trucks by improving truck design, employing digital solutions to optimise fleet management, and using higher quality fuels and lubricants.

“The next 10 years will be critically important for the road freight sector to introduce zero emission vehicles into the global fleet, and it is very encouraging that road freight leaders have already begun to align on a technology pathway,” said Carlos Maurer, Executive Vice President of Sectors and Decarbonisation at Shell. “We believe that once produced at scale, hydrogen will likely be the more cost-effective and viable pathway to net zero emissions for heavy duty and long-route medium duty vehicles, and electric mobility will do the same for light duty and short-route medium duty vehicles. Shell has already begun taking steps to make these energy

solutions available to customers and we are partnering with others to expand these efforts.”

Shell has also released a companion report named ‘Decarbonising Road Freight: Shell’s Route Ahead’ outlining Shell’s role in helping the sector decarbonise. The report outlines Shell’s climate ambition and plans to reduce the emissions intensity of its fleet of close to 3,000 contracted road haulage tankers by 10% by 2025 and by 30% by 2030, both compared to 2018 figures. It also sets out how Shell aims to deploy low and zero emission fuels and fuelling infrastructure, solutions for reducing and offsetting emissions, policy recommendations and plans for collaborating with others throughout the road freight sector.

“To decarbonise harder-to-abate sectors, including road freight, requires an understanding of the motivations of different ecosystem players and ways to align interests. Leaders throughout the road freight sector are clearly making this a priority and there are many reasons to be optimistic about the progress that can be made. It is important to collaborate and start making impact now. Deloitte is committed to working closely with the industry participants to enable and accelerate change,” Tarek Helmi, Partner, Deloitte Netherlands, mentioned.

“Industry perspectives on decarbonising road freight help our work in shaping policies to accelerate the move to greener and cleaner trucks and enable us to promote this issue on the policy maker’s agenda. This is a key question for transport as road freight is the fastest-growing emitter in terms of global diesel use since 2000. International Transport Forum (ITF) is providing insights for new standards and regulations to promote the use of zero-emission trucks, offering insights for all stakeholders involved in the transition to carbon-free mobility and clean energy. Further new research into the electrification of urban delivery vehicle fleets explores where most savings – both economic and environmental – can be made,” Young Tae Kim, Secretary-General, International Transport Forum, added. ■

# Fighting Against Air Pollution

## METHANOL FUEL CELLS TO PROVIDE HIGHER EFFICIENCY

Worldwide, the climate is changing mainly due to too much CO<sub>2</sub> emitted into the atmosphere. At the same time, 91% of the world's population lives in places where air pollution exceeds World Health Organization (WHO) guideline limits resulting in 4.2 million premature deaths each year.

That's why we need to find new solutions and ensure zero harmful emissions in the transportation sector as it is responsible for a large proportion of air pollution, especially in densely populated areas with heavy traffic. One of them is methanol fuel cells.

## How fuel cells are used

Fuel cells use hydrogen as a fuel to produce clean and efficient electricity that can power cars, trucks, buses, ships, cell phone towers, homes, and businesses. Methanol is an excellent hydrogen carrier fuel, packing more hydrogen in this simple alcohol molecule than can be found in liquified hydrogen.

Methanol can be 'reformed' on-site at a fuelling station to generate hydrogen for fuel cell cars, or in stationary power units feeding fuel cells for primary or back-up power. On-board reformer technology can be used on fuel cell vehicles, allowing quick 3-minute fuelling and extended range (from 200 km with hydrogen to 800 km on methanol). As a simple molecule – CH<sub>3</sub>OH – with no carbon-to-carbon bonds, Direct Methanol Fuel Cells can be used for some applications, where methanol reacts directly on the fuel cell's anode to strip hydrogen atoms to fuel DMFC systems.

Since methanol can be produced from a wide range of

conventional and renewable feedstocks, it is the most affordable, sustainable, and easily handled hydrogen carrier fuel.

## World's first medium-duty fuel cell

In September 2020, Element 1 Corp, a leading developer of hydrogen generation technology, in collaboration with Co-Win Hydrogen Power, announced road testing of world's first medium-duty fuel cell. Co-Win said that e1's proprietary methanol-based M-Series hydrogen generator has been incorporated onto a medium-duty fuel cell truck produced by one of the world's largest truck manufacturing companies.

Globally, particulate matter emissions from combustion engines burning fossil fuels causes millions of premature deaths annually. These dangerous emissions are not produced by fuel cell powered vehicles as the only emission is water vapor. The M-Series produces no particulate matter in the generation of hydrogen, and when using methanol produced from waste gas streams such as landfill gas or biogas, e1's hydrogen generation solution is carbon neutral.

"Co-Win is both a valued strategic partner and licensee of e1, and we are excited to be working with them on this fuel cell truck project," said Dave Edlund, e1's Chief Executive Officer. "The hydrogen generation technology being deployed is unique to e1 and is a game changer for clean

METHANOL



M-Series hydrogen generator (pictured above) has been incorporated onto a medium-duty fuel cell truck

transportation. To my knowledge, no other company in the world can provide a commercial onboard hydrogen generation product comparable to our M-Series product line.”

Fuel cell vehicles typically require a pure grade of hydrogen to produce the electricity needed for propulsion. Historically, this hydrogen has been compressed and stored on the vehicle, which necessitates a costly network of hydrogen refuelling stations to be developed. In many regions of the world, building out this infrastructure is simply not feasible. On-demand hydrogen generation from liquid methanol onboard the vehicle mitigates the need for hydrogen fuelling infrastructure. In regions where stationary hydrogen refuelling stations are being installed, e1’s L-Series product line provides a very cost effective, modular solution for generating

fuel cell grade hydrogen on-site.

The methanol used by e1’s hydrogen generators requires a fraction of the space onboard the vehicle compared to compressed hydrogen, enabling significantly greater driving range between fuelling.

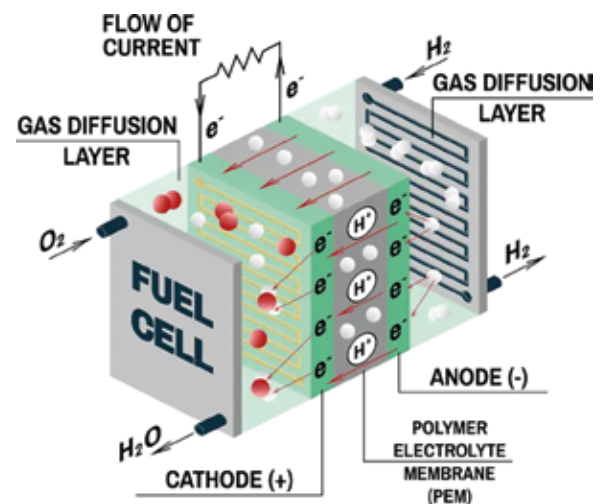
This range extension is critical for heavy- and medium-duty fuel cell trucks traveling long distances each day. In addition to fuel cell truck applications, e1 is experiencing considerable world-wide interest from firms developing fuel cell powered marine vessels. The company expects to be making significant announcements relative to on-board hydrogen generation for marine applications in both the commercial and military space.

## Methanol fuel cell systems

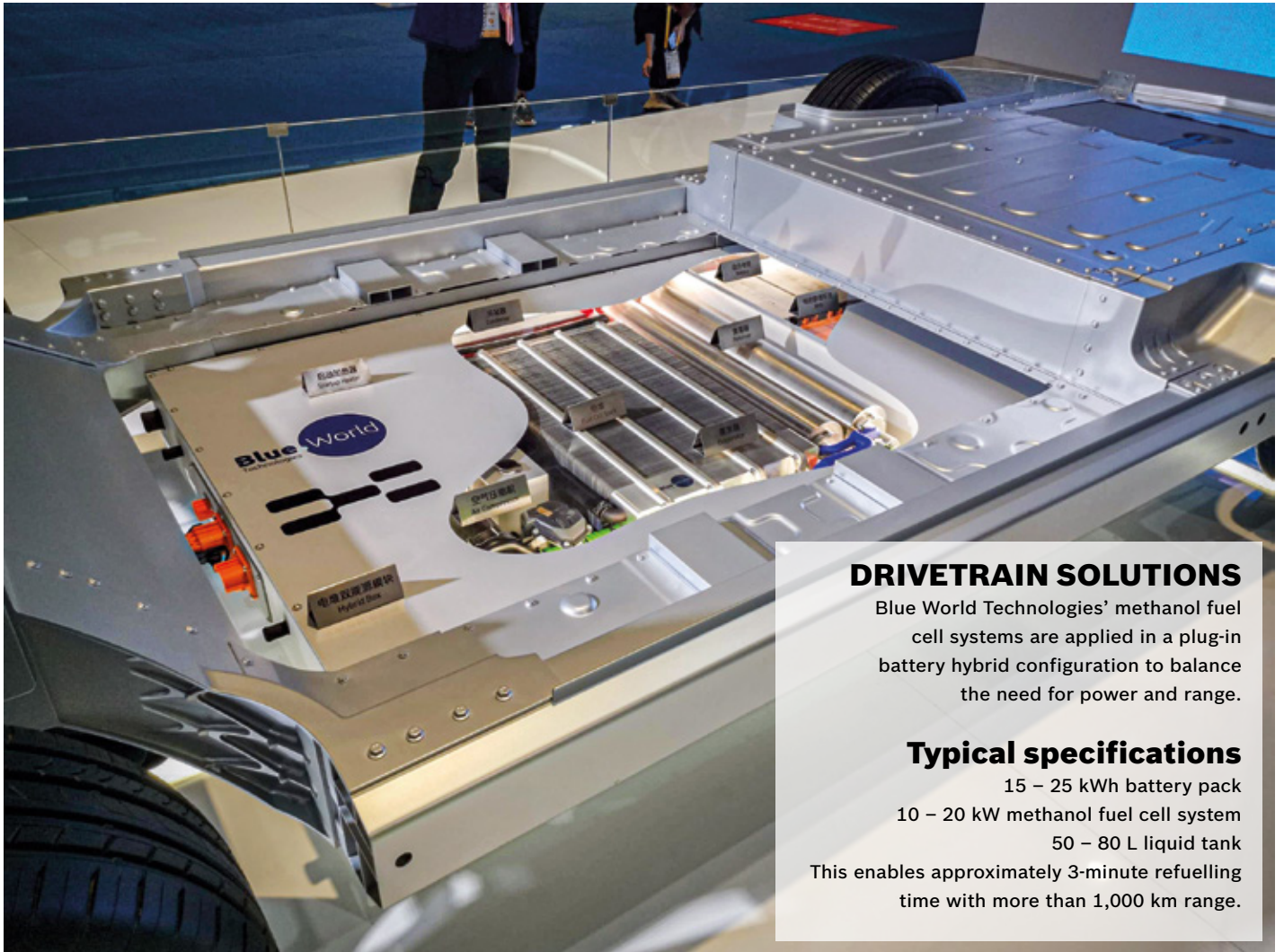
Blue World Technologies designs, develops and manufactures methanol fuel cell systems primarily for automotive and mobility applications. The methanol fuel cell system has zero harmful emissions and a low overall well-to-wheel CO<sub>2</sub> emission level providing a solution to the worldwide problems with air pollution and climate change.

With decades of experience in the industry, Blue World Technologies’ focus is on developing an advanced technology portfolio ranging from core materials through the stack and reformer design to the final reformed methanol fuel cell system.

Blue World Technologies is covering the entire value chain to enable optimized performance and cost-effectiveness of components and systems. This ensures a seamless scale-up of production and product delivery.







## DRIVETRAIN SOLUTIONS

Blue World Technologies' methanol fuel cell systems are applied in a plug-in battery hybrid configuration to balance the need for power and range.

### Typical specifications

15 – 25 kWh battery pack

10 – 20 kW methanol fuel cell system

50 – 80 L liquid tank

This enables approximately 3-minute refuelling time with more than 1,000 km range.

Recently Blue World Technologies acquired Danish Power Systems, a 25-year-old HT-PEM material research company.

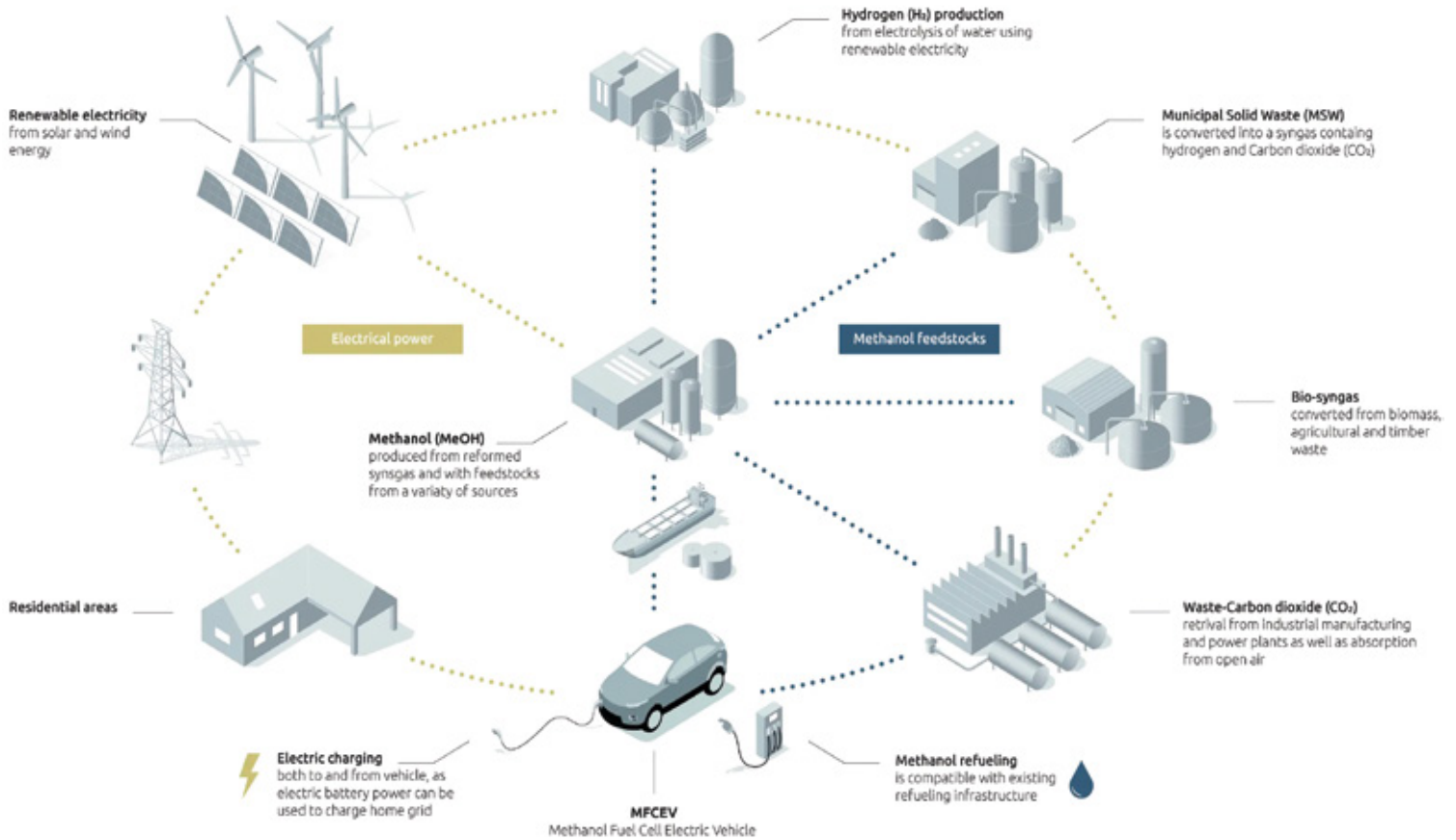
In December 2020, the respective general assemblies at Blue World Technologies and Danish Power Systems approved a combination of the two companies, whereby Danish Power Systems is acquired by and subsequently merged into Blue World Technologies to strengthen the market position of Blue World Technologies. The transaction follows the acquisition Blue World Technologies made in August 2019, where the company initially bought 15% of the shares in Danish Power Systems. The transaction awaits the approval of the Danish Authorities.

For more than 25 years, Danish Power Systems has been working with high-temperature PEM (HT-PEM) technology and was one of the first companies in the world to start research and development activities within this technology. Based on its outstanding MEA-technology (membrane electrode assembly) Danish Power Systems is widely recognised around the world. Since Blue World Technologies was founded in 2018 with the vision and strategy to

commercialise the methanol fuel cell technology, their fuel cell platform has been built using the MEA-technology of Danish Power Systems.

“The experience and knowhow the team from Danish Power Systems is bringing into Blue World Technologies are second to none. In the 20 years, I have been working with fuel cell technology I have not seen other component suppliers capable of providing the same stability, power density, and well-proven component-lifetime as Danish Power Systems. The acquisition of Danish Power Systems is, therefore, an important and value-adding step for us to secure additional technology competences strengthening and benefitting our fuel cell production,” states Anders Korsgaard, CEO and Co-founder of Blue World Technologies.

With the strong experience and competences of Danish Power Systems' team, Blue World



## Electrofuel production

Electrofuel covers the concept of taking electricity from electrons into chemistry by first forming hydrogen from electrolysis and thereafter binding this with CO<sub>2</sub> to form a logistical fuel such as methanol. The model shows how methanol has several pathways and feedstock which ensures flexibility on supply/demand and resistance to specific feedstock fluctuation. Biomass, municipal waste can be transformed by gasification and upgraded with electro-hydrogen to form the energy-dense storable fuel, methanol.

## Storage and distribution

Methanol is stored in massive amounts in a cost-effective way by using normal non-pressurized tank systems known from other liquid fuels. It can be stored through the yearly fluctuating energy needs and even for several years if needed. Methanol can easily be served from normal refueling stations and can even be distributed there by using barges or road tankers – all easily adapted from distribution of currently used fossil fuels such as diesel or gasoline.

## Consumption

The use of methanol in a highly efficient and clean conversion is where the Blue World Vision is really unique. The efficient conversion of methanol to electricity not only saves energy but also enables a better fuel economy than diesel/gasoline vehicles. The added benefit of zero harmful emissions comes for free and removes noise, particle emissions and vibrations from the equation. Furthermore, the fuel cell has few moving parts making it practically maintenance free which reduces operational costs further and keeps the vehicle in operation rather than in the workshop.

## Vehicle 2 Home

The vehicle is connected to the grid and can be used as a plug-in hybrid. This enables electric charging when there is an abundance of fluctuating electricity available. Furthermore, the vehicle will in time be able to supply the house when there is a shortage of electricity in the grid or in the case of emergencies or simply the desire to be off-grid.

Technologies is able to accelerate product development to optimise the technology platform bridging R&D activities and market needs. With an industrial approach, Blue World Technologies is differentiated from most other manufacturers of methanol fuel cells and fuel cell systems, by having all technologies and core component manufacturing within the fuel cell stack value-chain in-house, and in some cases even to system level.

“For many years, our activities have been centred around R&D. Now we are very much looking forward to being part of Blue World Technologies and contribute to the ambitious goal of commercialising the HT-PEM methanol fuel cell technology. It is taking us much closer to the market where we can really see our technology make a difference in the race towards a greener future,” says Hans Aage Hjuler, CEO of Danish Power Systems.

Blue World Technologies has initiated the commercialisation of the methanol fuel cell technology through large-scale production and is planning to start up pre-series production in mid-2021 with a production capacity of up to 5,000 units (50MW). The company is targeting to reach a full-scale commercial production capacity of up to 50,000 fuel cell units within three years. Large-scale and cost-efficient production is key for a truly commercialised breakthrough of methanol fuel cell solutions as a green alternative to industries around the world.

Blue World Technologies is founded by Mads Bang, Anders Korsgaard and Mads Friis Jensen - all executives from the fuel cell industry with extensive experience.

Anders Korsgaard expresses what the company has been working on and the interesting future that lies ahead of them: “One of the most crucial elements we have been working on is bringing down the production time and costs of the fuel cell components. We have now reached a point which enables us to move one step closer towards commercialising the technology to be able to compete with conventional technologies.”

“There is an increased focus on Power-to-X and there is a big market demand for alternative technologies providing CO<sub>2</sub> reduction, which we also see in both our current order books but also in the initiated dialogues we have with potential customers. Starting this initial production now allows us to progress with development and trial projects with customers,” explains Mads Friis Jensen.

## **An important role in the Power-to-X value chain**

Within the past couple of years, Power-to-X has gained global ground, both on the political scene and in many industries. In the green transition, Power-to-X technologies are going to play a significant role, especially within the sectors where direct electrification is not possible or feasible, which for example could be within heavy-duty transportation. When transforming green electricity into liquid fuel, such as methanol, it is possible to reuse the existing global infrastructure for storage and distribution while reducing fossil fuel consumption, and thereby, cutting down CO<sub>2</sub>

emissions.

Methanol and other e-fuels can be used to fuel conventional combustion engines and generators, either as a stand-alone fuel or as an additive, or they can be used to power fuel cells. On the utility side of the Power-to-X value chain, Blue World Technologies’ fuel cell technology is striving to play an important role. With high electrical efficiency of up to 45 %, Blue World Technologies’ methanol fuel cells will for many applications provide a much higher efficiency compared to combustion engines and generators. In addition, the fuel cells provide a clean and environmentally friendly operation where emissions of harmful particles such as NO<sub>x</sub> and SO<sub>x</sub> are eliminated. Furthermore, the operation can be either CO<sub>2</sub> neutral or have a significantly reduced CO<sub>2</sub> emission depending on the origin of the fuel, contributing to the combat against severe air pollution and climate changes.

## **Retiring the combustion engine**

The methanol fuel cell technology has great potential in several markets such as maritime, heavy-duty, stationary, and passenger vehicles. Blue World Technologies has a partner approach to fully leverage the potential of these markets. As a green and clean alternative to combustion engines and diesel generators the methanol fuel cell technology provides multiple benefits such as cost-savings, CO<sub>2</sub> reduction – or even a CO<sub>2</sub> neutral operation when running on green methanol – as well as zero harmful emissions. The fuel cells run on methanol which is an easy-to-use e-fuel as it is liquid at atmospheric pressure making refuelling convenient and makes it possible to integrate and reuse in the world’s existing infrastructure. Methanol is a fuel that can be produced from green sources and is CO<sub>2</sub> neutral in a well-to-wheel perspective. Therefore, it is a solid alternative to fossil fuel and can contribute to the green transition in multiple industries around the world.

With an aim to retire the combustion engine Blue World Technologies is eagerly working towards commercialising the fuel cell technology. Facing the optimisations and development of combustion engine technologies that have been ongoing for decades, Blue World Technologies has spent the past two years and is continuing to bring down production time and costs as well as increasing the electrical efficiency to be able to compete with the combustion engine. ■

# New Energy Policy

## GOVERNMENT PROMISES TO UPGRADE THE ENERGY SECTOR WITHIN 4 YEARS

Ensuring energy security is the primary purpose of a new energy policy, in line with the European context of a future integrated market, is the promise made by Citu Cabinet through the Romanian Government Program for the period 2020-2024. In the energy chapter, the government program does not come with new projects, in general taking over projects that have been in the recent years on the agenda of priorities of all governments, but which have not been implemented. A novelty is however the way in which the billions of dollars obtained as dividends from Black Sea gas exploitation will be used.

*by* Adrian Stoica



Within the new European legislative orientation that emphasizes the fight against climate change and the energy transition, the Government of Romania considers increasing the level of ambition for the reduction of emissions, increasing the share of renewable energy sources, the energy efficiency measures and the level of interconnectivity of power grids. Increasing the degree of energy security and ensuring the safety of supply are declared priority objectives, which can be achieved by implementing financing mechanisms in the energy sector and through transition to a clean energy, transforming the national energy system and adapting it to the new environmental requirements. Also, measures will be adopted to diversify the energy mix and adapt the energy system to the reliable and distributed energy production from renewable sources, boost competition, increase the degree of interconnection and encourage investments in the related infrastructure etc.

## Strategic objectives

- Implementation of measures to ensure energy security in the context of pragmatic lines of the EU targeting decarbonization and reduction of greenhouse gas emissions.
- Promotion of investments in the energy sector, especially in the field of clean energy, targeting the completion of reactors 3 and 4 in Cernavoda, retrofitting of unit 1 and introduction of advanced nuclear technology in the context of the intergovernmental partnership between Romania and the US.
- Unlocking projects for offshore gas exploitation in the Black Sea.
- Adapting some power production capacities to the new European trends in the field, in the sense



of switching them from solid fossil fuel (coal) to liquid fossil fuel (natural gas), as a resource of transition to green economy, in accordance with the European Green Deal.

- Making investments in the expansion of the power transmission grid to increase the capacity of interconnection with the neighbouring states and take over the additional power production capacity from new or renewable sources.
- Making investments in the expansion of the gas transmission and distribution network, with a focus on the implementation of smart transmission and distribution networks.
- Clarification of the legal and regulatory framework that would allow investments in new renewable energy capacities, by clarifying the possibility of signing bilateral contracts (corporate PPAs), for example, and stimulating green financial instruments to support investments in renewable energy.
- Creating a framework facilitating the absorption of European funds for making investments in the sector of onshore and offshore wind power and solar power; encouraging transition to energy based on sustainable biomass in rural areas and small urban areas to diminish the use of wood, which can be obtained from organic waste from agriculture and animal husbandry, as well as from the use of household and industrial waste.
- Active participation in European initiatives targeting the promotion of large-scale use of electric batteries, storage, in CO<sub>2</sub> capturing capacities, identification and capitalization on rare raw materials (e.g. lithium).
- Creating a competitive, transparent, and predictable regulatory framework, based on substantive public consultation, constituting the foundation of free and competitive energy markets; also, enrolling Romania in the Organization for Economic Cooperation and Development and the International Energy Agency.
- Participation in the European initiatives encouraging the development of hydrogen-based technologies to reach the threshold of economic competitiveness and large-scale use, with an essential contribution to energy security; and supporting the attraction of investments in modern technological solutions that have reached a degree of maturity and have been sufficiently tested to operate in conditions of economic efficiency.
- Supporting the development of clean transport infrastructure for electric charging stations and alternative fuels, according to European legislation - CNG, LNG, biofuels, and hydrogen (in the medium and long term) - by including in the existing support schemes, through administrative measures, bureaucratic simplification, tax incentives and encouraging research and development programs.
- Stimulating investments of the private environment in the energy sector, including through European funds, aimed at decarbonization and energy efficiency throughout the value chain (production - transmission - consumption) and in all related sectors (industry, transport, buildings), as well as boosting the process of digitization of energy networks.
- Modern governance system in the energy sector by acting on depoliticization and independence of regulatory authorities

and state-owned companies, on the simplification of the bureaucratic circuit, in the sense of transparency and digitization, in order to have a corporate and competent governance at all levels; creating a transparent, stable and consistent legislative and regulatory framework; listing on the stock exchange, where it is feasible, of energy companies in order to increase the degree of transparency of the management act and for investments based on principles of economic efficiency and technological neutrality, keeping strategic control by the Romanian state.

- Granting a central place for energy consumers and prosumers, combating energy poverty, increasing energy efficiency, introducing modern and efficient home heating systems, electromobility and digitization; promoting and facilitating the capacity of prosumer, and in the case of electricity produced by prosumers, the quantitative settlement of energy delivered into the national distribution system; redefining the notion of 'vulnerable consumer' - extend the definition to cover structural and access factors, commercial behaviour and market design.
- Creating and implementing the support mechanism of the type Contracts for Difference.
- Increasing energy efficiency by accelerating national programs of deep energy renovation of public buildings and of residential buildings with European funds - thermal insulation, introducing smart meters for utilities, replacing the interior hot water and heat installations, ensuring ventilation with heat recovery, integration of the most efficient heating and renewable sources, as well as digitization.

## Investment priorities of state-owned companies

Short-term investments: Completing the new power plant of Romgaz in Iernut; Continuing and completing the retrofitting of unit 5 of SE Rovinari; Upgrading the boilers related to unit 8 of SE Isalnita; Increasing the storage capacities of Romgaz's USFs and turning them into multi-cycle storage facilities for ensuring the operation of hydrocarbon-fired power plants, including in conditions of severe weather (negative temperatures).

## Strategic investments during 2021-2024

The Government of Romania considers strategic investments worth almost EUR 10bn in the nuclear sector.



Cernavoda Nuclear Power Plant

Nuclear power is a source of energy with low carbon emissions and is a main component of the energy mix in Romania. In order to cover the deficit of electricity production capacity forecasted for 2028-2035, as a result of reaching the operating time limit of several existing capacities, it is provided to extend the lifespan of nuclear reactors from Unit 1 of Cernavoda NPP and build 1-2 new nuclear units, the financing following to be ensured under the intergovernmental agreement signed in October 2020 between Romania and the US.

- Retrofitting of Unit 1 of Cernavoda NPP - investment value: approximately EUR 1.5 billion.
- The project of Units 3 and 4 of Cernavoda NPP - investment value: EUR 7.6 billion.
- Building the detritiation facility at Cernavoda NPP - investment value: EUR 190 million.
- Spent Fuel Intermediary Storage Facility (SFISF) - investment value: approximately EUR 20 million.
- Maintaining the integrated nuclear cycle, by providing the raw material for the manufacture of nuclear fuel necessary for the operation of the units of the Cernavoda Nuclear Power Plant, in conditions of national security, in compliance with the provisions of the Treaty on the Functioning of the European Union and the recommendations of the EURATOM Supply Agency by transferring the plant from Feldioara to the National Nuclear Power Company (SNN) and opening a new uranium mine by SNN.

## Restructuring of Complexul Energetic Oltenia

At Complexul Energetic Oltenia it is considered to put into practice the company's restructuring program after it is approved by the EC. It provides for the withdrawal from operation of some lignite-fired energy capacities and their replacement with natural gas generation capacities with modern technologies with low CO<sub>2</sub> emissions, as well as of some photovoltaic parks of about 700 MW. Thus, it is intended to transform the energy mix

from energy produced only based on coal, into energy produced based on coal, natural gas, and renewables.

## Division of Complexul Energetic Hunedoara

At Complexul Energetic Hunedoara (CEH), the aim is to apply GEO 60/2019, so that two companies will be separated from CEH. One company will include the Paroseni Thermal Power Plant and the coal mines, and the second will have the Mintia Thermal Power Plant, which will be given to the local administration.



Complexul Energetic Hunedoara

In both companies, investments will be made to reduce CO<sub>2</sub> emissions by introducing new technologies in compliance with environmental standards.

## Priorities at Romgaz

- Construction by Romgaz of a new energy capacity, with combined cycle with natural gas turbines, at the Electrocentrale Mintia Branch within Complexul Energetic Hunedoara.
- Setting up a joint venture, with Liberty Galati, in view of developing Greenfield investment projects, respectively the development of a gas-fired power plant (CCGT) and power plants based on renewable sources, using both wind and photovoltaic technologies.
- Partnership with Drobeta-Turnu Severin Administrative Territorial Unit and Mehedinti Gaz in order to develop thermal energy units for the production of thermal energy and expand gas distribution networks to ensure continuity in heat and gas supply to the city of Drobeta-Turnu Severin.
- Romgaz, through the Severin branch, will be



involved in the project of development of the first power plant in the country to produce electricity based on natural gas, green energy, and hydrogen, in Halanga: Power Plant by integrating the production of electricity from renewable sources (RES) with hydrogen production, through a combined cycle gas turbine (CCGT) plant, with a capacity of 150MW, a photovoltaic park of 50MW, as well as a hydrogen production unit.

- Romgaz's involvement in the project for the exploitation of Black Sea gas, by acquisition by Romgaz of the stake of 50% in the project held by ExxonMobil (if ExxonMobil wants to exit the project), as well as the joint operatorship with OMV Petrom.

### **Hidroelectrica, complex investment plan**

The implementation of an ambitious and complex investment plan by developing new projects totalling approx. RON 26.04 billion, by building new hydropower capacities, refurbishments and modernizations of existing power plants, new projects to

diversify the activity, by building capacities from other renewable energy sources, but also by implementing research-innovation activities at the company level.

- New hydropower projects with a total estimated value of RON 17.933 billion, a total installed capacity of 713.62 MW and an average annual production of 3,396.79 GWh/year, of which we mention the completion of investments in advanced stage of execution, currently ceased: Hydropower development (HD) of Jiu river on Livezeni-Bumbesti sector; Rastolita HD, Cerna Belareca HD, HD of Olt river on Cornetu-Avrig sector; Caineni, Rastolita power stage and Lotrioara power stage.

- Building new capacities for electricity production on inland rivers, evaluated, at this moment, at approx. 93.7 MW installed and project energy of 338.5 GWh/year.

- Retrofitting and upgrading projects with an estimated total value of around RON 3 billion, covering capacities with a total installed power of 1,969.40 MW and an average annual production of approx. 4,651 GWh.

- New projects to diversify the business portfolio with a total estimated value of about RON 5.104 billion, leading to the commissioning of new production capacities with a total installed capacity of over 655 MW and an average annual production of about 1,763.92 GWh.

- Electricity production capacities from onshore and offshore wind sources with a total installed capacity between 300 MW and 500 MW for each variant, depending on the result of feasibility studies.

- Electricity production capacities from solar sources with a total installed power of around 50 MW - 100 MW, depending on the result of feasibility studies.

### **ELCEN Bucharest, new energy production capacities in high-efficiency cogeneration**

Electrocentrale (ELCEN) Bucharest is considering the realization of the following investment projects:

- Implementation of a combined cycle cogeneration unit within CTE Grozavesti, which involves the realization of a new energy production unit in high-efficiency cogeneration in gas-steam combined cycle technology, gas-fired;

- Implementation of a combined cycle cogeneration unit within CTE Bucuresti Sud, which involves the realization of a new energy production unit in high-efficiency cogeneration (gas-steam combined cycle), of around 200 MWe and around 200 MWt;

- Implementation of a new energy production





CTE Bucuresti Sud

capacity, in high-efficiency cogeneration, gas-fired, within CTE Progresul;

- Rehabilitation of the combined cycle from CTE Bucuresti Vest to extend the lifespan/implement a new unit in a combined cycle of approx. 186 MWe and approx. 17 Gcal/h.

## Transelectrica's new investment program

Transelectrica's new investment program includes:

- Integration of production from renewable sources and new power plants - Dobrogea and Moldavia. Besides investments in progress, new investments are in stages preceding the start of work execution by integrating wind power plants off the Black Sea coast - in collaboration with Hidroelectrica - in line with the European Green Deal; the project will be implemented through a new wind power plant (WPP) of 300 MW offshore, a new hydropower plant HP Islaz - 30 MW, on Olt river, close to the Danube, with a pumping capacity of 24 MW, a new 400kV OHL Dobrogea Bucharest. The budget is estimated at EUR 922 million.



- Increasing the interconnection capacity:

Upgrading the 220 kV axis Resita-Timisoara-Sacalaz-Arad to 400kV - to increase the interconnection capacity of the transmission networks in Romania, Hungary, and Serbia, improving the integration of the electricity and renewables markets. The cost of the project is estimated at EUR 77 million;

A new Romania-Hungary 400 kV - Oradea-Jozsa interconnection overhead line, for increasing the interconnection capacities of the transmission networks in Romania and Hungary, improving the integration of the electricity and renewables markets. The cost of the project is estimated at EUR 200mln.

- Retrofitting of the Power Transmission Grid by continuing the objectives in progress and promoting new investments;

- Safety of supply to consumers.

## Directions of the modernization and development program of Transgaz

The modernization and development program of Transgaz for the period 2021-2024 mainly follows the following directions:

- Ensuring gas supply to consumers in conditions of safety, limiting the environmental impact:

- Modernization and retrofitting of the National Transmission System;

- Development of the National Gas Transmission System (NTS) on new directions of consumption, in order to ensure gas transmission intended for newly established gas distribution systems and supply to new consumers directly connected to the NTS;

- Correlation with the Management Program of the company.

- In the period 2021-2024 the Romanian gas transmission network has in advanced development the following projects, in a total value of RON 401,602,060:

- Development on Romania's territory of the National Gas Transmission System on Bulgaria-Romania-Hungary-Austria corridor (phase I), which involves ensuring a gas transmission capacity to Hungary of 1.75bcm/year and 1.5bcm/year to Bulgaria;

- Developments of the NTS in the North-East of Romania in order to improve gas supply to the area and ensure the transmission capacities to/from the Republic of Moldova, of 1.5bcm/year, in the interconnection point between the gas transmission systems of Romania and Moldova;

- New developments of the NTS in order to take over gas from the Black Sea coast (Vadu T1), involving the creation of an additional point for taking over gas from



the offshore exploitation blocks in the Black Sea;

- upgrading Isaccea 1 and Negru Voda 1 gas metering stations, involving the upgrade of gas metering stations in the interconnection points to increase the degree of energy security in the region.

Also, in the period 2021-2024, Transgaz has projects that include: NTS development on the Bulgaria-Romania-Hungary-Austria Corridor (phase II); development of the Southern Transmission Corridor for taking over gas from the Black Sea coast; Romania-Serbia interconnection; enhancement of the bidirectional gas transmission corridor Bulgaria-Romania-Hungary-Austria (phase III); interconnection of the national gas system with the gas transmission system of Ukraine, modernization of the gas transmission infrastructure in the North-West area of Romania.

## Investments in other strategic companies

- Conpet - modernization and increasing the security of the national crude oil and derivatives transmission system, investments for increasing the safety in operation and diminishing the specific consumptions, development of new related activities.

- Oil Terminal - development of storage capacity in the South tank farm, expansion and increase of loading/unloading capacity for oil, petroleum, chemical and petrochemical products as well as other finished products and liquid raw materials, modernization of existing assets - tanks, pipeline network, solving the historical environmental problems by carrying out greening works.

- Societatea de Administrare a Participatiilor în Energie (SAPE) (Energy Assets Management Company) - building, in partnership with Electrocentrale Grup, a new production capacity in cogeneration on the site of the former thermal power plant Titan, development of an Electrocentrale Grup production capacity in Fantanele.

- Midia Thermal Power Plant - building a thermal power plant in cogeneration, photovoltaic park.

- Societatea Electrocentrale Grup – co-financing the investment project on the construction of a photovoltaic power plant on the site of the former thermal power plant Fantanele - Mures County, co-financing of investment for a new production

capacity in cogeneration on the site of the former thermal power plant Titan.

## Where will royalties related to Black Sea gas be directed

One of the novelties brought by the Government Program for the period 2020-2024 is the exact determination of the destination of billions to be obtained from Black Sea gas exploitation, a project that the new government promises to unlock.

Therefore, the document provides that royalties from the exploitation of Black Sea gas will be used as follows: one third for green transition (co-financing for European projects), one third for the expansion of gas networks, one third for balancing the pension system.

According to a Deloitte report prepared in 2018, the development of Black Sea resources could bring to the state budget about USD 26bn, in total, by 2040. The new government promises to unlock Black Sea gas exploitation, by amending and supplementing the Offshore Law no. 256/2018.

## The Capital will have four new power plants

The construction of these units is an older project of the company Electrocentrale Bucharest. Three of the power plants are to be built by ELCEN, a government-owned company. These would be built on the site of the current CET Grozavesti, Sud and Progresul. A fourth power plant would be built by the Energy Assets Management Company, in collaboration with Electrocentrale Grup. Therefore, it is considered to:

- Implement a combined cycle cogeneration unit within CTE Grozavesti, which involves the realization of a new energy production unit in high-efficiency cogeneration in gas-steam combined cycle technology, gas-fired;

- Implement a combined cycle cogeneration unit within CTE Bucuresti Sud, which involves the realization of a new energy production unit in high-efficiency cogeneration (gas-steam combined cycle), of around 200 MWe and around 200 MWt;

- Implement a new energy production capacity, in high-efficiency cogeneration, gas-fired, within CTE Progresul.

All the three power plants require a total investment of EUR 370mln and the projects were submitted for financing through the Modernization Fund.

Regarding the fourth new power plant in Bucharest, it will be built on the site of the former CET Titan. The project involves a capacity of 50 MW in cogeneration. ■

# Mobilair M59

## SETTING NEW STANDARDS IN THE 5M<sup>3</sup> 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<sup>3</sup>/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



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.

smaller towing vehicle. And when the compressor arrives at the building site, it is easier to uncouple and manoeuvre by hand.

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.

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# Restart Energy to Double the Number of Household Customers

**Restart Energy, one of the largest independent suppliers of electricity and natural gas on the Romanian market, aims to double the number of household customers this year to 65,000 and increase its revenues about 80% - up to 220 million lei. The growth is determined by the liberalization of the energy market and new business lines with higher added value, such as the sale of equipment.**

**T**he management of Restart Energy, a company founded in 2015 in Timisoara, wants to reach 65,000 individual customers by the end of the year, more than 35,000 compared to 2020. Also, it aims to reach 7,500 customers in the business segment, increasing by 50% compared to last year.

## **83% higher revenues compared to 2020**

The advance of the number of customers and the addition of new business lines - such as the sale of equipment - will lead to a significant increase in turnover. Thus, Restart Energy relies on 220 million lei revenues for 2021, more by 100 million lei (+ 83%) than last year. The company's management plans to reach a net profit of 24.2 million lei at the end of 2021, compared to approximately 13 million lei (estimated) last year.

"Since the beginning of this year, with the liberalization of the energy market, we have registered a very large increase both in terms of requests for offers and the number of new customers. Thus, we notice that we receive approximately a thousand information requests daily, and around 70% of those who find out about our offers become clients. We know that it is a temporary effect - for a few weeks - due to the market's liberalization. This historic event for the Romanian

energy market will change the way the entire field looks and support us in achieving the objectives," says Armand Domuta, CEO and founder of Restart Energy.

## **A green bond issuance of 3-5 million euros**

Along with the liberalization of the energy market, another essential factor for the development of Restart Energy this year and the next five years is the launch of green bond issuance. This is also the most important plan of the company at the beginning of 2021. Through this process, Restart Energy aims to obtain 3-5 million euros for investments. The interest will be about 8-10%, and the listing on the Bucharest Stock Exchange will take place soon. The process will be mediated by the brokerage company GOLDRING.

"The bond issue is the first step in executing our strategy regarding the number of customers, the integration of renewable production assets, our regional expansion, and reaching the target of providing 100% energy from renewable sources. In the next five years, we aim to achieve ambitiously, but achievable targets: renewable energy production of 500 MW, 300,000 retail and business customers, a market share of 2.5% for electricity and 1.5% for natural gas on a fully digital model. The amount obtained through this bond issue will help us achieve these objectives," adds Armand Domuta.

## **USD 500 million projects by 2025**

Restart Energy wants to launch this year a plan for the acquisition and development of renewable energy projects with a capacity of 500 MW. The projects would be completed by the end of 2025.



“In the next five years, we aim to achieve ambitiously, but achievable targets: renewable energy production of 500 MW, 300,000 retail and business customers, a market share of 2.5% for electricity and 1.5% for natural gas on a fully digital model. The amount obtained through this bond issue will help us achieve these objectives.”

**Armand Domuta, CEO and founder of Restart Energy**

The company’s management wants to purchase and develop 100 MW of solar, wind, biogas, biomass, and geothermal energy projects every year until 2025. This Restart Energy plan will require investments of approximately USD 100 million per year. In this regard, Restart Energy recently entered a joint venture with the consulting and fund management company Interlink Capital Strategies (USA). This partnership will support Restart Energy in executing the strategy of developing green energy projects worth USD 500 million in Romania and neighbouring countries while expanding into the US market.

In addition to the acquisition and development of 100 MW projects this year, the company’s management wants to double the volumes for energy supply and natural gas supply.

The two companies decided to further strengthen their relationship by becoming partners for expanding the Restart Energy business into the American market - by launching together in USA the Restart Energy Democracy (RED) platform - an online energy trading platform based on blockchain technology that allows peer to peer transfers between energy producers and final consumers, launch of a fully digital energy business franchise and carbon credits system for renewable energy production and consumption. The RED Platform was launched in 2019, initially in Romania Restart Energy’s home market where it has the highest customer base of approximately 30,000 household customers and 5,000 corporate customers.

### **First fully sustainable green energy supplier in Romania**

“This partnership will provide access to US capital and accelerate Restart Energy’s goal of providing 1 Bil. KWh of clean and affordable renewable energy for 300,000 consumers in Romania and Europe by 2025. This will allow Restart Energy to help reduce the carbon footprint with 750 MN Kg CO2 per year and in the same time to become the first fully sustainable energy supplier in Romania delivering 100% locally produced green energy to its customers until 2025. At the same time, it will allow Restart Energy to enter the US market with its innovative blockchain platform, where we will have access to a mature and technology-oriented market,” says Armand Domuta.

### **The RED blockchain technology - a new approach to US renewable energy market**

“Restart Energy is an innovative company at the forefront of combining renewable energy supply and marketing through technology, vision and purpose, making renewable energy more available and accessible to all. What attracted us to this partnership is not only RED - a proven platform based on blockchain technology - but the entrepreneurs and their purpose-driven vision of improving access and proliferation of renewable energy, which is compatible with Interlink’s mission. The RED business model will bring to the USA a new, and improved approach to how renewable energy is financed, produced, and consumed which we believe will improve access to renewable energy, and ultimately benefit our climate. In parallel, the investment in the Restart Energy’s plans in Europe will allow us to develop additional renewable energy assets, especially since Restart is already active in Romanian and Serbian markets with intention to expand this year in Germany and Spain,” states Alan Beard, Interlink’s Managing Director.

This partnership will be operated through Restart Energy Innovative Technologies AG (REIT AG), a Swiss-based holding company and ecosystem of innovation that funds, researches, and develops energy-tech ventures part of Restart Energy group of companies. ■

# Small Modular Reactors and Recent Developments in Europe

**As the voice of the European nuclear industry, FORATOM draws attention to a topic related to the nuclear sector that is gaining more and more attention at international level but also in Europe. The development of Small Modular Reactors (SMR) is clearly accelerating at international level, with strong signals being given in Europe as well.**

**W**ith the announcement of new European SMR technologies like Nuward™ (developed by a consortium of French companies) and Rolls-Royce, combined with plans to potentially invest in SMRs in Estonia (Fermi Energia), the Czech Republic, Romania, Poland etc, it is clear that SMRs will play an important role in the European nuclear sector in the medium and long term.

Offering a wide range of applications from electricity to heat for industrial processes or district heating, SMRs provide a solution for GHG emission reductions and also help respond to some of the key issues on the EU's agenda such as smart sector integration or hydrogen production.

They can also address, due to their flexibility, some of the challenges which European electricity markets will face due to the massive deployment of variable renewables.

In order to understand and better address the challenges and benefits of this new technology, FORATOM has established a Task Force (TF)

that gathers experts in the field with a clear objective: to develop a position on the required technical, regulatory, economic and political conditions needed to support the development and deployment of SMRs for applications in Europe.

## **EU decarbonization targets: Impact of nuclear technologies in mitigating climate change**

“While most of the topics on which the TF is working are in the initial stages of development, things are moving fast and in the right direction. We are confident that by working closely together all partners will be able to address any potential challenges from the very beginning enabling a smooth deployment of SMRs in different applications depending on the needs of each Member State. We acknowledge the fact that non-European SMR technologies, which are in more advanced stages of development, are being contemplated by some EU utilities. We believe that SMRs are of strategic importance for the EU, not only for the benefit they will bring to the system but also to maintain the EU's technology leadership, contribute to strengthening its industrial base, ensuring long-term high qualified skills and jobs, and much more. It is therefore of paramount importance that the European Commission supports nuclear Innovation, Research and Development in this area. We also believe that, in order to ensure a smooth and rapid deployment of SMRs, a common EU approach to regulatory and licensing procedures is needed. In addition, considering the important impact of nuclear technologies as a whole in mitigating climate change, the benefits brought by the sector should be valued correctly. It is our strong belief that combining the deployment of innovative SMR technologies with the existing and future fleet of large reactors will contribute towards achieving the decarbonization targets the EU is committed to in the most efficient and affordable way,” FORATOM underlined.

FORATOM is ready to contribute on behalf of, and together with, its members to the work of the Commission in this field. ■

# Nostradamus Consulting to Analyse Energy Majors' Challenges

**E**nergy majors have had a challenging 12 months with price wars, over supply, weak demand, and pressure to provide less carbon intensive forms of energy which has resulted in materially low share prices. Struggling to embrace sustainable investment criteria, new research from Nostradamus Consulting suggests that majors may only need to focus on a relatively narrow set of sustainability criteria to make an impact on the investment community resulting in higher valuations.

Nostradamus isolated the digital commentary of over 250 energy investment analysts from November 2019 to November 2020 and analysed it through a bespoke analysis framework, structured around the Sustainability Accounting Standards Board's guidelines for energy companies. The study examines investor narrative and sentiment around 20 individual issues, which collectively reflect investor opinion on the performance of energy companies on environment, social and governance (ESG) metrics.

## Biggest investor conversations, driven by whom?

Whilst the 20 issues under examination fall broadly evenly across environment, social and governance parameters, by far the greatest volume of investor narrative was on the following issues: Business ethics; Physical impact on climate change; Energy management; Greenhouse gas emissions; Labour practices; Management of the legal and regulatory environment.

The investor commentary was examined across all 20 issues individually. The analysis was fuelled by the commentary from 19 of the 250 energy investment analysts from 13 investment firms, led by RBC Capital Markets, Sanford Bernstein, Goldman Sachs, and Credit Suisse.

## Player performance by ESG issue

Except for Equinor's improving performance on environment and governance metrics and bp's static performance on environment, all

players recorded declining investor net sentiment on all three E, S and G metrics, reflecting a challenging business and operational landscape.

Equinor and Total are the clear leaders, with Shell and Chevron occupying the middle ground and bp and Exxon Mobil trailing.

## Player performance by biggest issues

However, examining performance against the issues generating most investor commentary clearly places Equinor in pole position, recording improved investor net sentiment on physical impact on climate change and energy management. In second place, Total recorded improved investor sentiment on managing the legal and regulatory environment. The other players broadly retained ESG ranking positions and received falling investor sentiment across all issues.

## Conclusion: Not all ESG issues are weighted equally by investors

"2020 was a challenging year for energy majors which is reflected in their deflated share prices. This analysis suggests investors would reward energy companies which take focused action to improve their performance in a relatively small number of ESG issues, rather than seeking perfection across the entire range of issues," Julian Green, Nostradamus Managing Director concluded.

Nostradamus Consulting is a B2B insight and analytics advisory firm with specialist experience in providing insight on the global energy industry. The company is data agnostic and specialist in all insight gathering methodologies focusing on the optimal approach for clients' business challenge. ■



**POWER**

# **ANRE DECISION** **Electricity at the Best** **Price Until June 30**

*by* Adrian Stoica





**H**ousehold customers who haven't changed their contracts will benefit from the best price from the competitive offer of their suppliers and be able to choose a new offer within a much-simplified contracting process, according to a press release of the National Regulatory Authority for Energy (ANRE).

"Customers will benefit from the best price from the competitive offer of suppliers and be able to choose a new offer within a much-simplified contracting process. Also, at least until June 30, 2021, household customers will receive from the current supplier the best offer, without subscription, and be able to benefit from a discount covering the difference between the price of the universal service offer applicable in H1/2021 and the price of the competitive offer with the lowest value," ANRE representatives say.

At the same time, ANRE Order no. 5/2021 simplifies the contracting and information process regarding the offers of electricity suppliers, so that the end-customers can knowledgeably decide what is the offer most suited for their needs.

At the same time, additional obligations are provided for suppliers of last resort, to inform household customers, respectively to send, with each invoice issued until June 30, 2021, an information on the liberalization process and an offer selection form.

The offer selection form contains the competitive offer with the lowest value, an alternative competitive offer, and the universal service offer, offers applicable in H1/2021, as well as the value of the discount granted and the implementation period.

By filling in this form, the customer can choose directly the optimal competitive offer, and sending the form by selecting an offer amounts to the contracting agreement and, implicitly, a contractual obligation for both parties. The contract will enter into force 5 days after the date of receipt by the supplier of the offer form completed and signed by the customer.

Subsequently, the supplier has the obligation to send to the end-customer, after at least 5 days from the date of receipt of the completed selection form, a copy of the supply contract signed. This incentive offered to household customers simplifies the contracting process and avoids customer travel and congestion from suppliers' public relations centres.

We mention that in the new order the obligation to inform customers on the liberalization process is better structured, and suppliers of last resort have the obligation to send it with each invoice throughout 2021.

“The new regulations consider the need to ensure a better information of the electricity end-customer by suppliers of last resort, as well as to simplify the conclusion of electricity supply contracts under the conditions imposed by the current pandemic context, and for the process to be carried out to the benefit of end-customers,” the press release also shows.

In drafting the order, solutions were identified in accordance with national and European legislation that offers household customers a longer transition period from the universal service to the competitive market, while increasing their awareness of the liberalization process.

In order to facilitate the process of changing the energy supplier by the end-consumer and optimize the operational process, ANRE has in progress the project ‘Development of the institutional capacity of the National Regulatory Authority for Energy to simplify the process of changing the electricity and gas supplier’, co-financed from the European Social Fund, through the Operational Program ‘Administrative Capacity’ 2014-2020. Therefore, by implementing the project, it will be possible to meet the new European requirements providing that by 2026 the technical process of changing the supplier must be completed in 24 hours.

## Energy aid, up to 70% of the income

Government has on the table a draft law targeting the vulnerable energy consumer. According to it, the financial aid, granted depending on the energy resources used by the beneficiary, could reach up to 70% of the income of a person from a family in need. It is estimated that 427,000 persons will benefit from the future law. Specialists are not very pleased with this initiative and say that an institution should be set up to monitor and centralize the most accurate information about actually vulnerable consumers. The initiator of the draft law on the establishment of social protection measures for vulnerable energy consumers is the Ministry of Labour and Social Protection (MMPS).

The vulnerable energy consumer is the person who lives alone or in family and which, for reasons of illness, age, insufficient income, or other factors, should benefit from social protection measures and additional services to ensure at least their minimum energy needs.

According to the draft law, the heating aid is granted depending on the average monthly net income per family member or of the single person, in the form of percentage compensation. Single persons can benefit from support if they have a monthly net income of up to RON 1,445. For a family, the condition is that the average monthly net income does not exceed RON 810 per person.

## The support cannot exceed the value of the bill

The compensation cannot be lower than 10% of the reference value, taking into account depending on the heating system used (and which represents the maximum level of the aid), but also it cannot exceed the value of the billed consumption. The reference value is RON 500 per month for electricity, RON 250 for natural gas and RON 80 for solid or petroleum fuels. For thermal energy, the reference value of the monthly aid is established within the limit of the average consumption. It is defined as the quantity of thermal energy, measured in Gcal, necessary to heat the home. The draft law includes an annex which establishes this parameter depending on area, number of rooms, calendar month.

Therefore, the vulnerable consumer can collect monthly between RON 50 and RON 500, if it uses electricity for heating, between RON 25 and RON 250 if it uses natural gas and between RON 8 and RON 80 if it uses coal or a petroleum fuel for heating.

The heating aid is granted only to vulnerable consumers who don't benefit from other forms of support for heating their homes, granted based on employment contracts or other specific regulations for various economic sectors.

## How much money can the disadvantaged persons receive?

The energy supplement is calculated depending on the energy supply sources used, in the amount of: RON 30 for electricity consumption; RON 10 for natural gas consumption; RON 20 for consumption of solid and petroleum fuels; RON 10 for thermal energy consumption. This type of support can be requested together with the home heating aid or separately. Where the only source of energy used is electricity, the amount of the supplement is increased to RON 50.

Therefore, a vulnerable consumer who uses gas for heating and has access to electricity could benefit from a support of up to RON 280 per month. The maximum support that can be accessed by the citizen who uses electricity for heating and consumes additional electricity can reach RON 550, representing 68% of the amount of RON 810 established for the income of a person considered vulnerable consumer. ■

# First Enel X Romania Charging Stations for EVs in Constanta

**Enel X Romania, part of Enel X, the advanced energy services division of Enel Group, installed the first six charging stations for electric vehicles (EVs) in the city of Constanta. The network developed by the company in Romania thus reached 53 stations, respectively 106 charging points.**

**W**e actively support Romanians who opt for electric mobility by expanding the network of charging stations for electric vehicles in Romania, enabling drivers to enjoy greater flexibility and improved access to the electric charging infrastructure, in line with our commitment to facilitate clean and sustainable transport,” said Mihai Mardale, Head of e-Mobility Enel X Romania.

Based on a partnership with the Constanta City Hall, the six charging stations are in areas easily accessible to drivers, while the investment in the equipment and the costs of installation and maintenance are fully supported by Enel X.

Four of the stations are JuicePole-type and are located on Unirii and Fulgerului-Dezrobirii streets, at the Military Hospital and in the multi-storey car park of the Constanta County Hospital. With a power of 2 x 22 kW AC, each of the stations allows the simultaneous recharging of two electric vehicles and the charging of up to 40% of the battery in 30 minutes, depending on the car model and specifications. Two other JuicePump-type stations are located on Pandurului Street - Mangalia Road and in the Tomis Port parking lot. Each charging station allows the recharging of two electric vehicles at the same time with a power of 50 kW DC and 22 kW AC respectively. When using direct current (DC), charging of up to 80% of the battery takes about 25 minutes, depending on the car model and specifications.

Drivers can recharge their vehicles at Enel X stations using the new version of the JuicePass mobile application - the unique interface for

Enel X customers through which they can access a network of over 95,000 public charging points in 18 European countries. The application can be downloaded from Google Play or App Store, and the installation guide can be accessed on [enelx.ro](http://enelx.ro).

Drivers can check the location and status of Enel X charging points on an interactive map either in the JuicePass app or on the website here.

Enel X Romania has the largest public e-Mobility infrastructure plan in the country, which includes the installation of approx. 2,500 charging points across all regions, involving an overall investment between 15 and 20 million euros. The plan aims at adapting to the development of EV use in the country, at household and institutional level, as well as among businesses, through the demand from fleet owners.

Enel X Romania installs charging infrastructure within the ‘Recharge Partners’ spaces - shopping malls, supermarkets, restaurants and hotels that want to attract electric car users. The installation and maintenance of the charging infrastructure comes at no cost to the company’s Recharge Partners in exchange for the availability of parking spaces.

The company is also offering a similar service to municipalities that are interested in improving air quality by encouraging electric mobility. Enel X Romania helps local authorities identify the most appropriate solutions and provides the installation and maintenance of the charging infrastructure at no cost, on public parking spaces.

The company applies a tariff model allowing drivers to charge their electric vehicles starting from 1.29 lei/recharging unit (1 recharging unit = 1 kWh).

Enel X has installed around 116 MW of storage capacity as well as, in the electric mobility sector, it has made available more than 170,000 public and private EV charging points worldwide. ■

# Future of Stationary Energy Storage Led by Policy and Renewables

**Electricity generation from renewable energies is growing on a daily basis and, to integrate their variable nature, energy storage systems are growing in parallel. IDTechEx have investigated the evolution of the energy storage market, forecasting its growth in the next ten years, in the new report: 'Batteries for Stationary Energy Storage 2021-2031'.**

**E**nergy storage systems became an unavoidable asset along the different segments of the electricity supply chain, from generation, to transmission and distribution, to consumption. The stationary energy storage market is growing at a very high pace, and to better understand the future development, IDTechEx released an update of its report 'Batteries for Stationary Energy Storage'. The report addresses the latest adopted policies of the main countries adopting energy storage systems, together with the latest technical improvements, showing the possible future evolution of the battery market toward the next ten years.

Batteries for stationary storage applications are constantly growing, with announcement of new battery installation on a daily basis. The evolving grid infrastructure, driven by a constant adoption of renewable energies, is facilitating the adoption of storage systems currently dominated by the Li-ion battery.

The fast adoption of Li-ion battery (LiB) in automotive and portable devices has facilitated the cost decrease of this type of battery, fostering their adoption as stationary storage systems. Moreover, the short installation time, and (now) well regulated market, also due to the experience acquired in the past years, has placed this technology in a favourable position to be adopted on a large scale.

Although LiB is the most adopted and cited technology, other storage systems are approaching the market at different paces. The redox flow batteries (RFBs) are one of them. Based on the flow of electroactive

species, this battery is characterised by smaller energy density, but higher cycle life. Moreover, RFBs employ safer active materials than LiBs, therefore the risk of fire is not a concern for these systems. Besides the technical properties, which will allow RFBs to be adopted in specific storage scenarios, the higher upfront cost is currently one of the main restrictions for this technology to compete with Li-ion systems.

These systems, characterised by large power and long storage duration, are addressing the FTM segment of the market, and will facilitate the improvement of the electricity grid infrastructure, avoiding the installation of new power lines. High power and long storage duration come with a large device, which therefore requires long installation and time, and upfront cost, although with a reduced levelized cost of storage.

The evolution of the electricity market will soon focus on cost analysis, offering to emerging technologies the opportunity to find their position in the market, even with a greater upfront cost.

The growing necessity of energy storage devices is linked to the growing adoption of renewable energies. The renewable installations are affecting the existing structure of the electricity grid, and the requirement to maintain a constant flow of electricity is creating big opportunities for the energy storage market.

As analysed in the report, stationary energy storage devices can provide different services to the electricity grid. Utility scale batteries can for example support the power grid, by grid deferral and energy capacity service, among other services. Ancillary services are also another type of service which batteries can provide, to



stabilise the power grid. This is currently the most chosen segment.

The requirement for these services is constantly growing due to renewable energy integration, but also because of decommissioning of coal and gas power plants.

Together with the adoption of batteries in the existing power grid infrastructure, new business models are also being developed, based on the management of battery systems, such as the virtual power plant (VPP) from the agglomeration of several battery units, and the adoption and implementation of Vehicle-To-Grid (V2G) approach. This approach exploits the battery electric vehicles (BEV), which have a considerable battery capacity (100kWh compare to tens of kWh for home batteries), to provide ancillary services to the power grid.

The stationary storage market is therefore evolving. An increasing number of companies are offering, besides battery storage systems, also solar storage, power purchase agreements (PPAs), and electricity tariffs.

Although the stationary storage market is facing quick adoption, the market is still under the strong influence of political decisions. In fact, the adoption of renewable energy targets, the improvement of the power grid, or the decommissioning of power plant, are all decisions affecting the adoption of energy storage systems.

To understand the current status of deployment of energy storage technologies, and policies adopted by the main countries, IDTechEx forecasted the future evolution of the stationary storage market.

Although similar scenarios exist among different countries, each of the analysed countries presents its peculiarities, in terms of regulations, technical requirements, and adopted policies. Therefore, IDTechEx estimated a growing trend for each of the analysed countries, obtaining

as a final result a 38% compound annual growth rate between 2021 and 2031, with a cumulative energy capacity installed above 1TWh.

The evolving energy storage market is separated into two branches, Front-of-Meter (FTM) and Behind-the-Meter (BTM). The FTM sector is related to the operation of the electricity infrastructure; therefore, batteries are employed to maintain a smooth and continuous flow of electricity to the consumers. The BTM market instead is the customer side of the market; hence batteries are used by consumers to decrease electricity costs mainly.

The services provided by the batteries are similar most of the time, although on a different scale.

The report 'Batteries for Stationary Energy Storage 2021-2031' aims to provide the reader with a clear picture of the current status of the development of these two branches in the main countries currently adopting battery storage systems.

The future adoption of green policies will drive the adoption of renewable energies in both segments of the market, although other parameters like grid infrastructure and the energy sources adopted by countries (e.g. nuclear, coal, and lignite power plant) will play an important role in the adoption of energy storage systems.

To better understand the future evolution of the energy storage market, IDTechEx performed an in-depth analysis of the main countries adopting energy storage systems (including the U.S., China, Japan, Australia, Germany, and others), investigating the latest policies in terms of renewable energy and energy storage, as well as interviewing leader companies in the field of energy storage, to understand the market approach and the possible effect of COVID-19.

The result of this analysis shows a similar but different scenario among the investigated countries. The renewable energy target, with the current status of the grid infrastructure, in consideration of the different types of energy sources adopted by the country, defined a specific scenario for every country. As well as the differences, a clear point has been identified: the stationary storage market is only in its early stages, from both technical and policy aspects. ■

# MET Group Continues Investments in Renewable Energy

MET Group, as one of the leaders in European energy trading, has ambitious plans in renewable energy production in the Central and Eastern European (CEE) region. The group, through its 51% joint venture PEPO Energy, has recently launched a 1.2 MW biogas power plant in Serbia at a ceremony attended by Zorana Mihajlović, Deputy Prime Minister and Minister of Mining and Energy.

**P**EPO Energy, a joint venture between Switzerland-based energy company MET Group and Arhar Teh, a local firm in the north-eastern Serbian town of Novo Milosevo, has constructed and commenced operations of a green energy power plant which utilises residue agricultural biomass for biogas production, which in turn generates electricity and heat. The plant has a design capacity of 1.2 MW.

MET Group entered the PEPO project in May



PEPO power plant



Zorana Mihajlović, Deputy Prime Minister and Minister of Mining and Energy, Serbia

2020, acquiring 51% of the equity and providing the necessary project finance.

Zorana Mihajlović, Deputy Prime Minister and Minister of Mining and Energy, emphasized the importance of building a new biogas power plant in Serbia, in addition to the 28 existing ones. “Currently, we are building another 73 biogas power plants in Serbia, and with about 100 MW of capacity being installed in a year or two, Serbia will produce more electricity from biogas than Croatia, Slovenia and Montenegro together. This project demonstrates the orientation of the Serbian government towards green energy, and every investor who invests in renewable energy shows that they believe in our energy policy,” said Zorana Mihajlovic. She underlined that PEPO Energy is an investment worth five million euros, which will support over 30 jobs for the local community.

“The PEPO power plant is yet another milestone in our renewables strategy and demonstrates our strong commitment to a green and sustainable future. It also further underpins our commitment to Serbia, where MET has been doing business since 2009. We would like to continue to expand our renewable and conventional activities here, further investing in the Serbian economy.”

## Acquisition of 42 MW wind park in Bulgaria

MET Group has just completed the acquisition of a 100% stake in Enel Green Power Bulgaria, which owns a 42-megawatt wind park in Bulgaria. The transaction is part of MET’s growth strategy to develop a significant renewable portfolio in the CEE region.

The 42 MW wind park located in North-eastern Bulgaria is now wholly owned by MET Group, following the successful completion of a share and purchase transaction with Italian Enel Green Power, the renewable arm of Enel Group, as seller. The transaction was completed on 20 January 2021 and was cleared by the Bulgarian and Serbian competition authorities.

The wind park, the 5th largest in Bulgaria, is in the municipality of

Shabla and Kavarna, with 14 units of Vestas-V90 wind turbines (3 MW capacity each). The wind farm, operating since 2010, supplies power equivalent to the consumption of around 30,000 households.

MET Group considers the growth of renewable power generation in Central and Eastern Europe as a core part of its business strategy going forward, whilst also supporting the energy transition away from coal in Europe. MET’s goal is to build a geographically diversified portfolio of power generation and infrastructure assets, with a substantial renewable asset portfolio.

## About MET Group

MET Group is an integrated European energy company, headquartered in Switzerland, with activities in natural gas and power markets. MET is present in 14 European countries, with 1600 permanent staff in Austria, Bulgaria, Croatia, Germany, Hungary, Italy, Romania, Serbia, Slovakia, Spain, Switzerland, Turkey, Ukraine, and the United Kingdom. The group is present in 25 national gas markets and 22 international trading hubs. In 2019, MET Group’s consolidated sales revenue amounted to EUR 11.7 billion, the volume of natural gas traded was 50 BCM.

The first activities of MET Group on the natural gas supply market in Romania have begun in 2009.

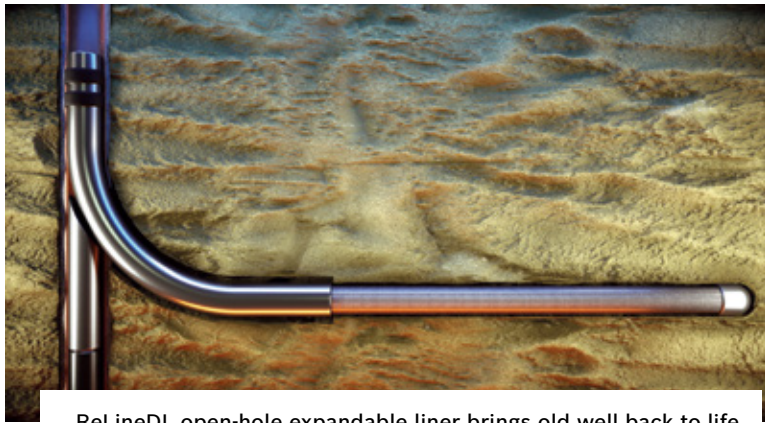
MET Romania Energy is currently one of the most important private suppliers, among the few with a growing market share. With a market share of approximately 5%, it is among the top 10 most important suppliers in the country, out of a total of about 100 companies active in this field. MET Romania Energy supplies electricity, natural gas and energy services to an increasing number of household and industrial consumers in Romania.

With a young but experienced team, MET Romania Energy has also become one of the most important companies taking the balancing responsibility on the electricity market (BRP - Balancing Responsible Party).

MET Romania Energy is owned by MET Austria Energy Trade GmbH (with a 99.99996% stake) and MET Holding AG (with 0.00004% of MET Romania titles). ■

# Coretrax Deploys Expandable Drilling Liner in Norway

Coretrax, the global well integrity and production optimisation leader, has marked a significant milestone with the first deployment of its expandable liner technology in Norway since acquiring Mohawk Energy.



ReLineDL open-hole expandable liner brings old well back to life

**T**he move has allowed the business to deliver and deploy novel technology and specialist personnel from local bases, significantly reducing the logistics, cost, and carbon footprint of travelling from the US.

The ReLineDL is a hydraulic expansion system which enables operators to isolate low pressure or thief zones which can be encountered while drilling. This provides a significant inner diameter (ID) advantage when compared to a conventional liner string, enabling the safe and effective passage of larger completion strings, and maximising production.

Planned and supported from Aberdeen, the expandable drilling liner was mobilised when a major Norwegian operator needed to isolate the gas cap in a lateral well during a drilling campaign.

Compared to conventional methods, the tool enabled the operator to kick-off much deeper in the well, eliminating the need to drill a section of the wellbore and install a tie back. The system was fully expanded within six hours and the entire project was completed in less than 40 hours. This saved 14 days rig-time and delivered significant project efficiencies.

The RelineDL system also provides the operator the option of adding a casing string in either planned or contingency scenarios with minimum loss of wellbore diameter.

“As the industry slowly emerges from the significant challenges that the Covid-19 pandemic presented, having local bases where we can deploy our technology delivers substantial benefits to our clients with reduced logistics and faster deployment. Maximising oil recovery as cost efficiently as possible is a key priority for operators and our expandable technology is ideally placed to support, delivering operational efficiencies, and allowing greater economic results to be garnered,” John Fraser, Chief Operating Officer at Coretrax said. “Our expandable systems have already built a strong track record in North America and the Gulf of Mexico and we’re thrilled to see their value fully realised in Europe. We’ve entered 2021 with a strong pipeline of projects and look forward to continuing the growth of our operational footprint in the UK and Norwegian sector,” he added.

Coretrax acquired expandable tubular well specialist Mohawk Energy in May 2019 and Churchill Drilling Tools in November 2019. ■



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## THINK BIG, ACT HUGE

# CorPower and OPS Primed for ‘Industry Advancing’ Wave Energy Project

**CorPower Ocean and OPS Composite Solutions are primed to deliver an ‘industry advancing’ wave energy project after securing close to EUR 500,000 from EEA Grants.**

**T**he Portuguese-Swedish wave energy developer and Norwegian engineering firm will join forces for the COMPACT (COMposite Pressure cAsing for CoST) Project, combining sector leading Wave Energy technology with low-cost composite design and fabrication processes from the offshore industry.

Financial backing comes from Iceland, Liechtenstein, and Norway under the EEA Grants ‘Blue Growth Programme’ - which is committed to stimulating ‘blue economy’ innovation, creating jobs, and driving growth for SMEs.

The COMPACT Project aims to boost the performance and slash costs of CorPower’s next generation WECs (Wave Energy Converters), which will shortly enter the flagship HiWave-5 demonstration phase in northern Portugal.

CorPower Portugal Country Manager Miguel Silva said the latest development marks another significant milestone speeding up the process to commercialization.

“The COMPACT project combines CorPower’s world-class WEC design knowledge with OPS’ vast experience in composite pressure vessels for offshore applications,” he said. “Together we are aiming to develop new technology addressing two common challenges experienced in state-of-the-art wave energy technology – weight and price. The process will involve developing, testing, manufacturing, and certifying an innovative light-weight pressure casing (cylinder),

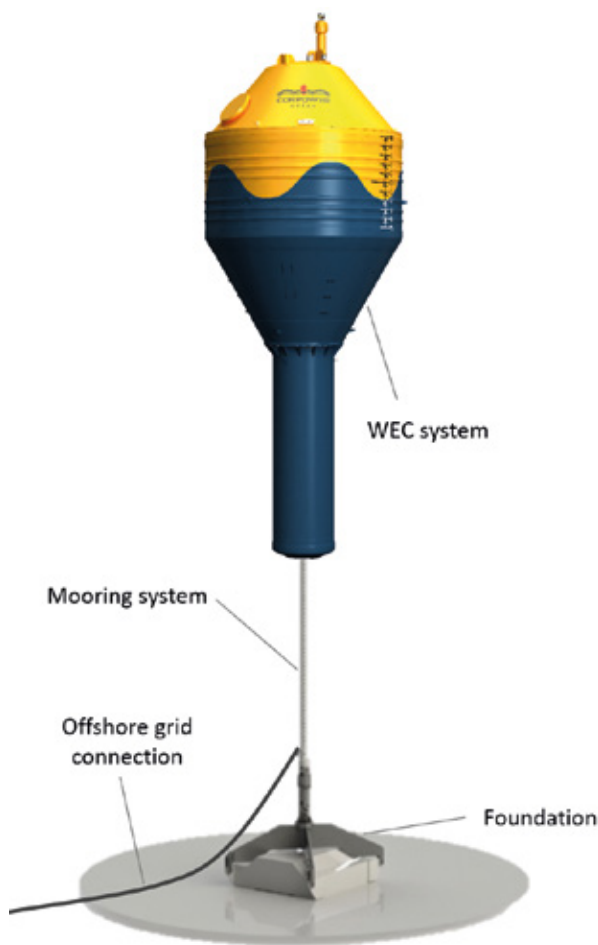
which is a key component of our WEC system. By making the WEC significantly lighter and using cost-effective materials and production technology, the COMPACT solution aims to increase energy efficiency while decreasing cost of energy.”

“We are proud to be a Partner to CorPower in this industry-advancing project. We strongly believe that the combination of OPS’s extensive experience with composite materials, and CorPower’s advanced technology, will bring this project closer to a successful industrial future,” OPS Composite Solutions General Manager Reidar Anderssen said.

The COMPACT Project will actively contribute to the Portuguese Industrial Strategy for Ocean Renewable Energies. Ocean renewable energy has the potential to supply 25pc of Portugal’s annual power consumption, while the sector could generate EUR 254 million in investment, EUR 280 million in gross value added, EUR 119 million in trade and 1,500 new jobs by 2020, according to the strategy.

## About CorPower Ocean

CorPower Ocean brings to market, a new class of high efficiency Wave Energy Converters (WECs) enabling robust and cost-effective harvesting of electricity from ocean waves. The design principle is inspired by the pumping principles of the human heart and offers five



times more energy per ton of device compared to previously known technologies, allowing a large amount of energy to be harvested using a small and low-cost device. The CorPower WEC's unique ability to become transparent to incoming waves provides survivability for the WEC in storm conditions.

CorPower's is headquartered in Sweden, with offices in Portugal, Norway and Scotland. The company has received broad backing across Europe, with funders including EIT InnoEnergy, the European Commission, the Swedish and Scottish Governments, Midroc New Technology, ALMI Greentech fund and additional private investors.

## CorPower's HiWave-5 Project

CorPower's HiWave-5 Project continues in northern Portugal following a decade of product development and three decades of research on wave hydrodynamics.

The Swedish-headquartered developer is currently fabricating its first commercial scale C4 WEC - 9x18m, weighing 60 tonnes with a 300kW power

rating. Dry testing is scheduled for Spring 2021, before ocean installation in the second half of 2021. This will be followed by a cycle of testing and design updates to further develop the commercial stage C5 machines. A total of three C5 machines will then be installed in Aguçadoura in 2023 to form a grid-connected pilot array and secure type certification.

The latest TUPEM announcement comes shortly after CorPower announced a new 16 MEUR (USD 18.1m) R&D, Manufacturing and Service Centre in Viana do Castelo.

## CorPower's verification process

CorPower's structured five-stage product verification program is recognized as best practice in the sector. It includes verifying step-by-step that the business case is supported by the physical and economical metrics in each stage from small scale models (since 2012) to full scale array product (by 2024). Dry testing each machine in controlled simulated wave loading on-land to debug and stabilize the machines prior to ocean deployment is a key part of the strategy. It includes a rigorous Certification process with DNV-GL and independent validation of device performance by EMEC and WavEC.

## What Makes CorPower technology unique?

The CorPower Wave Energy Converter (WEC) produces 5 times more electricity per ton (>10MWh/t) than any other known wave technology by combining storm survivability and strongly amplified power capture in regular sea conditions.

The WEC has four significant patented features:

- a) Pneumatic pretension system. Makes the device transparent to storm waves and brings down the required materials by 40% compared to a conventional gravity balanced WEC, reducing CAPEX.
- b) WaveSpring phase control technology, providing 300% increase in Annual Energy Production (AEP) for a given buoy size.
- c) Cascade gearbox technology, enabling robust conversion of the amplified linear motion into rotation with low losses.
- d) Composite hull technology, eliminating corrosion issues from salt water and provides long lifetime.

CorPower WECs can harvest the same amount of Annual Energy from a buoy with 1/10 volume compared to conventional point absorber WEC. As comparison, a 300kW CorPower WEC has a size of 9x18m and weighs 60 tonnes, where other wave devices may have dimensions of 100s' of meters and several thousand tonnes for the same capacity. Getting large amounts of electricity from a small device significantly reduces CAPEX. The compact lightweight devices are also less costly to transport, install and service, bringing down OPEX. ■

# China's Zero-Carbon Electricity Growth in the 2020s

**Rocky Mountain Institute (RMI) and Energy Transitions Commission (ETC) just released the China's Zero-Carbon Electricity Growth in the 2020s: A Vital Step Toward Carbon Neutrality report, which highlights both the opportunity and urgency of meeting electricity demand growth in China almost entirely from zero-carbon generation sources. The report outlines a scenario for 2030 that demonstrates that zero-carbon generation is economically and technologically feasible in China. It further outlines recommendations for policies and a plan to deliver them during the 14th Five-Year Plan.**

**O**n September 22, 2020, President Xi Jinping announced that China will strive to peak emissions before 2030 and achieve carbon neutrality before 2060. This new climate pledge is a critical step forward in the global fight against climate change and reflects China's determination to provide responsible global leadership. The key to achieving this goal is to electrify as much of the economy as possible and to ensure that almost all electricity is generated from zero-carbon resources well before 2060. The appropriate strategy compatible with China's long-term carbon-neutrality target should be to ensure that almost all growth in China's electricity generating capacity is zero carbon, with no new coal investment.

The report assesses a zero-carbon investment scenario for 2030 aligned with what is needed to decarbonize China's power sector by 2050, and assumes:

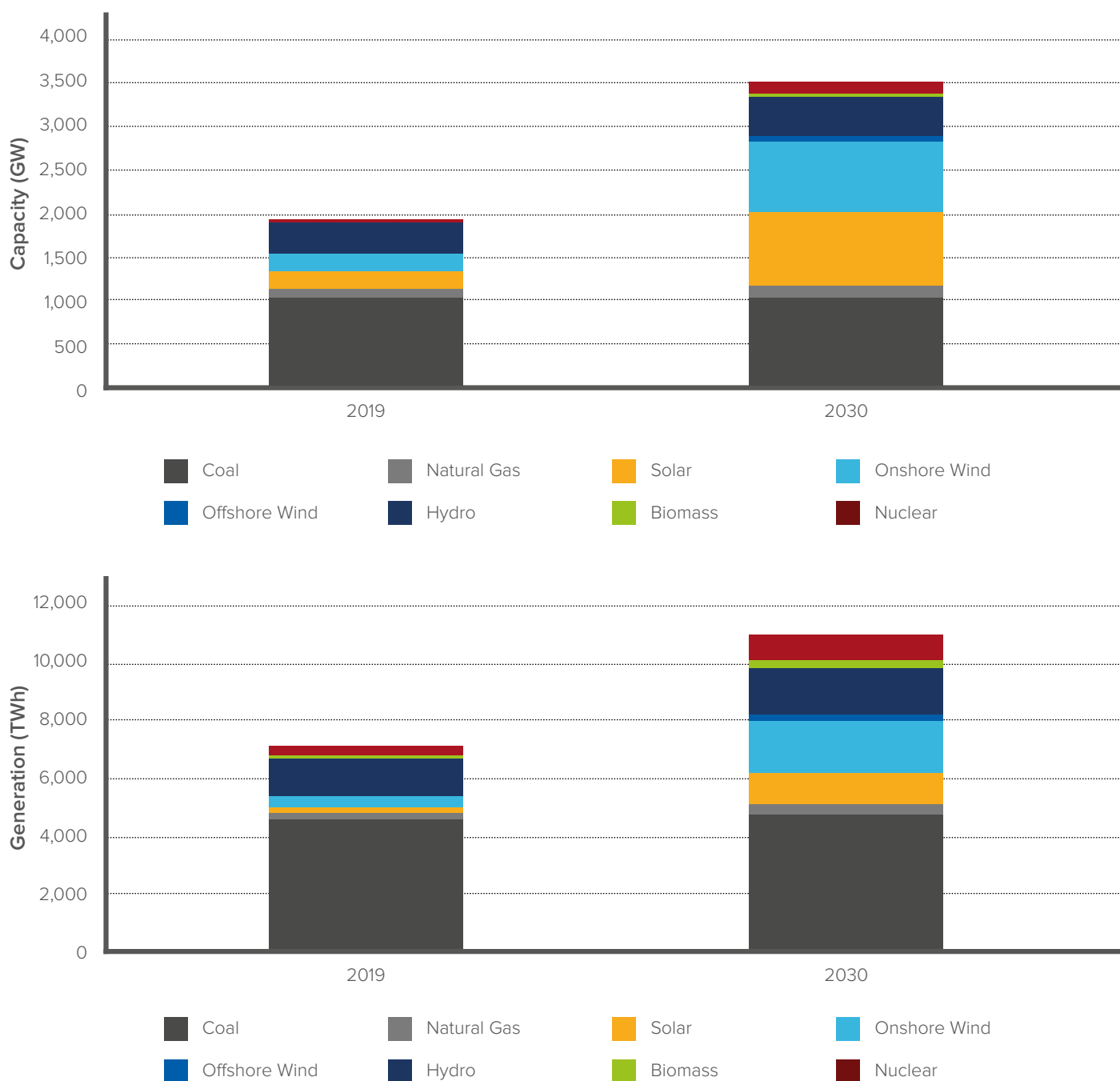
- Electricity supply reaches 11,000 TWh by 2030, an increase of 54% above current levels, reflecting an average growth rate of 4% per year.
- No new coal supply is added beyond the 1,041 GW in place in 2019, but with a slight increase in coal generation as existing assets are used more intensely.
- Variable renewables capacity increases from 408 GW in 2019 to 1,650 GW in 2030 with variable renewable generation accounting for 28% of total generation in that year.
- Total non-fossil fuel generation reaches 53% of the total, slightly above the target of 50% proposed by China's government in 2016.

According to the RMI and ETC analysis, the zero-carbon investment scenario for 2030 is economically and technologically feasible. In China, renewables and other zero-carbon generation resources are or will soon be the most cost-effective way to meet growing electricity demand, enabling the shift away from new coal investments.

China's power system can also continue to operate effectively with the higher levels of renewables outlined in the 2030 scenario. The power system can manage the increased variability associated with a greater share of wind and solar by increasing interconnections between provinces and increasing grid flexibility by retrofitting existing coal and hydro generation. Market and grid reforms will also play an important role.

As it is economically and technically possible for China to meet all future growth in its power supply from zero-carbon sources, it is essential that policies, particularly the 14th Five-Year Plan, are aligned with a zero-carbon growth objective. A clear quantitative target will enable China's wind and solar development and supply industries to achieve the economies of scale and learning curve effects which make cost reductions possible. The targets would also require policy changes from four pillars: mechanisms to incentivize investment

## Generation and Capacity Mix in 2030 under the Zero-Carbon Investment Scenario



in renewables; market and grid reforms to support flexible power; upgraded planning process to align with renewable growth; and improved technical regulation to enhance system reliability.

### Generation and capacity mix in 2030 under the Zero-Carbon Investment Scenario

The Zero-Carbon Investment Scenario would need to be followed by further rapid zero-carbon supply expansion from 2030 to 2050 and by the gradual elimination of existing coal generation - unless

fitted with carbon capture and storage - during that timeframe. Achieving this scenario will help make the “peaking before 2030” objective attainable and put China on a path compatible with its 2060 objective.

The report therefore describes: the economic case for zero-carbon power and the path to low-cost green electricity; the technical feasibility of rapidly expanding variable renewable energy (VRE) generation; approaches to balancing supply and

demand in a system with an increasing share of VRE; and the policies required to deliver zero-carbon electricity growth through 2030 and beyond.

## Zero-carbon power is economically viable in China

Across the world, the cost of renewable electricity generation has fallen dramatically over the past 10 years. Estimates of the global average levelized cost of electricity for solar are down 85%, onshore wind is down 60%, and offshore wind costs have now started a rapid fall, down over 60% in just five years. Renewable electricity generating costs are increasingly falling below those of fossil fuels in China and most geographies around the world.

In China, solar costs are already falling below the cost of new coal generation, and onshore wind will soon follow. Offshore wind costs will likely become competitive during the 2020s. Zero-carbon generation sources, such as hydro and nuclear, are fully competitive with coal as providers of baseload electricity and it is commonly acknowledged that hydro is the cheapest generation source in China. New zero-carbon generation sources are thus already broadly competitive with new coal power plants.

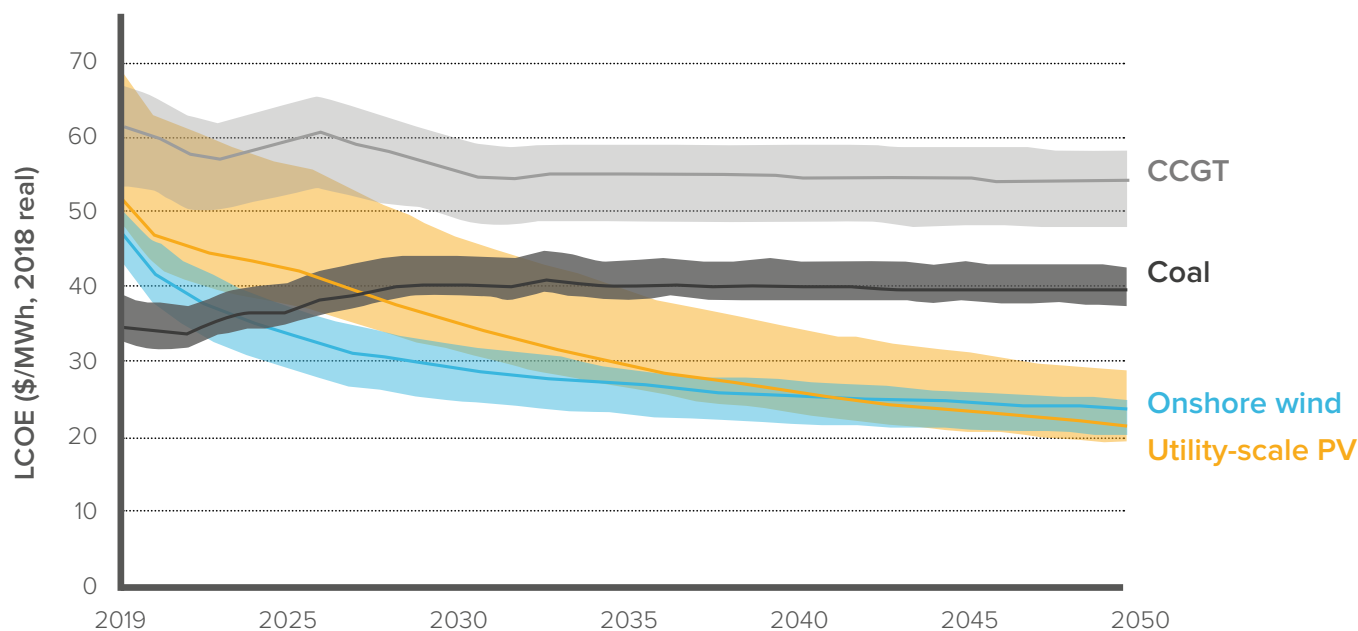
In addition, by the late 2020s, new wind and solar developments will deliver electricity below the cost of many existing thermal plants,

making many existing coal plants uneconomic. This stranding risk is increased by the current overcapacity of China's coal fleet, which has a national average capacity factor around 50%.

Renewable costs will continue to fall but the pace of decline will be influenced by Chinese policies. Historically, the initial subsidy regime and quantitative targets have driven impressive development of zero-carbon electricity, industry expansion, and cost reductions. Certainty about the quantitative pace of expansion has enabled the industry to achieve the economy of scale and learning curve effects that have brought costs down to competitive levels. However, the recent change of subsidy regime has produced a slowdown in the pace of wind development and there is a danger that the pace of investment may be too slow in the coming years. This could lead to new coal investments filling the gap, creating unnecessary cost and stranded assets later on.

It is therefore vital to maintain a supportive policy regime to drive rapid growth and unlock further cost reductions. Such a regime must create certainty for investors by setting targets for the percentage of

Levelised cost of electricity (LCOE) of New PV and Onshore Wind versus Running Costs of Existing Coal and Gas in China



Note: CCGT - Combined cycle gas turbine

Source: BloombergNEF

## Comparison of Zero-Carbon Power Generation Targets as a Share of Total by Country/Region

Country	VRE generation in 2019	VRE capacity in 2019	Target
Germany	33%	53%	65% renewable generation (including hydro) by 2030
UK	23%	36%	50% renewable generation (including hydro) by 2030
California	21%	23%	33% of retail sales of electricity in California come from eligible renewable resources by 2020, 60% by 2030, and 100% zero-carbon electricity by 2045
Spain	37%	49%	74% renewable generation (including hydro) by 2030
Sweden	10%	17%	100% renewable generation (including hydro) by 2040
China	8.6%	20.6%	50% non-fossil generation by 2030

power derived from renewables and/or specific quantitative targets for wind and solar capacity expansion.

Provided such policies are in place, renewable generation costs will continue to decline, delivering new supply at costs below both new coal and many existing coal plants before 2030.

### Technical grid management challenges are solvable

While the economics favour the rapid expansion of variable renewable energy (VRE), some grid operators are concerned about the potential technical challenges that a growing VRE share will create. These include frequency control, voltage control, fault ride through, and capacity utilisation for high-voltage direct current (HVDC) transmission lines. But many other countries are now running systems in which VRE shares reach far above 50% (and indeed close to 100%) during specific hours. This reflects the fact that there are technical solutions to all of the challenges mentioned.

### Balancing supply and demand by hour, day, and season are manageable with high-VRE penetration

The variable nature of wind and solar can create more challenges in balancing supply and demand than in a system where the vast majority of power supply is dispatchable thermal or hydro power. But several countries and regions across the world have already reached VRE shares higher than the 28% target in our Zero-Carbon

Investment Scenario for China in 2030. Many countries plan to increase the share of zero-carbon electricity to at least 50% and in some cases more than 70% by 2030.

International experience shows that for renewable penetrations up to the levels typically seen in other advanced countries today (e.g., 20% - 30%), flexibility challenges can in almost all cases be solved via flexible use of existing thermal capacity, whether gas or coal. For example, in a typical week in August, hard coal generation in Germany varied from 1.4 to 6.5 GW (a 79% variation) to support the system balance. As shares grow to much higher levels in the system, a wider range of options will be needed, such as pumped hydro, battery storage, and demand-side resources.

Implementing these flexibility options will in some cases involve additional costs. However, this additional cost is offset by the lower cost of zero-carbon generation and decreasing cost of innovative flexibility solutions, making total system cost flat or even lower. An estimate from the Energy Transitions Commission shows that it will be possible by the mid-2030s to build systems that rely on VRE for as much as 85% of all electricity supply. And furthermore, this can be done with total system costs that are as low (and in some cases lower) than fossil fuel-based systems today.

Fig. 1 Simulated National Daily Balance in Typical Winter and Summer Days in 2030

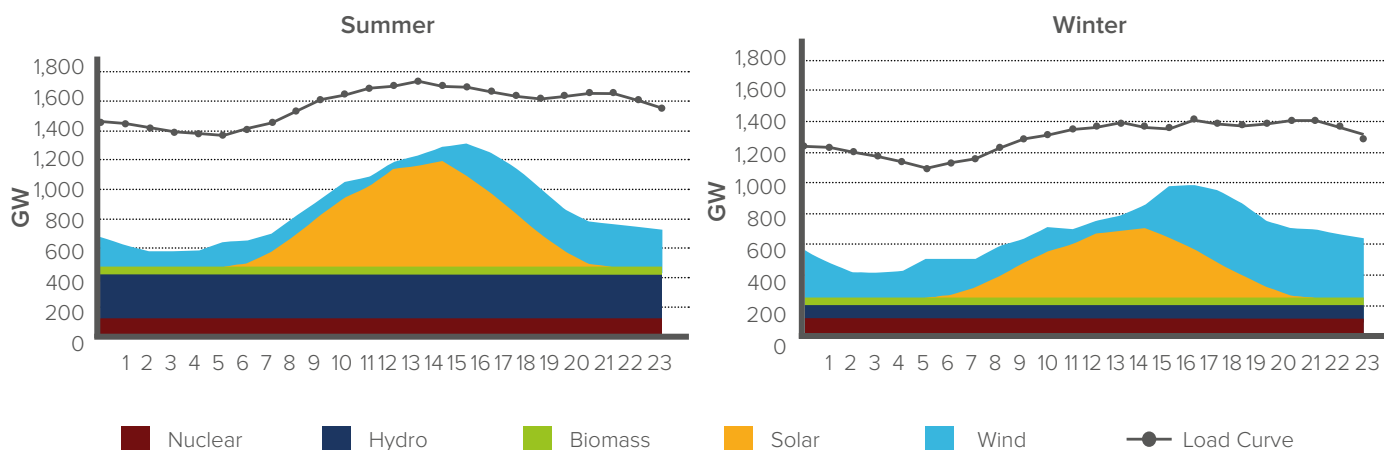


Fig.1 sets out reasonable estimates of typical summer and winter day national demand profiles in 2030, together with a profile of wind and solar energy production compatible with the capacity estimated for 2030 and with typical daily resource variation. Nuclear, hydro, and biomass are shown with the unrealistically conservative assumption that they will be completely inflexible on an hour-by-hour basis. The implied need for thermal power is given by the space between the zero-carbon supply curve and the total load curve.

Within the global picture described above, the challenge faced by any specific country reflects its supply and demand characteristics. In China's case, there is nothing about the pattern of demand that creates any distinctive challenge. However, two features of China's electricity supply - its starting point of reliance on coal rather than gas, and the less flexible nature of its hydro resource - create distinctive but manageable problems. In addition, China's balancing problem is made more difficult by inflexibilities in interprovincial trading arrangements.

If the Chinese power system could operate as one integrated national system, with complete interconnection between provinces, existing thermal flexibility could easily support a 28% share of VRE in 2030. This level could be achieved even if hydro resources (as well as nuclear) were completely inflexible on an hour-by-hour basis. Figure 1 shows the shape of China's possible summer and winter demand and non-thermal supply in 2030 under the Zero-Carbon Investment Scenario. With pumped storage hydro (PSH) shifting a small share of overnight demand to the daytime, and gas generation providing some evening and night-time supply, the required variation in coal power supply is clearly manageable even within the existing level of coal plant flexibility.

In addition to the predictable variations in average hour-by-hour demand and supply shown in Figure 1, the system will have to respond to random short-term variations in wind and solar supply (even when averaged across the whole of

China's landmass). However, hydro supply could vary significantly on an hour-by-hour basis, even if there are limits to significant variation over a longer period.

Viewed from the point of view of a theoretical 'one China' system, the challenge of balancing supply and demand in the face of a 28% VRE share can therefore be easily managed without major improvements in coal or hydro flexibility.

In today's reality, however, the decentralised nature of China's grid management system introduces additional complications. Existing forms of regional coordination make possible some short-term adjustment of power excess or shortage between provinces within the same region. However, daily dispatch decisions are primarily made at the provincial level, and nationally coordinated interprovincial export/import contracts are set on an annual basis and treated as fixed on a day-by-day basis. This decentralised approach increases the danger that flexibility resources will be insufficient to deal with a 28% VRE share in 2030.

In the case of an importing province the growth of solar demand usefully reduces the need for peak thermal capacity in the middle of the day, but inflexible imports and hydro supply at night would require more variation in thermal supply than possible with current coal plants. Meanwhile, in spring and autumn, total inflexibility of



Fig. 2 Estimated Flexibility of China's Coal Fleets, 2030

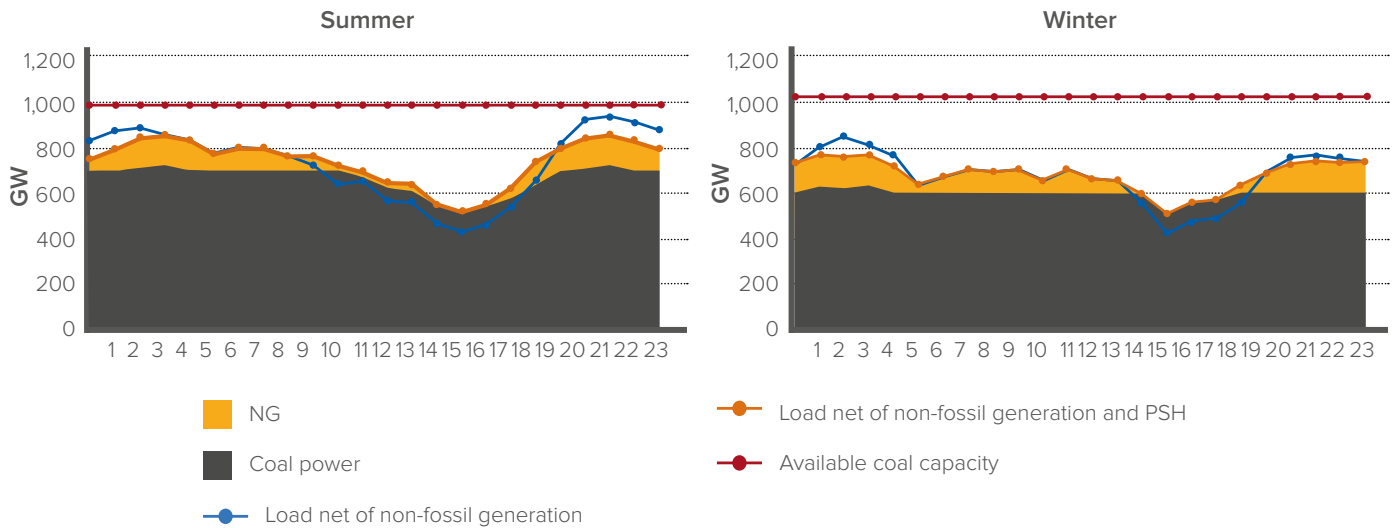


Fig. 2 demonstrates how the need for thermal power shown in Fig. 1 could be flattened by pumped storage hydro and met by existing thermal plants.

imports and hydro would require that thermal plants close down entirely for some periods of the day.

In the case of an exporting province, an inflexible export contract might make it impossible to export all midday solar output (resulting in wasteful curtailment). And high evening wind supply could necessitate total thermal shutdown, which is uneconomic on a daily cycle basis as opposed to a longer seasonal cycle.

The higher the VRE share, the greater the danger that inflexible import/export contracts and inflexible hydro resources will impose an impossible or prohibitively expensive demand on coal flexibility. To manage an increasing VRE share, China should therefore improve flexibility along three key dimensions while developing the other forms of flexibility resources that will be needed over the long term.

Greater flexibility in interprovincial transactions and in coal and hydro plant operation would provide more than adequate flexibility in the period.

### More flexible interprovincial transactions

There is no technical necessity to run HVDC lines at high and constant utilization rates. More flexible interprovincial energy contracts could create a better match between renewable supply curves in exporting provinces and demand curves in importing ones. For instance, if the interprovincial imports by the importing province varied in line with that province's demand schedule, this would simultaneously reduce both the required variation in the importing province's thermal output, and solar curtailment in the exporting province.

### Increased coal plant flexibility

Coal plant flexibility in power systems is influenced both by physical capabilities and by the market mechanisms in place and the incentives those mechanisms create. Policy should secure increased flexibility along both dimensions.

The 13th Five-Year Plan set targets to conduct coal plant flexibility retrofits that would deliver an additional flexibility resource of around 20% of total nameplate capacity (e.g., about 44 GW increased flexibility in plants with 220 GW total capacity). However only 58 GW of this 220 GW target has so far been achieved. Meeting the 13th Five-Year Plan objective and extending flexibility to as much of the coal fleet as possible should be a high priority.

At the same time, as power systems transition to high VRE and other zero-carbon generation shares, thermal generation shares should and will decline, but thermal plants are likely to play roles as flexible back up for the next 20 years, alongside other competing flexibility sources. Power markets will therefore need to provide high-priced remuneration for peak energy supply to remunerate thermal plants for the flexible services they provide.

### Increased hydro supply flexibility

For hydro as for coal, there are two key issues:

the inherent physical flexibility of China's hydro resources, and the impact of contracts and incentives on the flexibility with which hydro power is used. Improving the former may require significant investments, but the latter could be rapidly improved via power market reforms.

Analysis conducted by the China National Renewable Energy Centre (CNREC) in 2018 suggests that there is major opportunity for market and contract reforms to make hydro a far more flexible resource for daily supply/demand balancing. While in 2020 hydropower can vary in a range between 100 and 200 GW on a daily cycle, CNREC believes that it could vary as widely as 60 GW to over 300 GW by 2035, with a slight further increase in flexibility by 2050.

New forms of flexibility will become more important as VRE penetration continues to grow rapidly between 2030 and 2050. Three technologies - batteries, demand response, and hydrogen - will be particularly vital and China is excellently placed to be a global leader in each of them. To ensure these technologies reach full maturity will require the right policies to be put in place today, including in the 14th Five-Year Plan. They are not only vital to long-term system balance, but also may provide lower cost flexibility resources even in the short term.

In China, as elsewhere, some forms of increased flexibility will add to total system cost, particularly in the short term. However, just like solar and wind, technologies such as batteries and hydrogen will mature over time, driving down costs. Meanwhile, the costs of renewable and other zero-carbon power generation will be significantly below those of thermal power production. As a result, China's total system costs for a low/zero-carbon system will likely be below those for today's fossil fuel-based system.

### **Appropriate policies are critical to achieve the 2030 objective**

There is no doubt that it is technically and economically possible for China to meet all future growth in electricity supply from zero-carbon sources, building no new coal plants from now on. It is therefore essential that policies - and in particular the details of the 14th Five-Year Plan - are aligned to achieve the objective of zero-carbon growth.

The most important priority is to establish clear quantitative targets for renewable electricity development (supported by targets also for nuclear and hydro supply). This will enable the Chinese wind and solar development and supply industries

to achieve the economies of scale and learning curve effects which make maximum cost reduction possible.

Therefore, the following measures should be taken:

- A guiding principle of "all new electricity growth from zero-carbon sources" should be established and translated into an indicative penetration target for zero-carbon generation.
- This should be reflected in broad quantitative targets for renewable energy capacity over the next 10 years, in line with the Zero-Carbon Investment Scenario, with wind and solar capacity growing to around 1,650 GW by 2030. This implies capacity growth of wind and solar combined of approximately 110 GW per annum.
- End-year targets for the 14th Five-Year Plan should be compatible with the 10-year objective, broken down into year-by-year objectives and with requirements set on a province-by-province basis.

Four key pillars of policy are required to ensure that these targets are achieved.

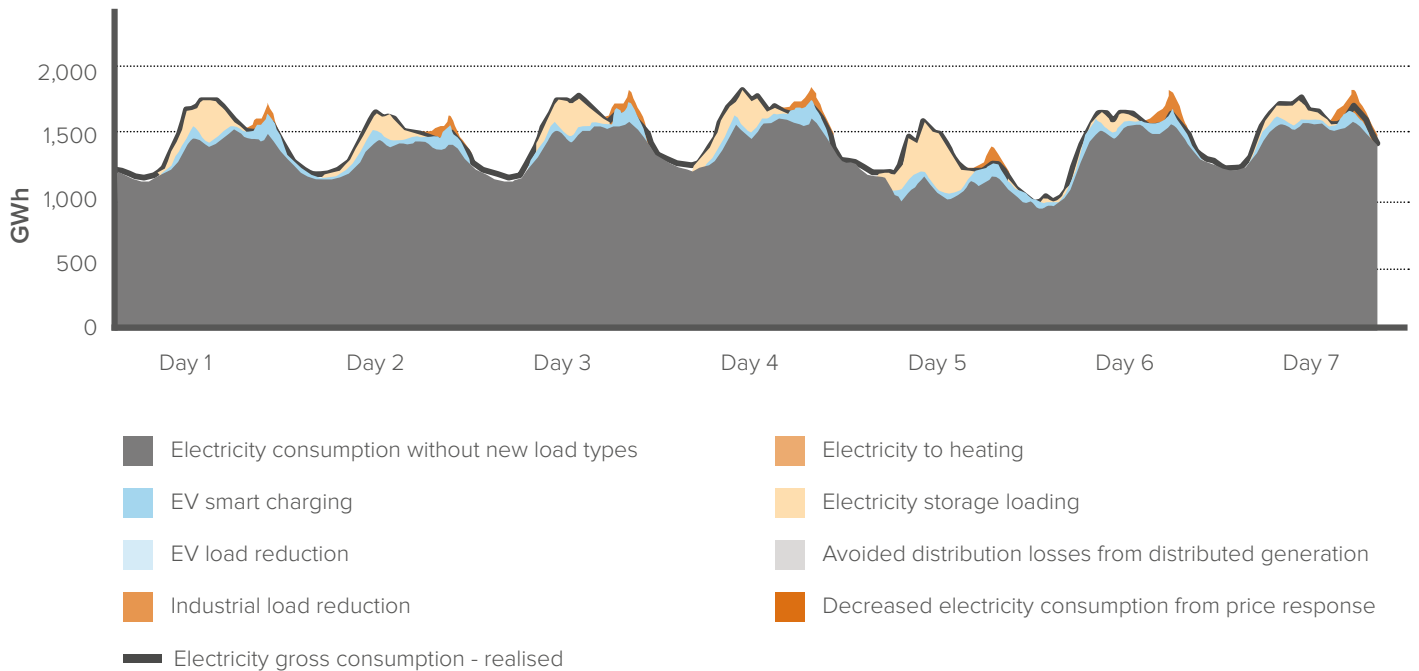
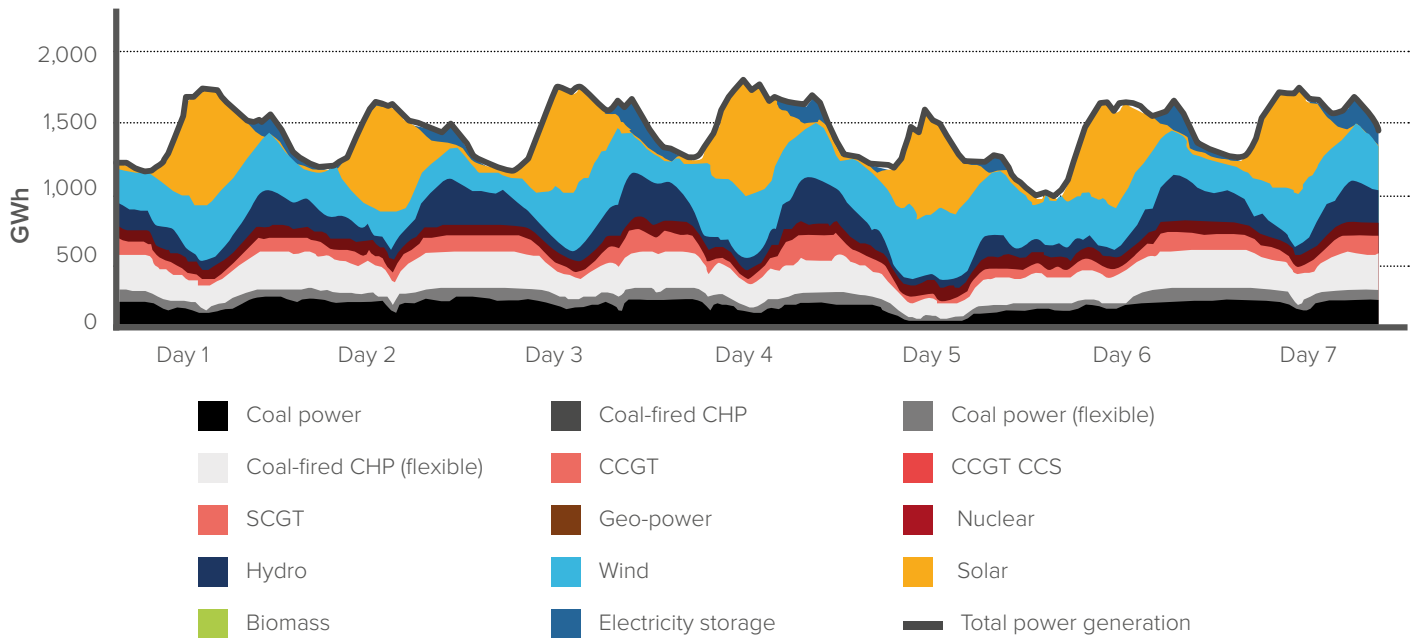
### **Policies to achieve delivery**

- Continuation of the subsidy-free regime for solar/wind interconnect at the coal benchmark price. Contracting at coal benchmark price for onshore wind and solar will generate an increasing premium for new projects, incentivizing rapid deployment in the near term.
- Continued use of auctions to ensure intense competition. China should also consider the use of competitive auctions for specified quantities of wind and solar development, giving successful bidders a certain fixed price for a significant share of their generation. Auctions of this sort should be deployed to the extent that other delivery policies are insufficient to meet provincial targets.
- Incentives for long-term private contracts. Private long-term supply contracts (PPAs) should be enabled allowing end-users to contract with developers. This would supplement publicly organised auctions by leveraging private power users who have set aggressive sustainability targets.

### **Market and grid reforms to support flexible power**

- Better wholesale markets for short-term energy trading. Inadequate price signals and economic incentives currently result in less flexible thermal and hydro operation than possible. A greater role for short-interval day-ahead and real-time markets could better reflect the output variations from VRE and stimulate all system resources to respond to the system needs by following the price signal.
- Opened markets for all participants. Both short-term energy markets and ancillary service markets should be open to all types of technology. Having closed markets can undermine market effectiveness and result in suboptimal dispatch. It can

Power Generation and Consumption Profile in China in 2035, Summer (Stated Policy Scenario)



Source: NDRC Energy Research Institute

also impede the development of new technologies that will be increasingly needed to balance the system as zero-carbon shares grow to high levels beyond 2030.

- Coordinated and flexible inter-provincial dispatch. Inflexible

interprovincial contracts and incentives make achieving balance more difficult. Policies to address this should: expand the balancing zones and developing a coordinated cross-

system dispatch; and allow inter-provincial trading to respond to short-term provincial price signals and balancing dynamics (versus today's system in which prices and volumes are scheduled on an annual basis).

- Transparent data disclosure. Diverse market participation and fair competition could drive innovation and lower costs of flexibility provision; this requires equal access to information, such as load profile and load forecast. But with a few major players currently owning and controlling proprietary data, new participants have found it difficult to compete effectively. Thus, it is important to set industry data disclosure standards, including data types, granularity, and disclosure frequency.
- A technology-neutral capacity market. Well-functioning energy markets could themselves provide adequate incentives for flexibility (and should be the priority), but the increasing role of flexible resources could also be remunerated via markets for capacity provision. But any such capacity markets should be “technologically-agnostic” to ensure incentives for the development of the full range of zero-carbon storage options (e.g., batteries or hydrogen), which will be increasingly required over time.

## Improved power planning processes to support VRE integration

- Comprehensive and granular load forecasts. The data that utility/grid companies currently publish on load patterns, which often show only a single average annual peak load number, can create a bias toward thermal investment and against other storage or peak supply options.
- Grid infrastructure to align with VRE growth. As VRE penetrates, it is critical to align grid upgrade planning at both transmission levels and distribution levels with long-term quantitative targets for growth in renewable capacity. In addition, transparent disclosure of methodologies for assessing future renewable integration capability will equip developers with visibility to develop long-term development plans and lower non-technical costs of renewable energy development.

## Technical and market actions to support short-term grid management

- Effective markets for ancillary services, such as very short-term frequency balance. As with short-term energy market and capacity markets, these should be developed on a ‘technology-agnostic’ basis.
- Technical regulations upgrade. Technical requirements, grid connection rules, and processes should ensure system stability in the face of growing renewables shares, covering in particular the following:
  - Improved forecasting of VRE output to prevent avoidable renewable curtailment and reduce unnecessary system reserves;
  - Tighter grid regulations on wind farm ramping to reduce steep wind output variation and resulting system impacts;
  - Mandatory requirements for HVRT to enhance VRE's performance during system disturbance and avoid cascading failure;
  - Careful quantification and management of system inertia to ensure system reliability as VRE penetration grows.

The key to achieve President Xi Jinping's carbon neutrality target by 2060 is to fully decarbonise the power system. Thus, the top priority for the next decade is to ensure that all power growth is coming from zero-carbon generating capacity.

This analysis suggests that zero-carbon power growth in China over the next decade is not only a necessary task, but also technically and economically achievable.

## About Energy Transitions Commission

The Energy Transitions Commission (ETC) is a coalition of global leaders from across the energy landscape: energy producers, energy-intensive industries, equipment providers, finance players, and environmental NGOs. Our mission is to work out how to build a global economy that can both enable developing countries to attain developed world standards of living and ensure that the world limits global warming to well below 2°C and as close as possible to 1.5°C. For this objective to be reached, the world needs to achieve net-zero greenhouse gas emissions by around mid-century.

## About Rocky Mountain Institute

Rocky Mountain Institute (RMI) - an independent non-profit founded in 1982 - transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

*Source: Yiyao Cao, Ji Chen, Bingqi Liu, Adair Turner, and Caroline Zhu, China Zero-Carbon Electricity Growth in the 2020s: A Vital Step Toward Carbon Neutrality, Energy Transitions Commission and Rocky Mountain Institute, 2021.*

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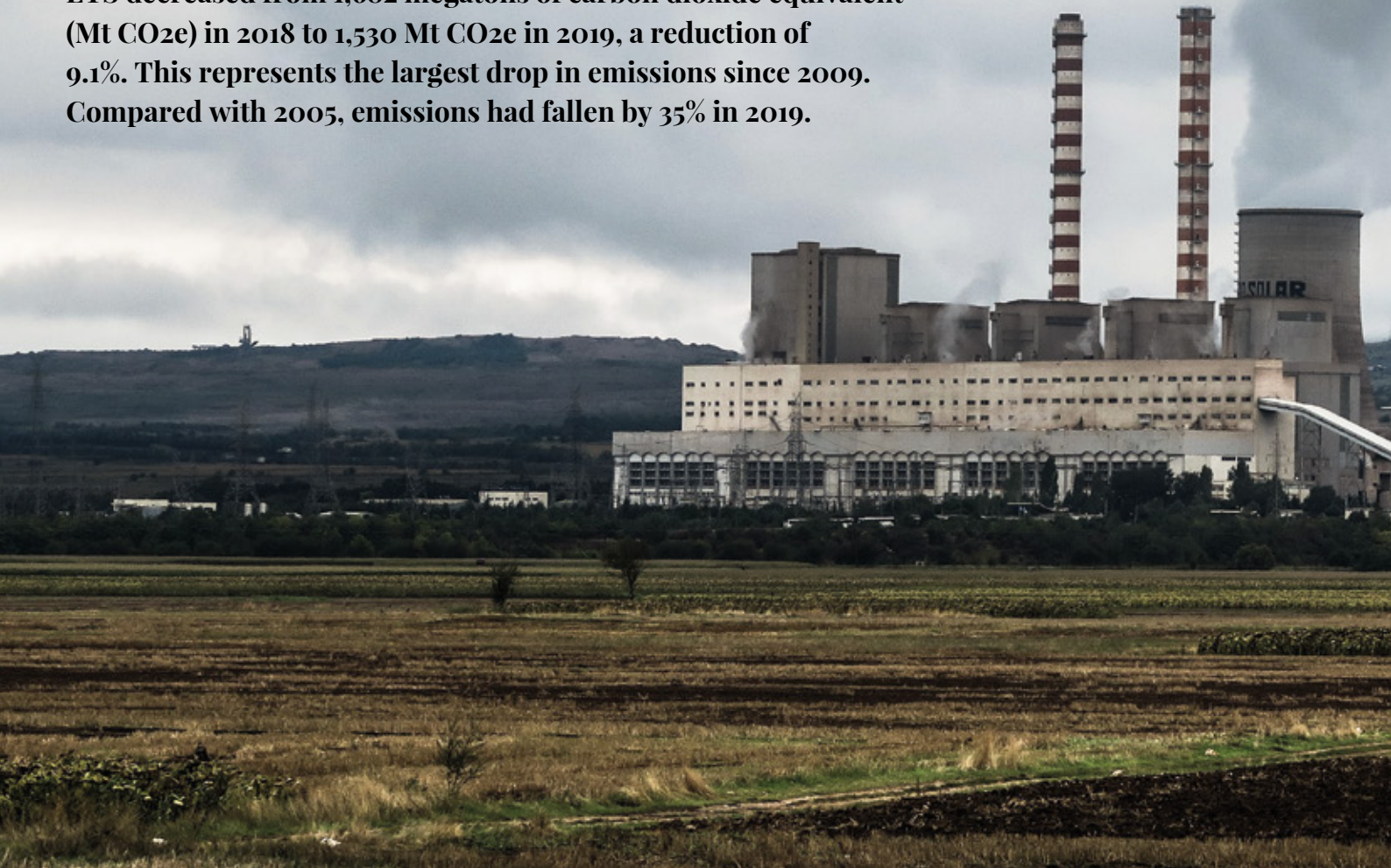


# EU Accelerating Decarbonisation

## ROMANIA TO MISS THE START

*by* Adrian Stoica

Greenhouse gas emissions from stationary installations in the EU ETS decreased from 1,682 megatons of carbon dioxide equivalent (Mt CO<sub>2</sub>e) in 2018 to 1,530 Mt CO<sub>2</sub>e in 2019, a reduction of 9.1%. This represents the largest drop in emissions since 2009. Compared with 2005, emissions had fallen by 35% in 2019.



**C**ombustion installations (mainly power stations) are responsible for 60% of EU ETS emissions, according to the report 'The EU emissions Trading System in 2020: trends and projects' by the European Environment Agency. This activity is the main driver of the decrease observed since the start of the system. Between 2018 and 2019 alone, emissions from combustion installations decreased by 12.9%, while emissions have decreased by 28% since the start of the third trading period in 2013.

The reduction in combustion emissions observed between 2018 and 2019 can be explained by a decrease in the amount of electricity produced from coal, following the increase in the price of CO<sub>2</sub> and a rising share of renewables in the total energy supply. In many countries, a switch from coal to natural gas can also be observed.

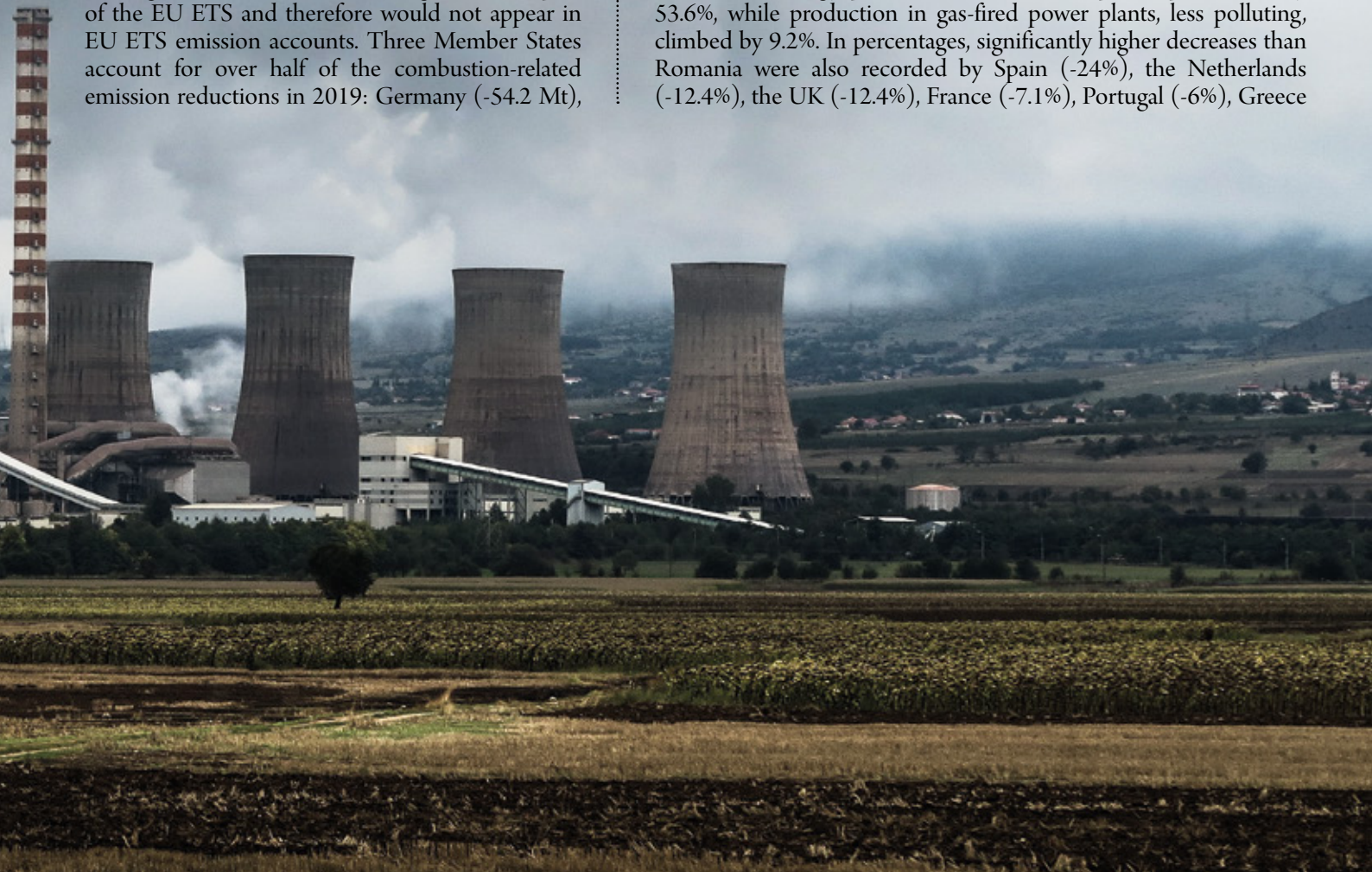
Exceptional decreases in emissions from fossil fuel combustion were recorded in several countries, in particular Iceland (-77%) and Estonia (-47%). The large decrease in EU ETS emissions for Estonia can be explained by the reduction in electricity produced from oil shale. However, this decrease was mostly offset by electricity imports, which, if coming from third countries, might not be part of the EU ETS and therefore would not appear in EU ETS emission accounts. Three Member States account for over half of the combustion-related emission reductions in 2019: Germany (-54.2 Mt),

Poland (-15.6 Mt) and Spain (-15.4 Mt). In Germany and Poland, electricity produced from coal lost ground to natural gas, wind power and imports from neighbouring countries; while in Spain coal was partially displaced by natural gas and, to a lesser extent, increased wind, and nuclear generation. Increases in combustion-related emissions were observed in only five Member States (Austria, Belgium, Malta, Luxembourg, and Croatia). Belgium and Croatia are the only two countries where there was an increase in the amount of electricity produced from coal.

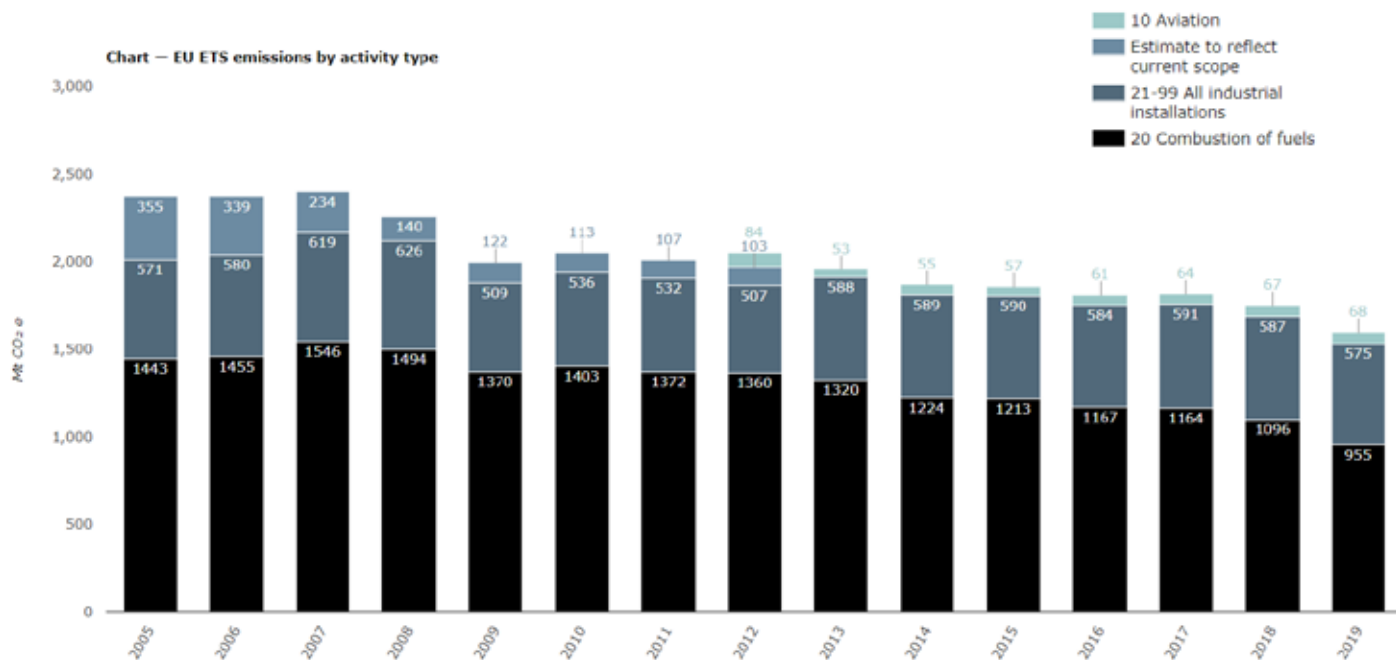
## Pollution in Romania

The Romanian energy system continues to be burdened by pollution produced by thermal power plants, at a time when at European Union level decarbonisation is moving very fast. A comparison between Romania and Germany, the most industrialized country in the EU, shows clearly how far behind Romania is in terms of reduction of pollution. While in Germany emissions coming from coal-fired power plants were halved in only one year, in Romania the reduction was by only 1.8%.

According to the report of the European Environment Agency, in Romania energy production in thermal power plants fell by 3% during 2018-2019, of which the reduction of coal-fired production accounted for 1.8%. As opposed to Romania, in Germany the decrease in energy production in coal-fired power plants was by 53.6%, while production in gas-fired power plants, less polluting, climbed by 9.2%. In percentages, significantly higher decreases than Romania were also recorded by Spain (-24%), the Netherlands (-12.4%), the UK (-12.4%), France (-7.1%), Portugal (-6%), Greece



## ETS emissions by activity type



Source: EEA (2020)

(-5%) and the Czech Republic (-3.9%). Even Bulgaria is in a better situation, recording a decrease by 1.9%.

### Clean air brings money

According to the latest data published by the Ministry of Finance, Romania auctioned, on the common platform of the EU, in November last year alone, 3.42 million emission allowances, obtaining in return EUR 90.13 million, after in 2018 it had won from their sale about EUR 500 million.

Total greenhouse gas emissions from idling facilities fell by 9.1% between 2018 and 2019, the greatest decline in the last decade. This made the number of greenhouse gas emission allowances auctioned in 2019 to fall by 36%, but their higher prices increased revenues from auctions by EUR 447 million compared to 2018, reaching EUR 14.1 billion.

### National projections indicate insufficient reductions to meet 2030 targets

In 2019, EU Member States reported their own greenhouse gas emission projections to the EEA and 13 of them provided updates in 2020. A number of caveats should be added to the analysis of these national emission projections, as they:

- Only reflect measures adopted or planned until early 2019 (for most countries);
- Do not take into account recent developments, such as the emission decrease observed in 2019, as well as the effects of the measures adopted to fight the Covid-19 pandemic, which are expected to considerably reduce ETS emissions in 2020 and possibly the following years;
- Do not yet include the impact of a potential increase in ambition of the EU's 2030 target.

With these aspects in mind, according to Member States' projections, ETS emissions are expected to decrease by between 33% and 40% by 2030 compared to 2005, depending on the implementation of additional measures reported by some Member States. The current EU target of a reduction of 43% by 2030 would



## Change in electricity generation between 2018 and 2019

Country	Change in emissions 2018-2019* (%)	Net electricity generation (TWh)								
		Total	Thermal	of which**		Nuclear	Hydro	Wind	Solar	Net import
				Coal	Gas					
Iceland***	-77	-	-	-	-	-	-	-	-	-
Estonia	-47	-4.4	-4.4	-	-	-	0.0	0.0	-	4.1
Liechtenstein***	-42	-	-	-	-	-	-	-	-	-
Portugal	-28	-6.2	-4.2	-6.0	1.7	-	-3.4	1.1	0.3	6.1
Denmark	-26	-0.5	-2.8	-3.1	-0.1	-	0.0	2.3	0.0	0.6
Lithuania	-23	0.5	0.2	-	0.2	-	0.0	0.3	0.0	-0.3
Spain	-22	-0.1	-0.2	-24.8	25.6	2.6	-9.7	5.1	2.2	-4.2
Germany	-18	-31.6	-45.3	-53.6	9.2	-1.3	2.7	13.6	-1.3	15.8
Greece	-18	-2.9	-2.3	-5.0	2.6	-	-1.8	1.0	0.2	3.4
Finland	-16	-1.4	-1.7	-1.2	-0.1	1.0	-0.9	0.1	0.1	0.1
Sweden	-15	5.9	0.5	-0.2	-0.1	-1.5	3.6	3.3	-	-8.9
Romania	-14	-4.8	-3.0	-1.8	-1.1	-0.1	-2.2	0.4	0.0	4.1
Bulgaria	-13	-1.4	-0.9	-1.9	0.1	0.4	-1.3	0.0	0.4	2.0
United Kingdom	-11	-8.2	-6.9	-9.4	0.9	-8.1	-0.3	7.2	-0.2	2.1
Ireland	-10	-0.4	-1.6	-1.5	-0.1	-	0.2	1.0	-	0.6
Slovakia	-10	2.3	1.1	-0.1	1.5	0.6	0.6	0.0	0.0	-2.0
Poland	-10	-5.4	-8.3	-1.5	2.4	-	0.3	2.2	0.4	4.9
Czechia	-7	-0.8	-1.7	-3.9	2.0	0.3	0.5	0.1	-0.1	0.8
Netherlands	-7	4.6	1.9	-12.4	12.8	0.4	0.0	-0.8	2.6	-5.0
Italy	-6	3.6	1.8	-	-	-	-2.3	2.7	1.4	-5.7
Hungary	-5	2.2	0.7	-0.6	1.3	0.6	0.0	0.1	0.8	-1.8
Latvia	-5	-0.3	0.0	0.0	-0.1	-	-0.3	0.0	-	0.2
Slovenia	-5	-0.3	-0.1	-0.1	0.0	0.0	-0.3	0.0	0.0	0.1
France	-4	-8.7	3.2	-7.1	10.6	-13.7	-7.7	8.0	1.4	5.2
Cyprus	-2	0.1	0.0	-	-	-	-	0.0	0.0	-
Norway	-1	-12.2	-0.2	-	0.2	-	-13.7	1.7	-	10.2
Austria	3	5.4	1.1	-0.2	1.3	-	3.1	1.4	-	-5.8
Belgium	5	17.6	1.5	0.2	1.6	14.3	-0.1	2.0	0.0	-19.2
Malta	6	0.1	0.1	-	1.8	-	-	-	-	0.0
Luxembourg	8	-0.3	0.0	-	0.0	-	-0.4	0.0	0.0	-0.3
Croatia	11	-1.0	0.7	0.2	0.4	-	-1.8	0.1	0.0	0.7

### Note:

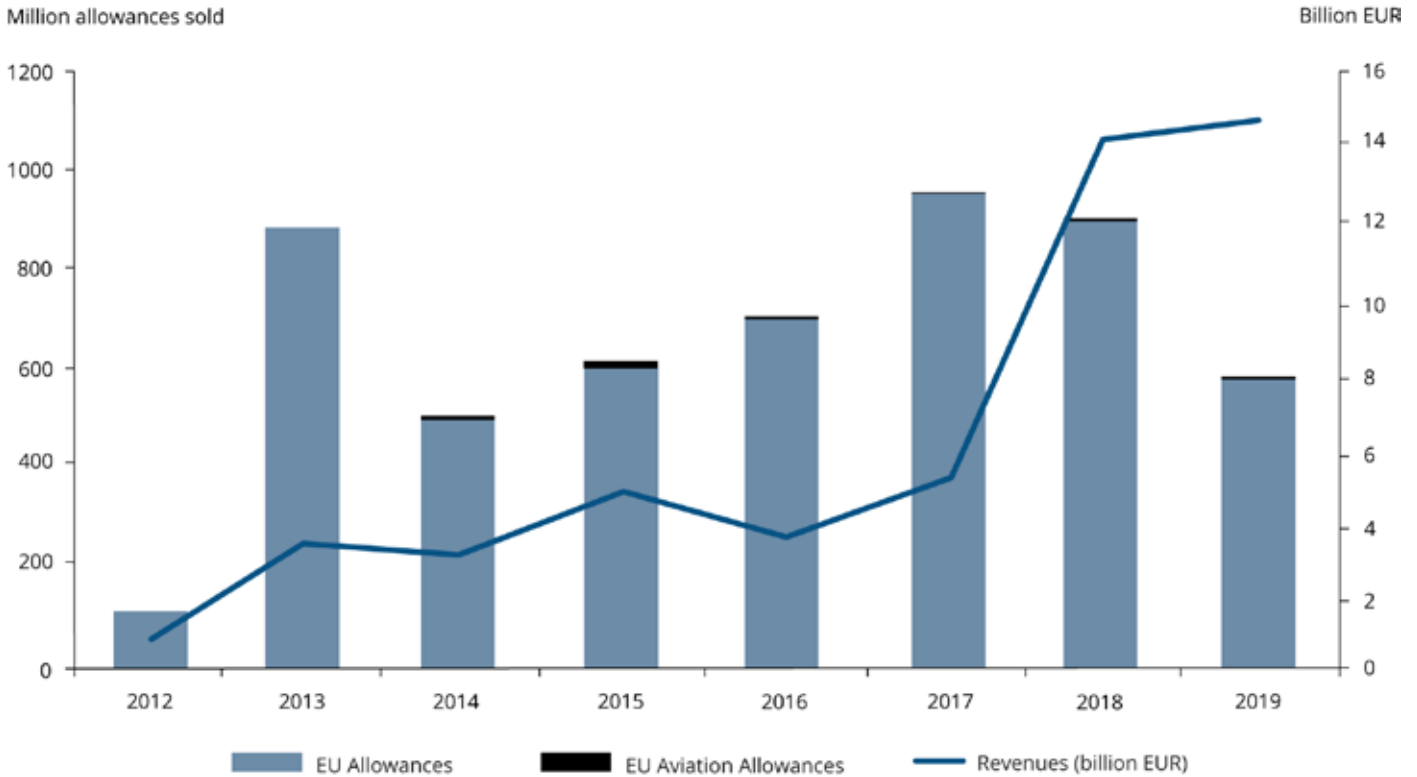
\* Combustion installations (Activity code 20)

\*\* Additional thermal electricity generation is reported by Eurostat from oil, renewable- and non-renewable-sources, which are not shown here.

\*\*\* No data on electricity generation available for Iceland and Liechtenstein

Source: Eurostat (2020)

**EU-ETS auctioning amounts and revenues for the third trading period (2013-2019)**



**Note:** 2012 (early auctions) refer to amounts that pertain to 2013 but had been auctioned a year earlier.

**Source:** EEX (2020); ICE (2020)

therefore not be met. However, for the reasons explained above, these should be considered as conservative estimates. For example, a 33% reduction by 2030 would not even match the 35% reduction already achieved in 2019.

Furthermore, the effect of the Covid-19 pandemic may lead to a situation where ETS emissions in 2020 would be below the projected 40% reduction, although, the impact of the Covid-19 pandemic on ETS emission levels should, for the most part, be considered as temporary unless backed by structural changes.

Seventeen countries anticipate a decrease in their

ETS emissions between 2019 and 2030, mainly due to growth in the use of renewable energy and the phase-out of carbon-intensive power generation capacity. However, 13 countries project that their ETS emissions will increase, due either to a planned phase-out of nuclear production capacity being replaced by fossil capacity or to an increase in carbon-intensive energy production or other processes.

Another reason for the potential increase in ETS emissions is an anticipated higher level of electricity demand due to electrification in the transport and buildings sector. If this additional demand, which reduces emissions in the Effort Sharing sector, is not backed by similar growth in renewable electricity production, it might lead to increasing ETS emissions. ■



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