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SEPTEMBER 2020

ENERGY

INDUSTRY REVIEW

'GREEN' VEHICLES
Trend or Necessity?

GEOTHERMAL ENERGY
Europe's New Bet

NAMR INSIGHTS
Romania Revaluing its Mineral Reserves

Kamran Allahverdiyev, CEO of WEVO

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Hydrogen Strategy in Romania

As part of the European Green Deal, the European Commission presented a strategy for energy system integration. The new EU strategy - in synergy with a new dedicated hydrogen strategy in Europe - will lay the foundation for the decarbonised European energy system of the future.

Romania Wind Energy Association (RWEA) supports the central idea of the Strategy for Energy System Integration, based on which, by the direct electrification of the final energy consumption from sectors such as transport and heating, as well as of certain industrial processes, renewable energy offers a proven and scalable solution for the decarbonisation of over 60% of the final energy consumption at the European level. However, in order to reach a higher decarbonisation level, there is a need for other solutions for the sectors in which decarbonisation is more difficult, and renewable hydrogen, produced by electrolysis powered by renewable energy, thus becomes essential, according to the Hydrogen Strategy.

The Strategy proposes a framework that would enable the development of the clean hydrogen production in Europe and this could have several applications in the decarbonisation process, being thus the key-element for the integration of sectors. The economic revival plan of the Commission identifies hydrogen as an investment priority for encouraging economic growth and resilience, creation of new jobs and the consolidation of the EU's leading status at global level. The Strategy identifies and prioritises renewable hydrogen, produced by electrolysis, using electric energy from wind and photovoltaic sources, as being the most compatible option with the EU objectives regarding climate neutrality. In order to become one of the beneficiary states, Romania will have to start, as soon as possible, the development of a hydrogen strategy at national level for 2050, which would mainly focus on the following aspects:

Renewable hydrogen, produced by water hydrolysis, using electric energy from wind and photovoltaic sources, is the method of obtaining hydrogen in line with the EU objectives regarding climate neutrality;

Developing an investment agenda for renewable hydrogen.

Romania may attract a considerable part of the necessary investments by 2030 at EU level (between EUR 24 and 42 billion for electrolysis systems and between EUR 220 and 340 billion for energy production capacities that would ensure their supply with renewable energy). Investments in hydrogen transport, distribution and storage are estimated at EUR 65 billion.

Romania may attract a considerable part of the necessary investments by 2030 at EU level (between EUR 24 and 42 billion for electrolysis systems and between EUR 220 and 340 billion for energy production capacities that would ensure their supply with renewable energy).

As we have already written, the Government of Romania is set to support the research activity in the field of hydrogen as alternative energy source. Romania has a Memorandum on the establishment of the Romanian HUB for Hydrogen and New Energy Technologies, ROHYDROHUB.

"The research activity in the field of hydrogen, as alternative energy source, is of particular importance and, together with the National Institute for Cryogenic and Isotopic Technologies, we initiated two actions, so as to amend the Competitiveness Operational Programme and develop the first project applied on this segment - Technological solution of thermal energy supply for rural communities based on hydrogen," Minister of European Funds Marcel Bolos announced.

Financing this project could be achieved under the Operational Programme 'Sustainable Development'. There were hopes that there would be a time "when we say that hydrogen could be the solution to obtaining thermal energy for heating the population or for other forms of use," Marcel Bolos concluded. We'll see how soon this will happen. ■

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

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EC to Provide EUR 81.4bln Support for 15 Member States under SURE

The European Commission (EC) has presented proposals to the Council for decisions to grant financial support of EUR 81.4 billion to 15 Member States under the SURE instrument.

SURE is a crucial element of the EU's comprehensive strategy to protect citizens and mitigate the severely negative socio-economic consequences of the coronavirus pandemic. It is one of the three safety nets agreed by the European Council to shield workers, businesses and countries. Once the Council approves these proposals, the financial support will be provided in the form of loans granted on favourable terms from the EU to Member States. These loans will assist Member States in addressing sudden increases in public expenditure to preserve employment. Specifically, they will help Member States to cover the costs directly related to the financing of national short-time work schemes, and other similar measures they have put in place as a response to the coronavirus pandemic, in particular for the self-employed.

Romania will receive EUR 4 billion.

OMV Petrom and Auchan Retail Romania Partnership

OMV Petrom and Auchan Retail Romania announced the agreement to extend their partnership for opening MyAuchan proximity stores in Petrom filling stations. The partnership brings together two of the brands renowned on the Romanian market for the advantageous quality-price ratio.

The existing shop area in the filling station will be refurbished and will offer customers the option for MyAuchan proximity shopping. The refurbishment of the shops is planned to be performed during the next years.

Petrom filling stations will enter a far-reaching modernization process which will include, besides the setting up of MyAuchan stores, the replacement of brand identity elements, as well as works in the outdoor area of the pumps and related services (car wash, LPG fueling). In addition, there will be five pilot filling stations where fast lanes will be set up - fuelling pumps that allow direct payment, by card or mobile phone.

Enel X Romania Launches Simulator for Photovoltaic Systems

Enel X Romania has launched a simulator for photovoltaic systems, capable of configuring installations with a high degree of customization, based on the information provided in real time via Google Maps app. The simulator is designed for companies interested in reducing their electricity consumption and CO2 footprint, by installing a PV system on the roof or on the ground.

"Enel X Romania encourages companies to choose energy efficient solutions, to generate new revenues and support the development of a more sustainable organization. We stand with companies to identify solutions with a high degree of customization, therefore the launch of the simulator is part of our strategy to provide customers with simple and accessible tools, in order to set in place easily new means for reaching energy efficiency and cost reduction," said Marius Chiriac, Head of Enel X Romania.

The photovoltaic panels systems provided by Enel X Romania are produced by Tier 1 global companies. They are based on two panel technology types, mono and polycrystalline. The available solar panels have a lifespan of 25 years and a 10-year warranty. Enel X specialists provide technical expertise for the strength of the building structure and the roof, in order to establish the feasibility of the project.

New Type of Polypropylene for Protective Medical Masks by Rompetrol Rafinare

Rompetrol Rafinare through its petrochemical division - the only polymer producer in Romania has successfully developed a new product in the last 3 months, a special type of polypropylene dedicated to protective medical masks. It's meant for the middle layer of the mask, the most important layer for filtering and protecting against pathogens.

"It is a premiere for Romania and Central and Eastern Europe, a major success of the team of specialists from the Petromidia refinery who managed to achieve a new vital assortment in almost three months to support the fight against COVID-19. Recently, with the support of domestic and international partners, we completed the testing and verification of the new material in accordance with all safety and quality standards and it will enter production in the next period," says Saduokhas Meraliyev, Operational director of KMG International Group - the majority shareholder of Rompetrol Rafinare.

The new type - RMB30H will be delivered in granules in bags of 25 kilograms and will be used in 'meltblown' units - a conventional method of manufacturing micro and nanofibers. Thus, the molten/liquid polymer is extruded together with high speed blowing gas on a support surface, ultimately resulting in a nonwoven fibre material.

According to the standards in the field, the production of a surgical mask consumes approximately 1 gram of inner filter material - RMB30H, with a density of 30 grams/square meter.

The first granules in the new product were obtained on July 10 with the support of its strategic partners to align the technical parameters of the production unit and ensure the chemical components - catalysts, additives. Subsequently, it was tested for the first time at the beginning of this month at one of the company's partners in Romania and later externally, the results being positive.

More internal and external tests will follow in the next period with local partners such as Taparo Grup Maramures and Global Treat Galati.

Among the benefits provided by RMB30H are a general filtration capacity of over 98%, a melt flow index of the final product up to the value of 1500g/10min depending on processing temperatures, a fibre diameter of 1 - 5 microns, but also the lack of odour, a very important property for protective masks or filtration systems.

It is mainly used for obtaining filter material, for other applications in the area of medical products (protective masks, disposable equipment - sheets, hoods, wet wipes, etc.) or for industrial areas (professional filters with high absorption rate).

"Romania thus becomes an important source of raw materials in Europe and the region for the production of sanitary materials. Together with the local partners we can produce sanitary materials in Romania and contribute to ensuring the necessary internal needs, and also establish a strategic reserve of medical equipment at national and European levels," adds Saduokhas Meraliyev.

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New Plant to Remove CO2 from Air in Iceland

Climeworks has signed ground-breaking agreements with both Carbfix, carbon storage pioneers, and ON Power, the Icelandic geothermal energy provider, to lay the foundation for a new plant that will significantly scale up carbon removal and storage in Iceland. The new plant will be able to permanently remove 4000 tons of CO2 from the air per year. The agreements set down an important milestone in the fight against climate change: they mark the first time the technologies have been combined for a project of this scale to remove carbon dioxide from the air.

The collaborative efforts of these agreements are particularly important as the scale-up of carbon removal is essential to reach the goals of the Paris Climate Agreement.

"This collaboration with ON and Carbfix marks a big step forward in reducing the CO2 in our air. The site in Iceland provides ideal conditions: the supply of renewable energy and a safe and natural storage space for our air-captured carbon dioxide. We are proud, together with our partners, to bring the permanent and safe removal of carbon dioxide from the atmosphere to the next level," Jan Wurzbacher, co-founder and co-CEO of Climeworks said.

Chevron to Invest in Nuclear Fusion Start-up

Chevron announced a Series A investment in Zap Energy Inc., a Seattle-based start-up company developing a next-generation modular nuclear reactor with an innovative approach to advancing cost-effective, flexible, and commercially scalable fusion. Chevron Technology Ventures' investment in fusion is an opportunity to enhance the company's focus on a diverse portfolio of low-carbon energy resources with the capacity to provide communities across the globe access to affordable, reliable, and ever-cleaner energy.

Conventional nuclear power uses nuclear fission which involves the splitting of a large unstable nucleus into smaller elements and generates long-lived radioactive waste. Nuclear fusion occurs when nuclei of lightweight elements (typically hydrogen) collide with enough force to fuse and form a heavier element – a process that releases substantial amounts of energy with no greenhouse gas emissions and limited long-lived radioactive waste.

Driving electric current through the flow creates the magnetic field, which confines and compresses the plasma. The higher the current, the greater the pressure and density in the plasma. This investment marks the 10th investment by Chevron's Future Energy Fund, which was launched in 2018 to explore breakthrough technologies that enable macro decarbonization, the mobility-energy nexus, and energy decentralization.

World's First Hydrogen Filling Station for Passenger Trains

The world's first hydrogen filling station for passenger trains will be built in Lower Saxony's Bremervoerde, starting in September. Representatives of the state and the companies involved met on site for a symbolic ground-breaking ceremony. An eighteen-month test phase for the first two trains was successfully completed at the end of February. The mobility project, which has attracted worldwide attention, is now entering its next phase.

The gases and engineering company Linde will build and operate the hydrogen filling station near Bremervoerde station on behalf of the Lower Saxony Regional Transport Company (LNVG). Other project partners are the rail vehicle manufacturer Alstom, the state of Lower Saxony and the Elbe-Weser Railways and Transport Company (EVB).

With a capacity of around 1,600 kg of hydrogen per day, it is nominally one of the largest hydrogen filling stations in the world. From the beginning of 2022, 14 hydrogen-powered regional trains supplied by Alstom will be refuelled there daily and around the clock if necessary. Thanks to a range of 1,000 kilometres, the multiple-unit trains will be able to run emission-free all day long on the EVB network with just one tank filling. Expansion areas at the filling station will allow hydrogen to be produced on site later using electrolysis and regenerative electricity.

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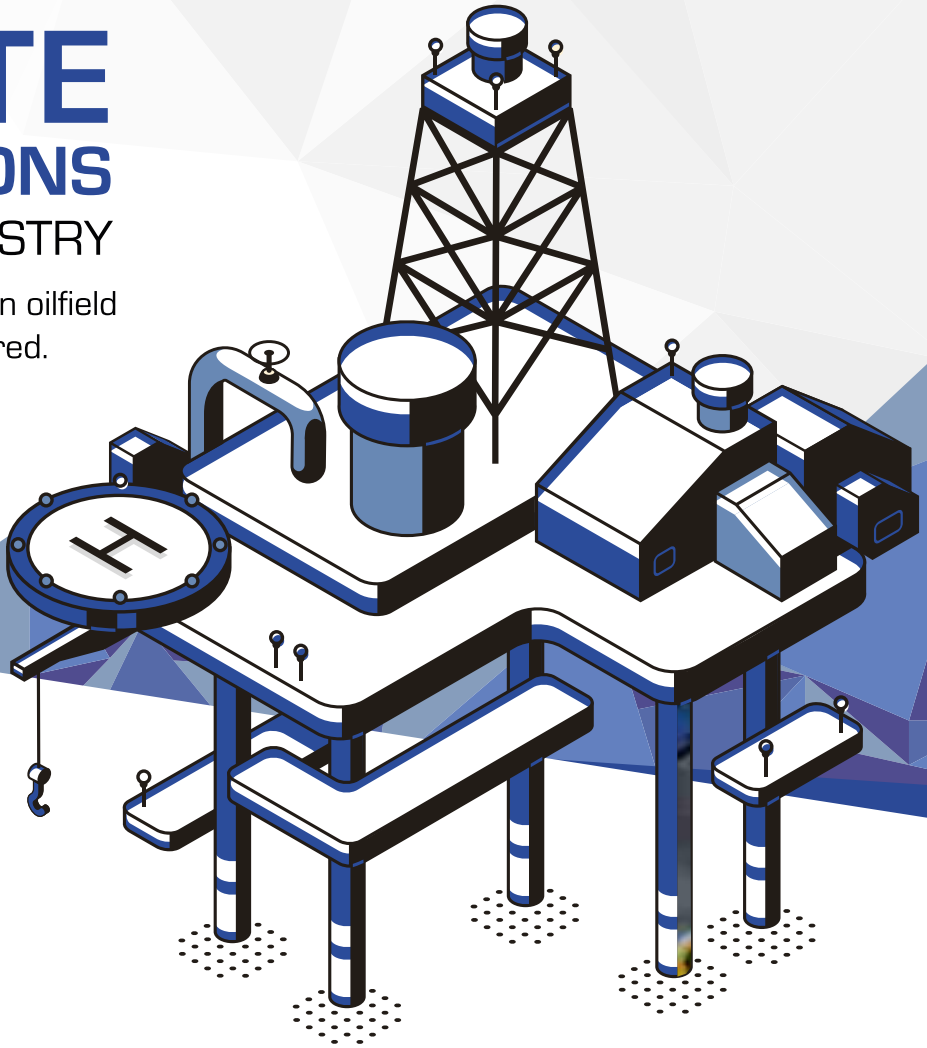

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EBRD and Raiffeisen Bank Aval Support Ukrainian LPG Retailer

The European Bank for Reconstruction and Development (EBRD) and Raiffeisen Bank Aval (RBA) are supporting the operations of Nadezhda, a Ukrainian wholesale and retail distributor of liquefied petroleum gas and petroleum products. In a joint transaction RBA is providing a loan of up to UAH 440 million (EUR 15 million equivalent) to Nadezhda the Poltava-headquartered company, while up to 60 per cent of the risk on the loan will be shared by the EBRD under a Risk Sharing Facility signed between the financial institutions.

The funds will allow Nadezhda to restructure its balance sheet and finance working capital needs, which will help the retailer cope with the impact of the pandemic on its operations. Nadezhda is based in Poltava, a city in central Ukraine, and mainly serves small and medium-sized enterprises in the agribusiness sector through a network of fuelling stations across the country.

Ukrgasvydobuvannya to Receive EUR 51.9mln Loan from EBRD

The European Bank for Reconstruction and Development (EBRD) will provide a EUR 51.9 million sovereign loan to Ukrgasvydobuvannya (UGV), Ukraine's largest natural gas producer. This will help UGV to increase domestic natural gas production, reduce the country's dependency on imports and improve the efficiency and transparency of the sector.

UGV, a fully owned subsidiary of the national joint stock company Naftogaz of Ukraine (Naftogaz) and responsible for 75 per cent of domestic gas production, will receive the EBRD loan in two tranches. Up to EUR 36.4 million will be used to finance the procurement of workover rigs, which will help increase natural gas production at existing fields. Up to EUR 15.5 million will be used for the introduction of innovative Organic Rankine Cycle waste-heat recovery systems at UGV's site in Lokachi, western Ukraine.

In the context of ongoing cooperation with Naftogaz and the government of Ukraine, the EBRD is assisting in setting up a natural gas exchange in the country. The parties also cooperate on legal changes required to attract private investors to Ukraine's upstream industry.

World's First Logistics Operation with a Drone to an Offshore Installation

Equinor has just completed the world's first logistics operation with a drone to an offshore installation. A drone flew a 3D-printed part for the lifeboat system from the Mongstad base to the Troll A platform in the North Sea. The operation was completed efficiently and according to plan.

"Development is rapid, and we see a huge potential within drone technology that could transform the way we operate, both under and above the sea surface. Equinor aims to lead the way in utilising new technology on the Norwegian continental shelf," says Arne Sigve Nylund, Equinor's executive vice president for Development and Production Norway. "Drones could reinforce safety, boost production efficiency and contribute to lower CO2 emissions from Norwegian oil and gas. Drones will also play a role as we shape new energy solutions on the Norwegian shelf," Nylund continues.

The flight spanning around 80 kilometres to the Troll field took about one hour, at an altitude of approx. 5000 feet. The flight was a test, the world's first of its kind, where an actual freight operation was conducted over a lengthy distance to an operating offshore installation. The drone was a Camcopter s-100 model, manufactured by Schiebel. This type of drone has been thoroughly tested and has logged around 70,000 flying hours from other types of operations within the defence and coast guard services. The drone is more than four metres long and weighs in excess of 100 kilograms. It has a cruising speed of more than 150 km/h and it can carry cargo weighing up to 50 kg.

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- Pipeline and bracket corrosion protection
- Insulation
- Scaffolding

Fincantieri and Saipem to Promote Development of Deep-seabed Mining

Fincantieri and Saipem have signed a Memorandum of Understanding to promote the development of deep-seabed mining (DSM), i.e. the sustainable exploitation of deep-sea floors over 3,000 metres in depth. This agreement sets the ground for a strategic partnership aimed at developing and pursuing business opportunities in the field of designing, engineering, building and managing DSM systems. The companies decided to pool together their expertise to provide these professionals with innovative solutions. Therefore, the first goal of the partnership will be to draw up an industrial plan containing evidence of the technical and economic feasibility and sustainability of new DSM projects.

"The agreement signed with Fincantieri brings together two Italian leaders involved in promoting deep-seabed mining. Saipem boasts innovative technologies, distinctive skills, assets and an outstanding track record in the sector that will be put to use in the joint project with Fincantieri with the aim of finding environmentally compatible solutions so that sea beds can be used sustainably," commented Stefano Cao, CEO of Saipem.

"The minerals in underwater deposits will turn out to be essential, should we manage to move from a fossil-fuel based economy to a green economy. Actually, many renewable technologies require huge amounts of metals that are available in high concentrations in deep-sea floors, and those who will be ready to encourage the use of such metals will move in this direction," Fincantieri's CEO, Giuseppe Bono remarked.

World's Longest Heated Production Pipeline

Neptune Energy announced installation is underway of the world's longest heated subsea production pipeline in the Norwegian sector of the North Sea. Once completed, the 36 kilometre electrically trace-heated (ETH) pipe-in-pipe solution will transport oil from the Neptune Energy-operated Fenja field to the Njord A platform, operated by Equinor. The first phase of the installation saw a 9km section safely installed and successfully tested.

The length of the ETH pipeline is a significant technological achievement and was developed and qualified through a collaborative approach with TechnipFMC. Due to the high wax content of the Fenja field's oil, the contents of the pipeline must be warmed up to a temperature above 28-degree Celsius before starting the flow after a shut down. During normal production, the temperature in the pipeline is well above this temperature.

"TechnipFMC is delighted that the extensive qualification program for the ETH Pipe-in-Pipe for Fenja has been successfully completed, and that the first section of the pipe has been installed on the seabed," Ståle Ryggvik, TechnipFMC's Project Director, said.

Lukoil Launches Power Plant for Efficient Associated Petroleum Gas Use

Lukoil launched Chashkino gas-turbine power plant which generates electricity using the associated petroleum gas (APG) produced at the company's fields in the Perm region.

The 16 MW plant will annually use about 50 million cubic meters of APG produced at the Lukoil fields in the Perm region. The bulk of the electricity generated will be transferred to the company's operation facilities. This will allow to reduce the amount of energy purchased and thus decrease LUKOIL Scope 2 greenhouse gases emissions by 49 thousand tonnes of CO_2-e.

Supplying power to external consumers is also on the roadmap. This will allow to provide for up to 2% of the total consumption at the Bereznikovsky-Solikamsky power distribution area. A digital substation – the first one in Lukoil's history – had been launched earlier at the Chashkino plant in order to transmit electric energy to the grid. The substation features a high automation level.

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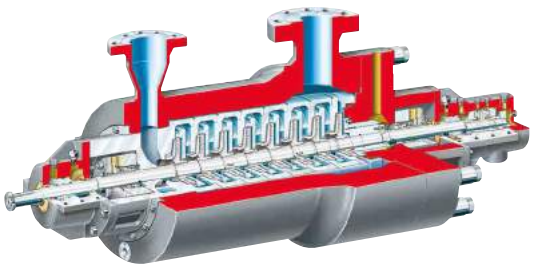

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STEP Energy to Advance Geothermal Power Projects

Schlumberger New Energy and Thermal Energy Partners (TEP) entered into agreement to create STEP Energy, a geothermal project development Company. STEP Energy will combine Schlumberger's subsurface and drilling expertise with Thermal Energy Partners' experience in project development and risk mitigation to advance geothermal power projects. STEP Energy will leverage its partners' expertise to develop efficient and profitable geothermal power generation projects, providing an opportunity to support a reliable supply of clean energy.

"Through GeothermEx, a Schlumberger company, we have acquired extensive knowledge of geothermal resource assessment and project design implementation," said Ashok Belani, executive vice president, Schlumberger New Energy. "By combining our geothermal, subsurface and drilling expertise with TEP's experience in project development and risk mitigation, we will develop de-risked and streamlined geothermal projects on a global scale."

STEP Energy will benefit from the partners' project execution, drilling, subsurface evaluation and digital technology integration expertise, combined with systems engineering, modelling, data analytics and machine learning capabilities. STEP Energy will create new avenues for growth of the geothermal industry, while also attracting investment from various financial institutions. The new company's first project is the 10-MW Nevis Geothermal Power Project on the Caribbean island of Nevis, which will enable the island to transition to 100% zero-emission renewable energy for its power supply. STEP Energy has additional opportunities to expand production in the Eastern Caribbean and in North and South America.

Odfjell Drilling Enters Floating Offshore Wind

Odfjell Drilling joins forces with Oceanwind in the floating offshore wind market. Oceanwind's long-term objective is to own and operate harsh environment floating offshore wind turbines. Odfjell Drilling has the intention to achieve a controlling position, subject to successful completion of the contemplated equity tranches.

"We are very pleased and honoured to have joined forces with Odfjell Drilling. With their long tradition and impeccable track record as a high-quality operator of drilling units, it was easy for us to knock on their door. For many years, our goal has been to harvest green energy offshore. In 2001, as founders of SWAY, we initiated the game-changing technology for floating offshore wind turbines. Almost twenty years later we have decided to enter the business of owning and operating such assets and become an important contributor to the reduction of fossil fuel emissions," says Oceanwind Founder Jon Erik Borgen and CTO/Founder Eystein Borgen.

TAP's Network Code Now Published

TAP issued its Network Code, as approved by the national energy regulatory authorities of Greece, Albania and Italy. The TAP Network Code has been finalised following the public consultation launched in August 2018, and sets out rules that govern TAP's services to customers, including shipper registration, credit support, capacity products offered, capacity booking, balancing, usage costs, etc.

TAP will be offering capacity in line with the TAP Network Code through the PRISMA capacity booking platform. The shippers' registration process has opened on 10 August 2020. Additional information required for the completion of the registration process is available on TAP's corporate website.

"I would like to extend my thanks and appreciation to the national regulatory authorities of Greece, Albania and Italy. We look forward to our continued cooperation as the TAP project moves forward towards the start of commercial operations. By transporting new gas volumes via a new route, TAP will promote market development and enhance the interconnectivity of infrastructure in South Eastern Europe. In turn, this will facilitate gas access to the wider region, where several markets are dependent on a single source or do not have access to gas at all," Luca Schieppati, TAP Managing Director, said.

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Sale of Land Outside the Buildable Area

NEW RESTRICTIONS AND WAYS TO COPE WITH THEM

Unlike other economic sectors, energy is a domain where activity is primarily developed on land: be it fossil fuels or renewable energy, the operations require large surfaces of land for the development of the projects. It is self-understood that such large surfaces cannot be secured (but only to a limited extend) within the buildable area (Romanian: *intravilan*) and, as such, the operators have to look for suitable and available surfaces in the *extra-murros* realm, but still in the vicinity of existing infrastructure which itself is concentrated in the neighbourhood of existing communities (due to the need of using the roads, electrical network etc). Consequently, the recently enacted Law no 175/2020 (**'Law no 175/2020'**) amending Law no 17/2014 concerning the sale-purchase of agricultural land located outside buildable areas (**'Law no 17/2014'**) is of extreme importance.

Reactions of professional associations have been publicly made available and submitted to the Romanian President before the promulgation of Law no 175/2020; despite said reactions, **Law no 175/2020** was published in the Official Gazette on 14 August 2020 and it **will enter into force upon 13 October 2020.**

The importance of the location. Practices

In any oil and gas or renewable energy project, land represents a cost. It is generally not the highest one (as drilling or the cost of the equipment itself outruns by far the cost of land, especially in Romania where *extra-murros* land is still not that expensive compared to other jurisdictions), but the relevance of the secured land reveals itself from a different perspective: it is where the heavy development investments into power plants/facilities/wells etc. will be made and where production will be generated for decades; as such, it is essential that the location is 'clean' from the very start. In short, a viable location (together with a good relationship with the surrounding communities) offers a project the sense of stability which is highly valued by the investors that must 'pour' large amounts of money and wait for years before seeing any returns.

In any permitting schedule of a project, securing the land is the first operation where the operator consistently reveals its presence (and, indirectly, its intentions) in the local community. Within the Romanian framework, energy operators consider several options:

Ownership right

Some operators have a practice of securing the required land by simply purchasing it[1] – as such, they get hold of the ownership right (i.e. the most 'complete' right in *rem*).

1 In rare cases, some operators purchase the land through vehicles/third parties indirectly controlled by them, in order to avoid an artificial increase of the price of land, but we will not dwell into such practices. The Romanian oil and gas realm recently witnessed a case in Western Romania where land was secured though such third party to avoid criticism of the local community (which is, actually, more detrimental than acting openly...).

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While ownership is obviously the most costly alternative, it provides the whole range of attributes of a landowner (e.g. the right to use, the right to lease, the right to freely dispose of the land etc) and, consequently, the largest freedom of movement. It also offers the most secured feeling in terms of long-term stability (that is why there is a preference that the most important parts of a project - e.g. treatment facilities/transformer stations etc - are placed on owned land).

Superficies right

Other operators (primarily in the renewable sector and, to a limited, extend, also in the oil and gas industry) choose to secure the land via superficies agreements. The superficies right entails ownership over the construction as it is erected (e.g. a wind/solar plant, a treatment facility etc) and only the right to use the land underneath. Payment is (generally) made on an yearly basis or per objective at a fix price established for a long period of time[2] (with the beneficiary's right to unilaterally agreement if the project runs uneconomic at some point).

Right of use

The third most used practice of securing land is via rental agreements, based on which the operator obtains the right to use the land in exchange of an amount periodically (i.e. 1 year/6 months etc.) paid to the landowner. The rental agreement is valid for as long as the objective is used; the construction must be removed at the end of the rental period (which is anyhow a mandatory requirement under the oil and gas legislation). Note is to be made that the petroleum industry benefits of a specific exception under Law no 50/1991 (i.e. the 'Construction Law') which allows for the issuance of a construction permit based only of a rental agreement (i.e. right of use which is a so-called personal right) instead of a right in *rem*.

Other rights

All three above mentioned possibilities may be used for land owned by public authorities also (yet, in such cases, special provisions[3] must be observed). To a less extend, concession agreements are also used (entailing a public tender – longer and more difficult formalities). Additionally, the free use agreement (Romanian: *contract de comodat*) is used in even more rare cases and for specific situations (e.g. when an affiliate has the right to use and transfer it).

Recent legal amendments. Implications

We have presented the above for a better understanding of the impact of the recent amendments. We shall begin by mentioning that Law no 17/2014 refers only to the **sale-purchase** of *extra-murros* land (i.e. ownership option). As such, **the amendments should have no direct impact on the other legal options above presented; such options may be used for the future as they were prior to the entry into force of the new amendments** (i.e. land secured via superficies agreement will not be – and anyhow it was not till today – subject to said amendments).

That being said, sale of land outside the buildable is to be done in substantially more restrictive conditions than before:

1. **Enlarged list of pre-emptors**

A pre-emptor has a (legal) preference in purchasing the land over third parties against the same price/conditions offered by such third parties. The existing (i.e. prior to the amendment) categories of pre-emptors are enlarged by new additions. In the justification (Romanian: *expunerea de motive*) of the initiators of the amendments, the initiators consider that the amendments will benefit to the young farmers and help consolidate larger agricultural surfaces. Consequently, young farmers are added to the list of pre-emptors, but also persons having domicile in the same or neighbouring administrative unit(s) and owners of agricultural investments in vineyard, hops cultures, private irrigation and agricultural research institutions.

2. **Procedural aspects**

Clearer rules for determining the order of pre-emptors are introduced. Reaction times

2 Up to 99 years, as per Article 694 of the New Civil Code.

3 Such as Articles 334-346 of the Administrative Code etc.

are increased (for example, the offer for sale must be listed for 45 days instead of 30 days); city hall must notify all pre-emptors of the offer for sale (this will entail certain costs and logistical efforts) and, *only* in case they cannot be contacted, the city hall must post the offer for sale at the city hall's headquarters/ or on its website.

3. Potential purchasers (i.e. purchasers meeting specific conditions)

If the pre-emptors do not express their intention to purchase within the above mentioned 45 day term, a category of 'potential purchasers' is enabled under the Law no 175/2020 to express their intention to purchase within another 30 days (computed as of the expiry of the 45 day term reserved for pre-emptors).

Such potential purchasers (i.e. a new category of 'preferred' buyers which are not considered by the law as pre-emptors, but nor regular potential purchasers) must meet certain conditions reflected in the new Article 4^1 introduced by law no 175/2020. As such, if they are natural persons they must cumulatively and for at least 5 years (i) have domicile/residency in Romania, (ii) perform agricultural activities in Romania and (iii) be fiscally registered in Romania.

Correlatively, the legal entities willing to purchase the land must cumulatively and for at least 5 years:

(i) have their headquarters and/or a secondary office in Romania;

(ii) perform agricultural activities in Romania;

(iii) show that at least 75% of their revenues stems from agricultural activities[4];

(iv) the (ultimate) controlling shareholder – as a natural person - must have his domicile in Romania (also for at least 5 years);

It is not clear what would happen in case both natural person(s) and legal entity(ies) meeting the above conditions express their intention to purchase.

Certification of meeting the conditions must be issued by the county Agricultural Directorates (for surfaces up to 30 ha) or by the Ministry of Agricultural and Rural Development (for surfaces exceeding 30 ha).

4 As classified according to the NACE codification

4. Sale to any other person

If no pre-emptor and no potential purchaser falling under the above categories expressed its intention to purchase, the land can be sold to any natural person/ legal entity under the conditions provided by the Civil Code.

5. Restrictions/ burdens for re-sale (Art 4^2 newly introduced under Law 17/2014)

If the land is sold within less than 8 years as of its purchase, the state will change the seller with a tax of 80% applied on the difference between the purchase price and the sale price. While we recognize the potential of such a provision to encourage an owner to keep the land for at least 8 years, we see little benefits from it. Eight years is a rather long period; it does not necessarily mean that one is into speculative transactions if one sells the land earlier than 8 years; many rationales can change in such a long period … unfortunately, irrespective of the reason, the tax penalty will be applied!

Similarly, in case of a change of control within less than 8 years (as of equity purchase) over companies owning *extra-murros* lands representing more than 25% of their assets, the seller will owe the same 80% tax computed against the value of said lands upon their purchase and the lands' value considered at the change of control. First comment is that this provision shall not be applicable to companies not owning land (and have it secured through other means than ownership). Second comment is that there are so many unclarities in this provision that one can hardly see it applied without interpretation issues: in case of multiple lands purchased at different moments in time, will there be an individual calculation per each land? What if there is absolutely no speculative intention in said transactions - why should the tax be applied? Is 25% the right threshold – is it too low or is it too high? - was there a study done to identify this threshold?

The 80% tax set under Art 4^2 refers to 8 years as of the purchase of the controlling stake in the company. What if at the time of acquiring the controlling stake, the lands did not make 25% of the company's assets and

their value increased over time to the detriment of other assets of the company? Why should the tax be paid in such cases?

We can foresee many questions in relation to this new tax and we express hope that the methodological norms (which must be issued within 15 days as of the entry into force of Law no 175/2020) will clarify at least part of said questions.

6. **Other relevant provisions**

The new Art 4^2 paragraph 5 sets forth that owners of lands outside the buildable area must use such lands exclusively for agricultural purposes. If this is read on a standalone basis, one may interpret that no other activities may be performed. And it is by definition that energy related activities require removal of land from agricultural circuit. We believe that despite the imperative character of this provision, it must be corroborated with the specific provisions of Law 18/1991 regarding land fund (Romanian: *legea fondului funciar*) which allows for energy related activities (e.g. drilling of wells or power infrastructure) to be performed on *extra-murros* surfaces.

It is worth noting that pecuniary sanctions will be doubled (Art 15 under Law no 17/2014); the legal sanction of relative nullity (which, under certain circumstances, could be remedied and can be invoked only by an interested party) will be replaced with absolute nullity (which cannot be remedied, can be invoked by any interested person etc) as per Art 16 under Law no 17/2014.

7. According to the amendments brought to Law no 17/2014, in any situation, buyers of agricultural lands situated *extra-murros* **have the obligation to use them exclusively in order to carry out agricultural activities from the date of purchase,** and in case that, on the agricultural land there are agricultural investments for trees, vineyards, hop cultures and private irrigation, the agricultural destination of said investments shall be kept.

Final considerations

The amendments brought by Law 175/2020 obviously reveal the legislator's intention to protect local agricultural investors and offer facilities to young farmers. These are remarkable intentions (in line with the trend observed in other neighbouring countries – e.g. Poland), but their reflection in Law no 175/2020 might exert repercussions on other activities entailing **ownership** on land (including part of the energy sector/ telecom etc); it is beyond doubt that acquisition of *extra-murros* land will be impacted/restricted for such 'other' activities; even existing businesses with owned land may potentially be impacted in case of sale of such land within less than 8 years as of acquisition (and if the other conditions above detailed are met). At the same time, certain provisions under Law no 175/2020 leave room for interpretation; if the methodological norms will not clarify them, one would have to wait for the practice of the authorities to apply said provisions before interpreting them. ■

Opinions Post COVID-19

FINDING BALANCE IN CRISIS

The oil & gas industry must find balance with the reality after COVID-19, a reality crushed by the announcements related to aggressive climate policies, and also by uncertainty in terms of market demand forecast for the near future.

The entire industry is expecting to recover 'step by step'.

What will the consequences be?

One would be the quick switch, this time, to the sustainable and not politically imposed technologies, meaning without consideration for the economic calculations amid the supply/demand imbalance.

In no case amid the lack of investments that would set the tone of pernicious independence of prices, prices set in an awry manner to come out of recession. If this aspect were verified more closely, one could come to the conclusion that it's not the unpredictability of the oil world to blame, but the inability to understand the current situation, preferring to invoke fantastic or imaginative scenarios, to put it more clearly.

Does the 'cold' wave of the lack of energy investments represent an extremely negative side of the post-pandemic crisis? The annual report of the International Energy Agency (IEA) will not limit, as always, to the usual balance, but will propose very 'cold' estimates for returning to balance.

The new behaviours in the global energy sector will mean a strong argument for the near future. Lockdown has transformed many of those that we could call behaviours with direct effects in the energy sector, but also for the environment, labour, mobility etc.

An expected new normal

The apparition of the new phenomena should have been subject to thorough examination before feeling the effects of the virus, attempting to implement an expected new normal.

We could qualify as a certain oil 'Darwinism' all these bankruptcies that are an everyday occurrence, mergers of companies, purchase of shares which are basically thwarted, proving that all is nothing, an irreversible nothing.

The energy security will undoubtedly become a continuous must. The obvious need for new low-carbon technologies is auspicious. It's important not to enjoy the 'end' of the oil industry, induced for years, because we could get chocked-up. The alarm presented in this manner is used increasingly often by the major oil producers. The question "oil, what would the historic agreement be", is already famous.

First of all, it is inappropriate to define as a 'historic agreement' the one of April 12, between OPEC and non-OPEC countries, an agreement for the gradual reduction of their crude oil production. Because the oil market is and will remain driven by demand.

If a historic agreement is necessary, it will be in force 'as of tomorrow', a tomorrow not today, meaning when the crisis is over.

The oil apocalypse is supported as a semantic notion for the moment only by the duplicity of the stocks that seem to be constituted, not taking into account the existence of the commercial demand-supply binomial and the balance that its existence requires.

Today's oil, as both resource and notion, is considered more than a pivot for merging energy sources. It is known that average prices dropped by even 70% at the beginning of the current crisis.

In parallel, some specialists supported the

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possibility, immediately proven as impossible, that the price could reach USD 10/bbl.

If Athens cries, Sparta does not laugh

Experts argue as an axiom that the crisis will be resolved only once the pandemic is over. They use in the affirmation of this truth even an allegory which we summarize as follows: "If Athens (fossil sources) cries, Sparta (renewable sources) does not laugh." The wisdom of the allegory may bring us closer to understanding the current situation.

Focusing on Coronavirus, it would be better not to confuse situations. A bad correlation, we would say, could arise from the possible relationship between the virus and climate change.

Simple but true genetics would conclude: trying to put a little order between the madness of the news and the dramatic, sometimes hallucinatory announcements, could create the risk of producing, unfortunately, much deeper troubles.

It is clear, without doubt, that this virus is not a 'distraction.' Serious concerns will arise for the future of the energy transition, but talking about coronavirus as a 'slight distraction' is not acceptable. For many experts, this virus can be considered like the First World War, and the recession would lead us to a logical question: "could the world be saved before the Last Supper?".

In this direction, even allegorically presented, the same specialists claim that so far nothing has been understood, so that arousing a reaction among readers may not change anything in everyday behaviour in the face of climate change.

The fear remains that the effect will not be a bit contradictory. ■

TRANSFORMING BUSINESS WITH INFRASTRUCTURE AUTOMATION

Interview with Kamran Allahverdiyev, CEO of WEVO (former IT Grup)

Text by LAVINIA IANCU

Having graduated from the two European State Universities, in different fields - Mechatronic Engineering and International Relations and European Study, Kamran Allahverdiyev is the CEO of WEVO (former IT Grup). He is still studying EMBA at Sheffield University in UK. The all of them taught him various knowledges in order to become a successful CEO in the international IT company.

Kamran Allahverdiyev gained experience working in the multinational, private sector and also in the government sector. He began his career at WEVO (former IT Grup) as Business Development Engineer. Right now, they are carrying out the rebranding process, changing the logo and name to a unique one, which tells more about them and their business position.

WEVO is generated from the two words: 'we' and 'evolution'. WEVO's new motto is: "Together we evolve". WEVO (former IT Grup) was founded in 2000 in Romania and since then has been involved in major local and regional projects for the Downstream industry. It was the first company to develop and implement for Romania the unattended concepts in downstream industry by certifying and implementing the first 18 full unattended petrol stations in Romania, which are automated projects.

Dear Mr. Allahverdiyev, how did you get started in your profession and when did you join the WEVO (former IT Grup)?

I have always thought if you want to reach heights you should put much effort in order to make your dreams a reality.

So, no matter how high you are, there is always a place for a next step and next level of your achievements.

Having graduated from the two universities, I gained experience working in a multinational, private sector and also in the government sector, particularly, political and diplomatic fields. Being a Mechatronics Engineer, now I am in the EMBA program at the University of Sheffield.

I began my career at WEVO (former IT Grup) in Romania as a Business Development Engineer.

My skill of understanding technology, client needs and business leadership resulted in rapid and successful professional growth at the company. Thus, Mr. Mihai Lucian, owner of the company, has appointed me in the position of CEO of WEVO (former IT Grup). Mr. Mihai Lucian Gabriel is very innovative person and always thinking about client's satisfactions. His experience in the IT and managerial fields helps us a lot to develop our strategical and tactical plans.

My aim and achievement, as a CEO, is to make our company known worldwide, to bring it to the international market and to transfer our innovative solutions to other countries of the world.

Now we are European and also international company, with one office in Azerbaijan, Baku and the head office in Bucharest, Romania.

We have a professional team whose common goal is to complete a task in the most effective and efficient way. In this way, I always help and support my team in order to obtain success for WEVO (former IT Grup), because our team's success means WEVO's (former IT Grup's) success.

What are your responsibilities as the company's Chief Executive Officer?

My responsibilities as a CEO include the following, but are not limited to:

- Communicating, on behalf of the company, with shareholders, government entities and the public;
- Leading the development of the company's short- and long-term strategy;
- Creating and implementing the company or organization's vision and mission;
- Evaluating the work of other executive leaders within the company, including managers and other employees;
- Maintaining awareness of the competitive market landscape, expansion opportunities, industry developments etc.;
- Ensuring that the company maintains high social responsibility wherever it does business;
- Assessing risks faced by the company and ensuring they are monitored and minimized;
- Setting strategic goals and making sure they are measurable and describable.

WEVO (former IT Grup) was the first company to develop and implement for Romania the unattended concepts in the Downstream industry. What does this concept mean exactly?

I would like to note that our system automates all business processes in the filling station. Our proposed system consists of software and hardware components:

• HOS – 'Head Office System' platform manages the goods and petrol prices from a single place. It manages all transactions from the petrol stations network and uses the power of BI to take the right decisions very quick;

• Point of sale and Back office system- 'BOS' platform manages fuel transactions and delivery by controlling the forecourt devices, Fuel pumps, ATG, Price Poles. It also manages shop and service goods transactions and delivery without any mistake. Issues fiscal receipts and fiscal invoices for transactions at one finger ahead. You can get control of your shop and fuel stocks;

• Fleet Card Management System platform manages products and services allowed on any Fleet Cards transactions (DKV, EWG, UTA, AS24). Any downstream company can be a fleet card issuer at one click ahead: define, create, print its own Fleet card (MSR and contactless). You can also manage card restrictions in your petrol station network and manage fleet cards customers, contracts, invoices and payments. Fleet Card management system has secure transactions using EMV Level, 1,2,3 devices;

• EPS – Electronic payment system – This system allows us to check the card limits online, avoid security and financial issues by using online or offline check. We can control the products allowed

for each fleet card. The system assists you to increase your sales by accepting other international fleet cards: DKV, UTA etc.;

• OPT (Outdoor Payment Terminal) hardware controls the fuel pumps to dispense the prepaid amount of fuel. It also speeds up the transaction process to avoid queues and delays. It also assists you to preauthorize any fuel transaction with the available amount from your customers' fleet or bankcards. OPT is secured and resistant to cold and hot temperature, dust, water and to all kind of impact.

Types of payments as follows:

a. Contact and contactless bank cards;
b. Fleet Cards MSR, secure contactless (Myfare Desfire EV1 EV2AES 128bits), unsecure contactless (RFID keys or Myfare Classic);
c. Cash (optional).

OPT functionalities as follows:

a. Fuel sale on all payment methods specified above;
b. Wet price management (programmed prices);
c. Possibility of discount during fuel sale;
d. Stock management (unloading assistance, real-time tank volumes, sales correlations with pump indexes);
e. Attended (can be used as POS assisted by an operator);
f. Unattended (manages self-propelled fuel station);
g. Customs reporting (specific reports required in relation to the Bureau).

What are the requirements for the filling stations in infrastructure automation?

As you know, each filling station has individual IT infrastructure and methodology for management of business processes.

In this case, we have to approach each customer individually. First, we conduct business and system analysis and get to know the business processes of the filling station.

Then, we prepare the technical proposal where we describe the solution for the filling station.

I would also like to note here that the system, equipment and solutions we prepare are not the same. They must comply with the laws of the country and their local and regional standards. The mentality and the system of each continent are different.

Is there any need to upgrade the equipment and train the staff to ensure proper functioning of the system?

Automation is something that saves time and reduces human effort.

I think that automation of filling stations will help a downstream company to manage all business processes, which are conducted inside of filling petrol station, sale, refilling and other operations.

If you look around, you will see that other industries tend to automate processes. Therefore, automation is very important for each industry.

As regards the training of staff for project management, I can say that if we realize the project we need to upgrade equipment for meeting the requirements of the proposed solution, and training the staff is very important in order to manage the project, otherwise the project can fail due to irresponsibility of duties.

Our staff is specialized in this field and also upon recruitment we try to hire the best candidates and also within the interview they need to pass (English Communication and Technical test); every aspect is very important for us.

Our staff is built from the people who enjoy to learn and discover new things in this field and all of them are licensed, certified from Microsoft and the other Organizations (these kinds of certifications are supported and paid by us).

We enjoy working with smart people who upgrade their knowledge because they work smart, not hard. Our Helpdesk department is working 24/7 and it addresses every challenge.

WEVO provides many volunteer and internship programs for the development of the young generation.

What are the main benefits of an unattended filling station? What about the savings?

Using our solution, the business processes in the filling station will be completely automated.

The main benefits are the following.

• **Service quality:**

Refers to a customer's comparison of service expectations as it relates to our company's performance.

• **Customer satisfaction:**

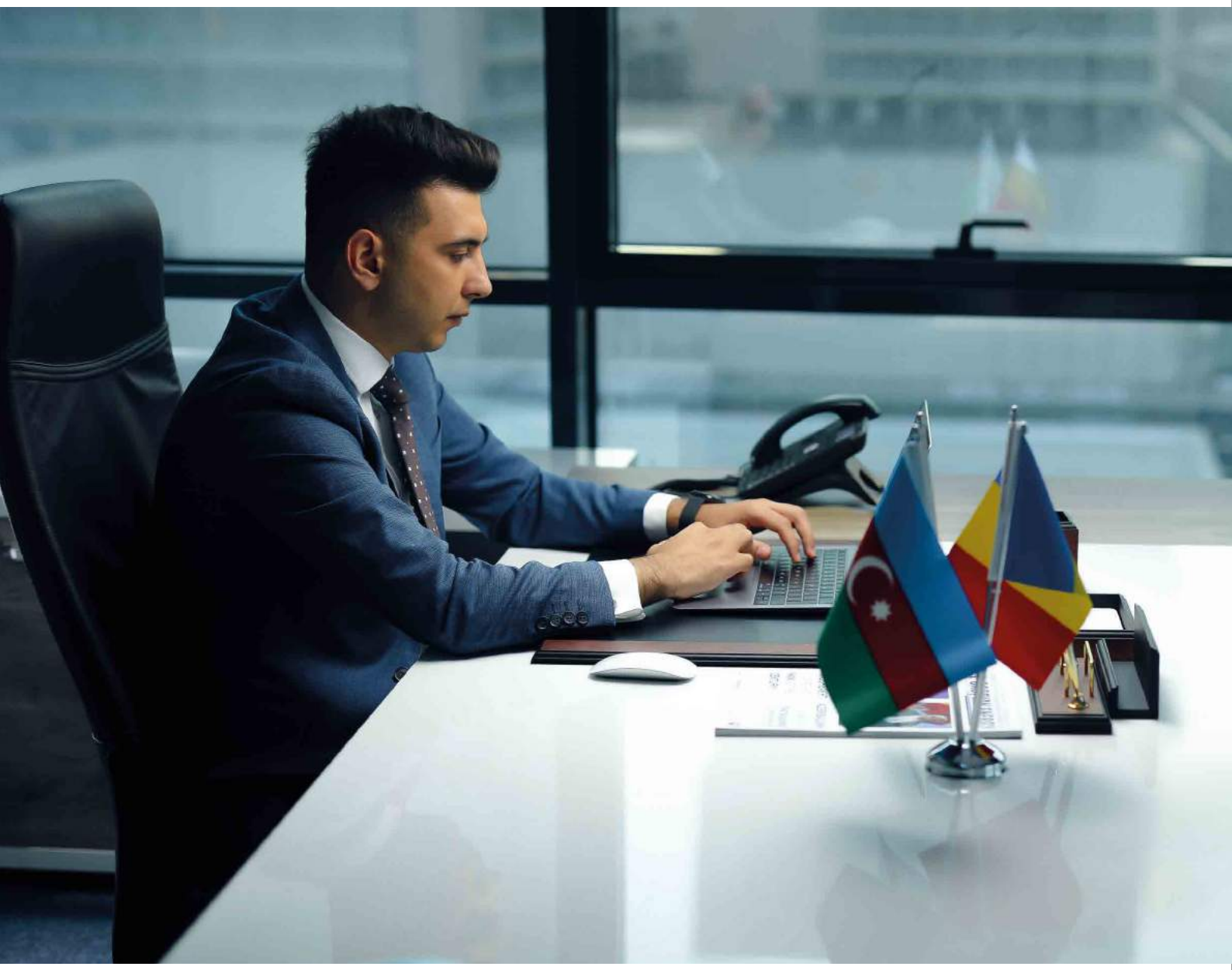
People are satisfied with the quality of the product and service they get from our company.

• **Convenience:**

Customer can control sale processes via system in just one click; Customer can get daily/weekly/monthly reports via system in just one click.

• **Security:**

Fleet Cards are protected by EMV Level III transaction data at the pump, which means drivers must enter specific information known only to them to begin fuelling. Since fleet cards are owned and operated by the same system, if fleet fraud occurs, the provider can quickly notify you about the suspicious activity and, if necessary, take a swift action.



• **Time:**

Unattended Filling station makes it simple and fast for drivers to get in, get fuelled and get back on the road. Not only does this increase productivity, but it also increases the level of customer satisfaction, with more deliveries and jobs completed on time.

Further, there are no stores at Unattended Filling stations that drivers can stop in for food or drink, and there are no crowded lots to make manoeuvring of the vehicles more difficult, which makes the chances of a parking lot accident more unlikely.

• **Savings:**

Customer will not need to hire many employees. Because the sale process is automated. Employee expenses are minimized.

Are there any other specific products and services WEVO (former IT Grup) offers? Please, tell us more about your range of solutions for the Downstream market.

We can propose various solutions for Downstream, Upstream and Midstream companies, Bank sector, Hypermarkets etc.

As we have mentioned, we are open for every innovative project.

We have all the necessary resources for implementing every project and for making all customer expectations a reality.

But first of all, we need to know their exact requirements and their business processes. In this case, we can propose a solution and we can automate the business processes the customer needs.

We have those resources to bring innovative solutions and also the 20-year experience.

What are the major local or regional projects WEVO (former IT Grup) is currently involved in?

Our first contract in Romania was started with Lukoil. Some major local/regional projects are: 1. Project with SOCAR (Romania); 2. Project with Oscar Downstream (Romania); 3. Governmental Projects in Azerbaijan.

What are WEVO's (former IT Grup's) major partners?

Currently, WEVO's (former IT Grup's) major partners are: SOCAR, Oscar Downstream, Microsoft, IBM, Huawei, Red Hat, ABBYY, Avaya, Barracuda, DELL Technologies, VISA, MasterCard etc. We are also partnering with the biggest fleet-card providers from Europe: Eurowag, UTA, AS24 and DKV.

One of the key recommendations of the European Union 2020 analysis refers to the functioning of the internal energy market and the level playing field for energy technology development, investment and sustainable financing in the EU to keep all technology options open for achieving net-zero emissions. How do you see the future development of WEVO (former IT Grup) in this regard?

WEVO (former IT Grup) is a leading European and International IT company.

The company plays the necessary role in the internal energy market and provides various innovative IT solutions for the Downstream Industry.

WEVO (former IT Grup) company is focused on energy technology development and invests in the development of various software and manufacturing of hardware oriented to the energy market.

So, we wrote many success stories in the span of 20 years and now we aim to realize our innovative IT projects in all countries of the world.

What are WEVO's (former IT Grup's) short- and long-term plans? Do you take into consideration to expand your business internationally?

WEVO (former IT Grup) company's long-term plans are to transfer and realize our innovative IT solutions in other countries of the world.

Therefore, we established the branch in the Republic of Azerbaijan to operate our forthcoming international IT projects through Baku city, Azerbaijan.

My achievement was to set up the WEVO Company in Azerbaijan from scratch, hiring the best IT professionals, gathering around me the eminent IT and administrative team that is able to realize any project.

We brought the company to the international market.

Now we conduct negotiations for transferring our IT solutions to the European, Asian, African and American markets. ■

BRUA Phase 1, Bibesti Gas Compressor Station Completed

by Adrian Stoica

Transgaz has completed works at the third and last gas compressor station within BRUA project Phase 1, the one in Bibesti, Gorj County. The inauguration of the station took place on August 23 and the event was attended by Romanian Prime Minister Ludovic Orban, together with Minister of Economy, Energy and Business Environment Virgil Daniel Popescu and other government officials, as well as the General Manager of SNTGN Transgaz SA, Ion Sterian, and representatives of the executive management of the company and of local public authorities.

It is the third and last compressor station within BRUA project Phase 1, which Transgaz commissions, after the inauguration and commissioning in 2019 of gas compressor stations in Jupa-Caras Severin County (September 30, 2019) and Podisor-Giurgiu County (October 31, 2019).

The purpose of Bibesti gas compressor station is to compress gas in order to offset pressure losses inherent in the gas transmission process. The station is bidirectional, being able to compress gas both to Podisor/Giurgiu direction and to the Jupa/Nadlac direction. Bibesti Gas Compressor Station is a technological facility interconnected to the following main gas pipelines: Dn 32" GCS Podisor - GCS Bibesti, Dn 32" GCS Bibesti - GCS Jupa, Dn 20" GCS Bibesti - TN Hurezani.

The Bibesti Compressor Station is part of Phase 1 of BRUA gas pipeline, a strategic project which was approved, supported and financed at European level, obviously with Transgaz co-funding.

"The government supports the ambitious investment plan designed by Transgaz. We have a number of other extremely important investments that are taking place or will take place. Of course, the objectives we pursue are, on the one hand, a better interconnection, a diversification of gas supply sources in order to increase Romania's energy security; we also aim, as objective, to expand main gas pipelines in as many areas in Romania as possible, to allow connection to gas networks, so that Romanian gas serves Romanians, reaches the homes of Romanians, reaches local communities and especially provides a support for programs for the development of local communities... In parallel with Transgaz's investments, the Government has already designed and is already implementing a program to finance gas distribution, to expand local gas networks. On August 17, as promised, we launched the call for projects to which administrative and territorial units, local administrations can apply, either single localities, or IDAs, or localities that associate in a partnership for the development of gas networks. The initial amount allocated for this smart grid expansion program in local communities is 234 million in the first phase, from the multiannual financial year 2014 – 2020," PM Orban said on this occasion.

In turn, SNTGN Transgaz General Manager Ion Sterian said: "BRUA gas pipeline is not a highway without discharge, BRUA will be an integral part of the National Gas Transmission System, a factor of energy security and a driver for national economic development. Natural gas will reach Europe through TAP gas pipeline from the LNG terminals in northern Greece, from Revithoussa and

Alexandroupolis, and further, from the Vertical Corridor Greece-Bulgaria-Romania, ensuring bidirectional transmission capacities of 1.5bcm/year in/from Bulgaria and 1.75bcm/year in/from Hungary. We have always worked on several levels, BRUA being one of our most important projects, but no by far the only one. We have worked in parallel at the Ungheni-Chisinau gas pipeline, a geostrategic project for Romania and the Republic of Moldova and which we commissioned in late July, according to the assumed commitments. In all this time, we have always considered the NTS development works in various regions of the country, as well as those from the north-east of the country or in the south, through Craiova-Segarcea-Calafat pipeline, where we have also inaugurated the Craiova-Segarcea section".

European co-funding of EUR 179mln

GCS Bibesti is part of BRUA project Phase 1, which is on the list of projects of common interest (PCI - 7.1.5) of the European Union and is developed in the context of the need to diversify gas sources in EU countries. BRUA project Phase 1 aims to ensure access to new gas sources, as well as facilitate Caspian gas transport to markets in Central

and Eastern Europe.

BRUA Phase 1 project has benefited from grant from the European Union of approximately EUR 179mln to implement the investment, which will ensure access to new gas sources, as well as facilitate gas transmission from the Caspian region to the markets of Central and Eastern Europe.

The project is developed in the context of the need to diversify gas sources in European Union countries and ensures bidirectional transmission capacities in/from Bulgaria and in/from Hungary.

Development projects worth EUR 4bn

BRUA project is an integral part of the 'Plan for the Development of the National Gas Transmission System during 2019-2028', approved in early March this year. The Development Plan provides for investment projects estimated at approximately EUR 4.03bn. The plan meets the requirements of the European energy policy regarding:

- Ensuring gas supply safety;
- Increasing the degree of interconnection of the national gas transmission network to the European network;
- Increasing the flexibility of the national gas transmission network;
- Gas market liberalization;
- Creating the gas market integrated at European Union level;
- Ensuring third party connection to the transmission system, according to specific regulations, within the limits of transmission capacities and in compliance with the technological regimes.

The works related to the 3 compressor stations, including GCS Bibesti, were carried out by the Association INSPET SA (LEADER) – PETROCONST SA – MOLDOCOR SA – HABAU PPS PIPELINE SYSTEMS SRL – IRIGC IMPEX SRL – SUTECH SRL – TIAB SA – ROCONSULT TECH SRL.

The works commencement order was issued on April 16, 2018. Works related to GCS Bibesti were influenced by the need to execute in advance the intrusive archaeological diagnosis works and the preventive research works. Therefore, over an area of approximately 12,400sqm (approx. 30% of the total area of the station) works were carried out only after conducting preventive research. The archaeological discharge certificate was issued in early December 2018.

Characteristics and technical parameters of GCS Bibesti

The main operating parameters of Gas Compressor Station (GCS) Bibesti are:

- Suction pressure: 20 barg - 40 barg;
- Discharge pressure: 30 barg - 60 barg;
- Compressed gas flow rate: 282,500 Sm3/h.

GCS Bibesti includes two Gas Compressor Units (one active and one back-up) manufactured by the US company SOLAR TURBINES, with a power of 4.6 MW each and consisting of:

- SOLAR C40 centrifugal compressor for increasing gas pressure for transmission;
- SOLAR CENTAUR 50 gas turbine, which is the driver of the centrifugal compressor.

By additionally installing a Compressor Unit, in the future, the compressor station will be able to compress a gas flow of up to 565,000 Sm3/h.

The investment in GCS Bibesti amounts to EUR 39.08mln. ■

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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New Investment Project to Increase Degree of Crude Oil Processing

Rompetrol Rafinare, a member company of KMG International, has completed a new investment project to increase the degree of crude oil processing and optimize operational flows.

With a value of over 1.4 million dollars, the project was recently implemented during the general turnaround of the Petromidia refinery and aimed at installing a new light gas oil recovery system at the fractionation column within the Delayed Coking plant.

"Our company has successfully implemented a project that supports plans and objectives to increase efficiency, reduce costs, optimize operational flows, but also to modernize and align with the most modern crude oil processing solutions. This initiative joins the large projects to reduce the impact on the environment and digitalization projects, meant to bring more efficiency," said Felix Crudu Tesloveanu, General Manager of Rompetrol Rafinare.

The introduction of the project in the flow of the Delayed Coking plant will optimize the thermal profile on the column, which will lead to an additional recovery of light gas oil at the same quality, by reducing the amount of heavy gas oil.

In addition, the reduction of the yield of heavy gas oil leads to the increase of raw materials processed in the Petromidia refinery.

From a technological point of view, the additional removal of heat from the 180-C2 fractionation column leads to a production of approximately 7 tons/hour of steam and, implicitly, to the reduction of the pressure on the system.

The modernization of one of the most important units in Petromidia's portofolio comes in the context of the 35th

anniversary from the beginning of operation of the Delayed Coking plant. Since 1985, the unit has been a vector of stability in the smooth running of operational processes in the largest refinery in Romania and one of the most important in Southeast Europe.

In 2013, the Delayed Coking plant underwent an extensive modernization project, costing more than 50 million dollars, which led to a 90% reduction in technology consumption, an annual decrease in losses of approximately 3 million dollars, as well as a decrease in energy consumption.

In 2019, the Petromidia refinery recorded a total production of 1.37 million tons of gasoline and 2.93 million tons of diesel (up 5% compared to 2018). The company also managed to obtain 406 kt of Jet A1 aviation fuel, a record level in the refinery's over 40-year history.

Rompetrol Rafinare, the company that operates Petromidia Navodari and Vega Ploiesti refineries, is mainly owned by KMG International (54.63%; directly and indirectly) and the Romanian State through the Ministry of Economy, Energy and Business Environment (44.69%). ■

Turkey Storms the Black Sea

After 8 Years, Romania is Still Waiting

by **Adrian Stoica**

A drone photo shows the Turkish drillship Fatih leaving the Port of Trabzon for a drilling mission in the Black Sea, northeastern Turkey, June 26, 2020. (AA Photo)

Turkey in August announced the discovery of deposits evaluated at 320 billion cubic meters of gas in the Black Sea, not far from Neptun Block, located in the Romanian territorial waters. President Recep Tayyip Erdogan was quick to declare that his country wanted to start using these resources since 2023 and become a net energy exporter. While Turkey joins the race for the exploitation of the offshore field excited and hopeful, in Romania the amendment of the Offshore Law, insistently requested by investors, and the establishment of a stimulating and predictable fiscal framework will remain at the stage of promises at least until after the parliamentary elections.

The site where gas was discovered is Tuna-1 block, located approximately 150 kilometres off the Turkish coast, at the intersection between the maritime borders of Bulgaria and Romania with the territorial waters of Turkey and close to the Neptune block in Romania. Turkey's ambitions don't stop here, the Energy Minister saying that another area was also considered, with an area of 6,000 sq km. "The evaluation of our experts is that we may see similar structures there too," Turkey's Energy Minister has stated. Despite the enthusiasm of Turkish officials, international analysts remain skeptical of this discovery, claiming that, although the value of the gas field is noteworthy, the finding is not significant enough to remedy Turkey's financial situation or to turn it into a regional energy hub.

Gas does not cover the account deficit

Turkey's Central Bank has spent tens of billions of dollars from its foreign currency reserves to support the Turkish lira this year, but despite these efforts the local currency continued to depreciate in relation to the US dollar, writes Turkish website ahvalnews.com, quoting a number of analysts. On the other hand, a lending boom recorded by state-controlled banks in Turkey fed the demand for imports and increased the country's current account deficit.

A slowdown of foreign investments, combined with the decrease in revenues from tourism, leaves Turkey with little funds available to finance its deficit, which leads to increased concerns for the financial and economic instability of the country. Under these circumstances, the economic analysts are skeptical of the statement that the discovery of the gas field would eliminate Turkey's current account deficit.

Although authorities claim that production will start as early as 2023, the centenary of the Republic, the capitalization of offshore fields is technically difficult and expensive.

With the low hydrocarbon prices, the return on investment could take place slow. Demand on the internal market in Turkey has been in decline in the past two years, and volumes coming from domestic sources will face competition from importers, including cheap liquefied natural gas (LNG). The same is true for EastMed gas, if an agreement is reached for its extraction.

Challenges for the major suppliers

Economic analysts claim that the new discovery will make the Turkish gas market more competitive and create challenges for suppliers.

"Azerbaijan is safe for now, but Russia and Iran could lose volumes to the new find and to LNG imports, which have also grown. Finally, some of the gas could be exported to neighbours such as Bulgaria, Serbia and Romania, again providing competition for Russian gas," believes Robin Mills, chief executive of energy consultancy Qamar Energy, quoted by thenational.ae. It could prove too expensive to be sold.

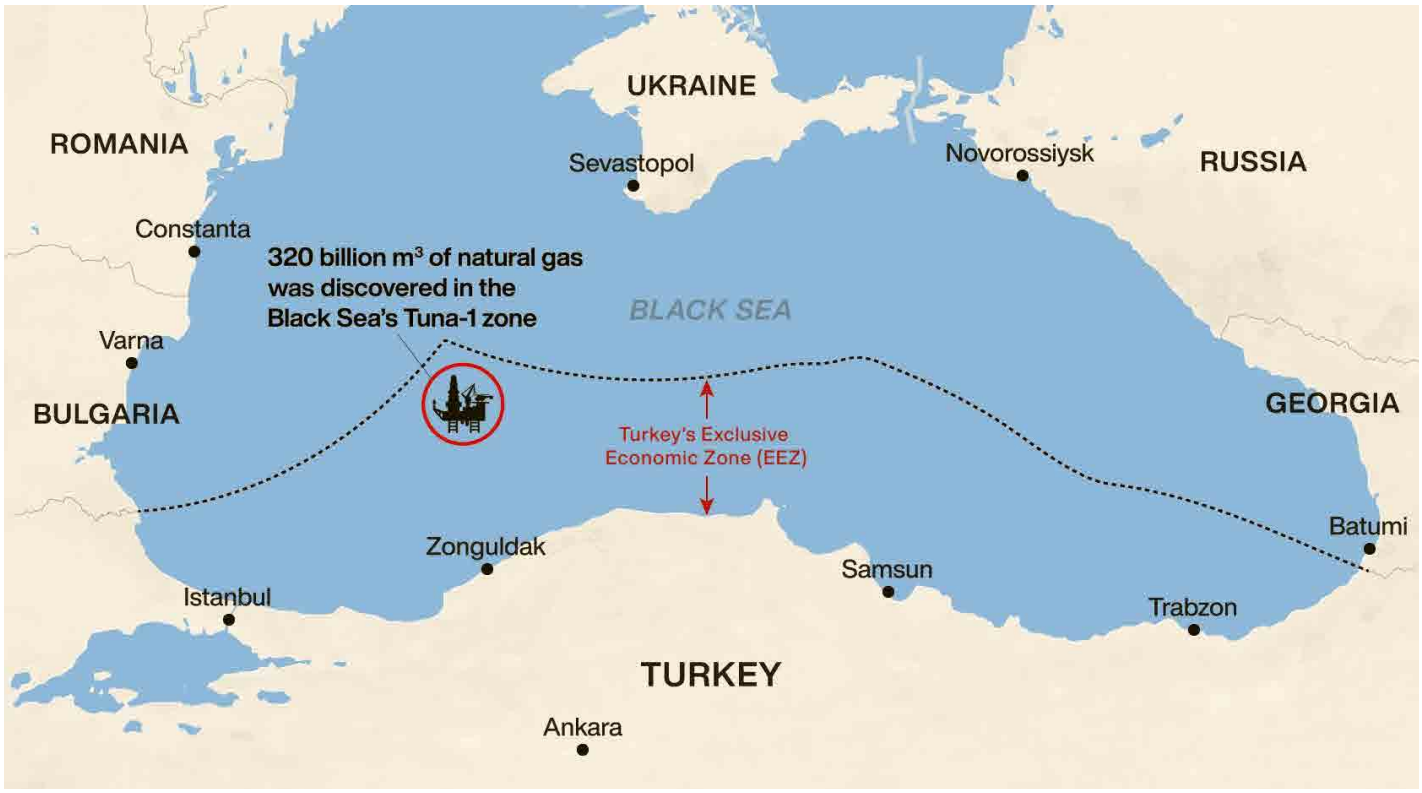
However, the Black Sea discovery will make a difference. In the following five years, Turkey will renegotiate long-term contracts with the important suppliers. The list includes offers signed with Gazprom for the so-called Western route, currently served by TurkStream pipeline, as well as for Blue Stream, writes aljazeera.com.

Turkey consumed 45bcm of gas in 2019, falling from around 50-55bcm several years before, and the bill of energy imports was USD 41bn last year.

2023, a too optimistic deadline

The deadline provided by Ankara for starting exploitation, 2023, is rather optimistic than realistic.

"Turkey is in the phase of geological investigation. After the reserves are confirmed, they will move to the development phase, which means making available the exploitation and transmission facilities.



From the moment of field discovery to that of bringing it online years will pass," explains Nicolae Turdean, President of the National Agency for Mineral Resources (NAMR).

We shouldn't forget that Turkey has no experience in the exploitation of deep offshore fields, and starting the exploitation of the field requires very large investments. Under these circumstances, Turkey will be forced to partner a major company, with experience in this type of exploitation, with human and financial resources, according to NAMR president.

Russia and Iran, the first to lose

Historically speaking, the largest gas supplier of Turkey is Russia, imports from this country accounting for more than half of the gas volume entering the country. Next are imports from Iran, Azerbaijan, Algeria, Qatar etc. In the first half of this year, Russian and Iranian gas imports fell however by over 40%, Azerbaijan becoming the largest exporter on the Turkish market, covering almost a quarter of total gas imports. In the same period, LNG imports climbed by almost 45%, Algeria and Qatar covering approximately half of these imports, according to an analysis by aljazeera.com.

After the new discovery, Turkey's domestic production promises to reduce the dependence on foreign suppliers and, possibly, lay the foundations of exports to the EU markets.

Increase in political influence, a new asset

Beyond the reduction of Turkey's chronic trade deficit, fed by a large oil and gas bill, Black Sea hydrocarbons could also increase political influence.

Erdogan's announcement comes at a time when Turkey is blocked in a dispute on maritime borders and access to offshore hydrocarbon deposits in eastern Mediterranean.

The agreement signed with Government of National Accord (GNA) in Libya to delineate exclusive economic zones (EEZ) led to a boost for Greece, Cyprus, Egypt, Israel and, lately, France. Tensions in the Mediterranean Sea increase after Greek and Turkish vessels collided in August. Recently, the air forces of Greece and United Arab Emirates (UAE) have organized their first common exercise, south to the Crete island, while Turkey organized its own military exercise. Aljazeera.com analysts note that both Greece and Turkey would rather avoid a dangerous escalation and, ultimately, return to the table of negotiations, but for now neither country wants to take a step back.

Should Erdogan choose to reduce pressure by freezing the exploratory activities in the disputed waters around Cyprus or off the Greek island of Kastellorizo, the new Black Sea discovery would be a reason to deviate the

domestic attention.

Unlike the EastMed, the territorial waters of the Black Sea are not disputed in general, except for Crimea, of course, after the annexation by Russia in 2014.

Gas discovery is also seen in Turkey as positive news at a time when the Turkish economy is struggling. After a recovery in 2019, the economy was strongly hit due to the COVID-19 pandemic. The IMF and World Bank are expecting the Gross Domestic Product (GDP) to fall by 3.8-5% this year, for the first time since 2009. Turkish lira lost a fifth in value compared to the US dollar since January. There will be a modest recovery in 2021, but the golden days when the ruling Justice and Development Party (AKP) gained support following a solid economic growth and improvement of the standard of living are gone.

Romania is not affected

Turkey's discovery does not affect Romania at this point.

The entire Europe is supplied mostly with Russian gas, and diversification of supply sources is essential in the European Union's strategy. "Romania must solve its legislative problems, and I refer to the Offshore Law, and start Black Sea gas exploitation. We have a consumption of 14-15bcm of gas and we came to produce 10.5bcm. Under these circumstances, the exploitation of the field discovered by OMV Petrom and ExxonMobil would ensure the consumption of the domestic market for 8-9 years," NAMR President also pointed out.

Green Deal leaves deep scars

The European Green Deal of the European Union sets the most ambitious antipollution targets in history. The document shows that the European executive wants the EU to become by 2050 neutral in terms of greenhouse gas emissions and also by 2050 the economic growth to be decoupled from the use of fossil fuels. The reduction of the carbon footprint by 2030 with an outlook to 2050 aims not only at coal exploitation, but also the exploitation of other deposits, including natural gas. From this perspective, it would mean imposing restrictions in exploitation, which would make some fields uninteresting. But, for Romania, this is a major risk which, financially, it cannot afford.

Instead of conclusion: Legislation blocks investments

Eight years ago, in Neptun Block, in Romania's Black Sea territorial waters, the largest gas discovery was announced, a field estimated at 42-84 billion cubic meters of gas. Companies OMV Petrom and ExxonMobil, which hold equal shares in Neptun project, have so far postponed the start of investments, accusing a legal framework inadequate for investments of such scale. Finally, the US company ExxonMobil last year announced that it wanted to withdraw from this project and sell its stake. Several companies have shown interest in taking over this stake, but things are still far from being settled.

This year, amid the coronavirus pandemic and the economic crisis triggered by it, discussions on selling ExxonMobil's stake stagnated. ■

Helium: Fuelling the Future?

by **Evgenios Zogopoulos**

What is Helium? HELIUM, deriving from the Greek word 'Helios', 'Ηλιος', meaning 'Sun', and with the elementary symbol 'He' (in the elements periodic table) is a colourless, odourless gaseous element. Helium is considered one of the noble gases; how could it not be? It is the element of the Sun itself!
Helium has a peculiar and very interesting fact attached to it: it is the only element discovered out of Earth before it was discovered on our planet. It was eventually discovered and isolated around 1895 by Sir William Ramsay, a British chemist, who recovered it from a uranium-bearing mineral. It was concluded that it can usually be found in places where deposits of natural gas exist. The real difficulty lies with the fact that separation and extraction of helium from other gasses is a bit complicated.

The element has some unique qualities. Being non-combustible, helium is preferred to hydrogen as the lifting gas in lighter-than-air itself. Helium possesses 92% of the lifting power of hydrogen, although it bears double the weight of hydrogen. Liquid helium boils at approximately -268.93 Centigrade (4.2 Kelvin) and will not freeze at atmospheric pressure conditions. Solid helium will form when pressures above 20 times atmospheric are provided.

Liquid helium, due to its extremely low boiling point, can be used in cryogenic systems when temperatures below the boiling point of nitrogen are required. The way to cool down objects is to submerge them in liquid helium or liquid nitrogen. Liquid helium and nitrogen are usually stored in vacuum insulated flasks (we commonly know these containers as 'thermos'), officially called 'Dewars', named after their inventor, Sir James Dewar. Liquid helium is probably the coldest fluid that exists in nature. That being said, the unwanted substances that lie within liquid helium, or 'impurities', will be in a frozen, solid condition which makes it relatively simple to eliminate and get 'optically clean' liquid.

Within the cryogenics scientific community, they distinguish the different kinds of helium. The main distinction is between the two naturally occurring isotopes, Helium 3 and Helium 4. Helium 4 makes up over 99% of the natural Helium, therefore this is the Helium we refer to when we do not specify the isotope. Helium 3 (He3) is in fact the rarer isotope, and boils at 3.2 Kelvin, one degree less than Helium 4. Both isotopes can be cooled to below their boiling temperatures by regulating pressure, reaching points below atmospheric pressure. Liquid helium, behaves like water boiling at lower temperatures if pressure is lower.

But there is also the curious case of Helium 2, an extremely unstable - and still very interesting - isotope. In order to explain its strange behaviour, scientists established the two-fluid model. Helium 2 is depicted as a combination of two fluids: normal helium and superfluid helium. At temperatures just below the lambda point, the temperature at which normal fluid helium makes the transition to superfluid helium, the mixture is almost entirely normal. While temperatures are dropping, more and more of the substance becomes superfluid.

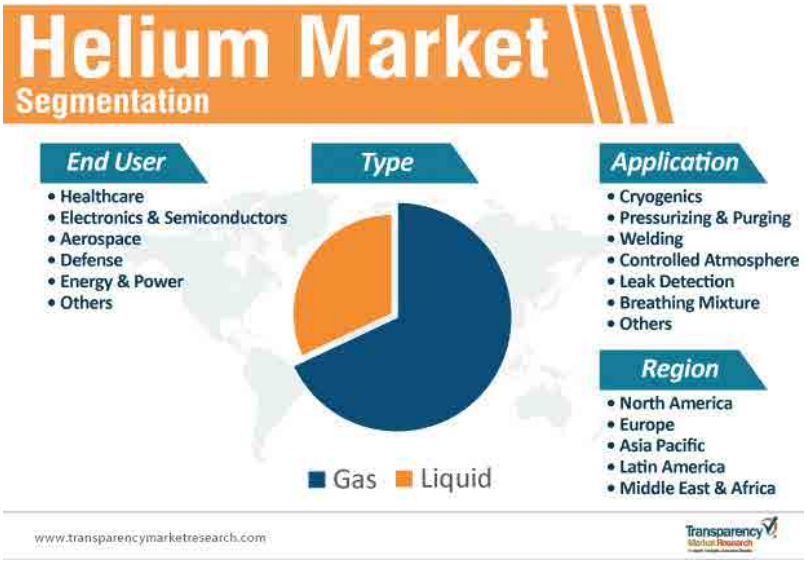
Here are some of the very interesting properties of the superfluid helium:

- It carries no thermal energy, which means no entropy;
- It has no viscosity, no thickness, and therefore is can be deformed instantly (flow through gaps, for example);
- It naturally 'seeks' heat, which converts the superfluid to normal. The flow of superfluid into any heated area will cool that area and restore the uniform mixture of normal and superfluid.

Applications and uses

There is no question as to whether an element with such unique properties can have useful applications. More specifically, Helium is absolutely vital for a wide range of activities and industries. For example, it is being used for rocket fuel pressurization purposes. It can purge semiconductor atmospheres, calibrate analytical instruments, inflate airplane tires and airbags. It can also be used to test for leaks in pipe systems, inflate large balloons for meteorological studies and let's not forget the inflation of smaller balloons for children parties.

More specifically, Helium is being used to pressurize and stiffen the structure of rockets before launching as it remains a gas even at the low temperature of liquid hydrogen; similarly, it pressurizes the fuel tanks in order to force the fuel



into the rocket engines. Because the tanks are so cold, other liquids would freeze and clog the system. Additionally, while other types of material could react badly with oxygen within tanks resulting to explosions, Helium is inert and won't combust.

Additionally, Helium is an excellent alternative to replace nitrogen as part of the synthetic atmosphere breathed by deep-sea divers, caisson workers, and others, because it reduces susceptibility to the bends. This artificial atmosphere is being used by doctors to relieve patients of severe respiratory conditions because helium is much more 'fluid' than nitrogen and can flow easier through constricted respirators.

Helium is usually transported in a gas form, compressed in steel cylinders. When it comes to larger amounts it is shipped as a liquid in insulated containers, saving shipping costs.

According to a U.S. Geological Survey report, almost 33% of the Helium the U.S. used last year went to cryogenics. Labs all over the world now, use liquid Helium to cool their instruments requiring extremely low temperatures. Those devices measuring magnetic fields for brain cell research need liquid Helium, for example, as do the world's most powerful magnets. Magnetic resonance imaging (MRI) equipment need liquid Helium to cool the superconducting magnets generating their magnetic field. Modern medicine needs MRIs to diagnose all sorts of diseases, while researchers use them for experiments across all sectors. Newer machines use less Helium but developing a magnet not requiring any Helium will take many years more and might not happen at all, according to the National Research Council.

As we mentioned, Helium is a very stable refrigerant, able to cool things down to extremely low temperatures, more effectively than anything else. For example, liquid Helium cools the superconducting machinery in particle accelerators, including several facilities in the U.S. and the Large Hadron Collider in CERN. Particle accelerators are usually many miles long and need cooling all along their length, thus requiring significant amounts of Helium. There is great efficiency in this application, as once an accelerator is filled with Helium it is able to continually reuse the refrigerant. The only need for refilling occurs due to the small amounts of natural leakage every year.

Helium is also important to Internet use as one of the methods of creating semiconductors requires liquid Helium to cool the magnets during the manufacturing process. Meanwhile, the fibre optic cables provide internet access and cable TV services need to be made in an all-Helium atmosphere to prevent bubbles from getting trapped inside.

Of course, there are also the military applications of the element. The U.S. military's submarine detectors use liquid Helium, and the U.S. Air Force uses Helium in experiments on superconductors as a power source. Balloons, not only the party ones, require Helium. For example, research balloons and Department of Defence survey balloons use Helium. The DOD is reportedly developing a Helium-filled balloon called JLENS that will be used for permanent surveying of U.S. skies for cruise missiles.

The next generation of nuclear power generators may need Helium as a cooling mean. U.S. labs are working on creating very-high-temperature reactors that would be safer, more efficient, more affordable and faster to construct. Scientists are not really certain yet regarding how much Helium a reactor would require. For more than four decades, scientists have been working on producing power from nuclear fusion rather than fission. In today's nuclear reactors, the hydrogen isotopes tritium and deuterium are used as fuel, with atomic energy released when they fuse to create Helium and a neutron. Nuclear fusion is actually duplicating the same energy source that fuels stars (like our Sun), and does not produce the radioactive waste as a by-product of current nuclear fission-generated power. However, the so-termed 'fast' neutrons released by nuclear fusion reactors fuelled by tritium and deuterium lead to significant energy loss, entropy, and are extremely hard to control. A potential solution could be to use Helium 3 and deuterium as the fuels in 'aneutronic' (neutrons-less) fusion reactors. Nuclear fusion reactors using Helium could therefore provide a very efficient form of nuclear power with virtually no waste and no radiation by-products.

Helium though is a non-renewable natural resource and is becoming scarce in the U.S., according to speakers at the U.S. Senate. The

U.S. has established a significant Federal Helium Reserve back in the 1920s but the amounts seems to be diminishing. To better meet demand, the Senate hearing considered a bill that would change how the reserve sells Helium. A Helium shortage would affect the U.S. in myriad ways, spanning from high-tech gear development to national security.

Harvesting the Solar System?

Just the thought of interstellar exploration and furthermore exploitation sounds like a science fiction movie. The truth is that Helium-3 (He3) is a gas that has the potential to be used as a fuel in future nuclear fusion power plants. The problem with that idea is that there is very little Helium-3 available on the Earth. With our current capabilities, it is produced as a by-product of nuclear weapons maintenance, which could provide us approximately an amount of 15 kilos per annum.

Early dreamers imagined that Saturn or Jupiter would be the ideal places to try and get their hands on some Helium-3, but it now appears that multiple governments have set their sights on the Moon, where it is believed that there could be significant quantities. The Moon could be offering a lot more than He3 though; to be more specific, it is believed that other than Helium there is an abundance of other raw materials like titanium. As our natural satellite lacks an atmosphere, it has been bombarded by solar winds containing He3 for billions of years. Some of the estimations lead to thoughts of more than a million metric tons of the isotope on the lunar surface. These resources could be extracted by heating the lunar dust to around 600 degrees Celsius, before bringing it back to the Earth to fuel the innovative nuclear fusion generators. Only that amount, given the right conditions, could fuel humanity for thousands of years.

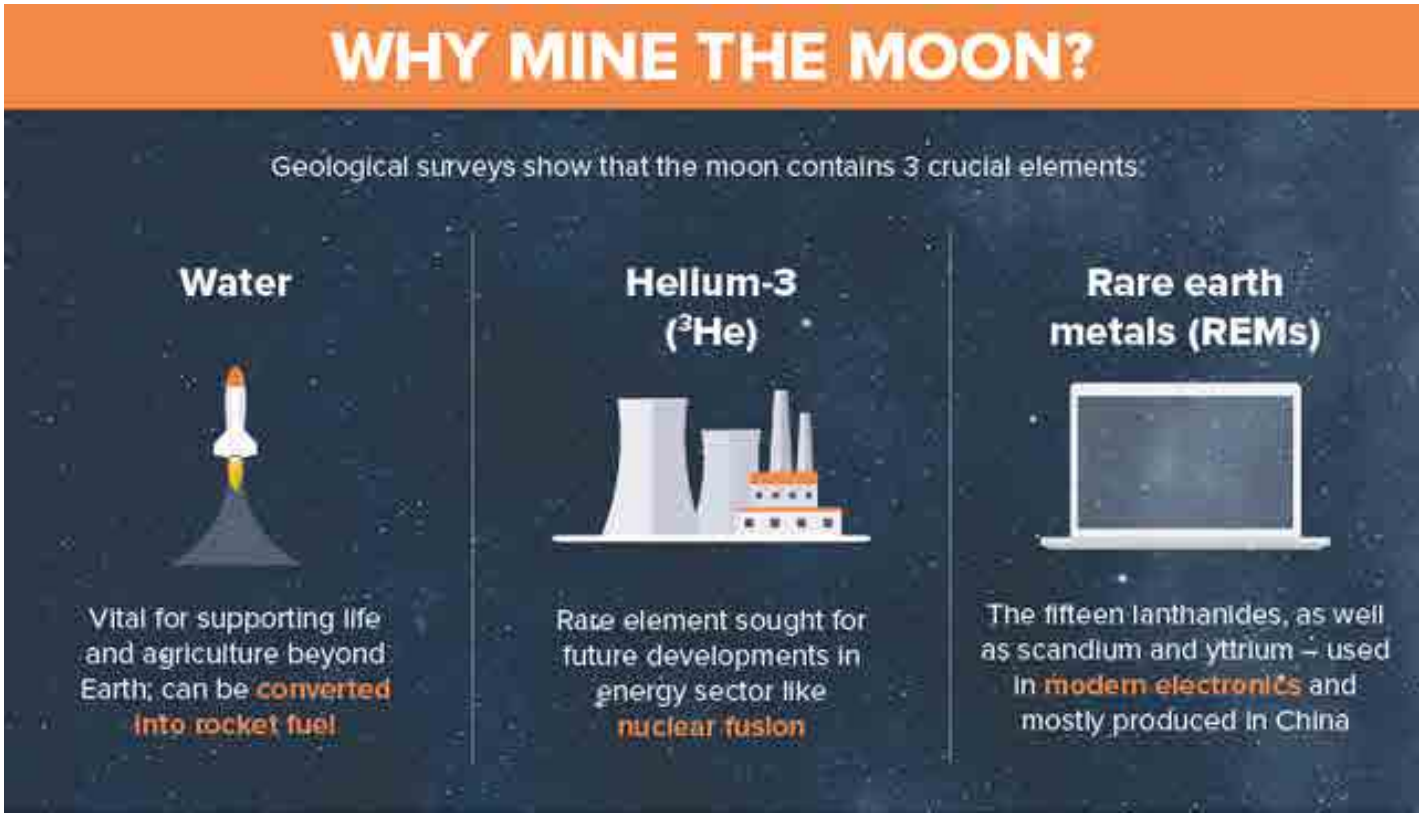
To provide a more specific example, an Artemis Project memo indicates that a fully loaded Space Shuttle cargo of He3 could power the United States of America for about a year. This means that this resource could have a valuation of up to 3 billion dollars per ton. That is definitely motivating enough for anyone in the public or private sector.

The sun is a natural fusion generator but it is massive and the gravitational forces provide ample energy for fusion to take place in the star's core. Fortunately, or unfortunately, such forces cannot be reproduced by us. Therefore, even if we do eventually start harvesting the solar system, and more specifically the Moon, we do have some Earth-bound technical challenges. The most advanced fusion programs in the world are inertial confinement and magnetic confinement fusion. For both of them, there is no projection for commercial power generation before the next 30 years. The immense cost of such reactors (like ITER and National Ignition Facility) are due to their enormous size, and there is already a projected need to build even larger ones. More superficially, the reaction rates of He3 fusion are not high enough, indicating that a larger reactor might be needed.

As a workaround, a number of other types of reactors have been proposed, though many of them remain theoretical and have indeed fundamental challenges with achieving a net energy gain. It seems for now that the amount of energy we need to achieve He3 nuclear fusion is more than the energy we receive in return.

Lunar-politics?

As noted above, several of the global powers have made announcements that they are either actively considering or would like to go to the Moon and mine Helium-3. Whether the science will actually work or not, it is almost irrelevant at this point. No-one can dismiss the potential of lunar Helium-3 power generation or the rest of the Moon's resources.



While there are international treaties regarding the notion of exploiting the Moon, they are probably laughable obstacles to a regime like China which is about to go and get their own lunar Helium-3. At the dawn of the 21st century, and while many dismiss that we ever landed on the moon (implying that the space-race was a gambit-hoax of the US to bankrupt the USSR) few could have predicted a second race for the moon so soon. The current race though, will not be like the one from the 1960s, as a full list of global players, including China and India are taking part.

NASA's Vision for Space Exploration included 'boots on the ground' within 2021 and permanently establishing a permanent base there by within the decade. While the U.S. have not officially declared any intention to mine Helium-3, there are strong voices within the agency (NASA) advocating for it.

Russia, on the other hand, through Nikolai Sevastyanov (head of the Russian space corporation Energia) had claimed they would have a base on the Moon by 2015 with He3 mining operations and industrial-scale Helium-3 production by 2020. This is not going to happen apparently, and it might be a play to force the U.S. into spending much more for that purpose (-ironic, right?)

On a more serious note, China landed a robot vehicle on the Moon, back in 2013, successfully completing the 'middle' stages of its Lunar Exploration initiative. It was planned that before 2017, the fifth and final stage of the program would come back with lunar material. Apparently, their Chang'e lunar probe series is delivering some solid progress! Chang'e 5-T1 just completed its transfer from the Earth-Moon Lagrange Point 2 back to a stable orbit around the Moon, which is significant enough. The next mission objectives will be to bring back the first samples of fusion-ready He3.

India is following decisively. India's president, among other government officials, clearly stated their country's interests in deploying enormous solar collectors in orbit and on the lunar surface. They have also shown interest in He3 mining. At the same time, other players like Japan and the EU are talking about launching their own missions, and about the possibility of mining He3 as well.

Back to Earth

Meanwhile, and back to Earth, the U.S. seems determined to continue its efforts to extract more terrestrial helium. The U.S. Geological Survey found Qatar and Algeria could have major helium deposits, but because a domestic supply would be much

cheaper, it seems to be the most cost-effective solution.

"It's highly unlikely if the United States does not make advances to seek out new gas-bearing fields for helium," officials have stated referring mainly to quantities allegedly found in several states like Wyoming, Utah and Arizona.

Advocates of He3-based fusion highlight that the current efforts to develop fusion-based power, like the humongous ITER project, use the deuterium-tritium fuel cycle, which is fundamentally problematical. Deuterium and tritium are hydrogen isotopes, and when they're fused in a superheated plasma, two nuclei come together to create a helium nucleus–consisting of two protons and two neutrons–and a high-energy neutron. A deuterium-tritium fusion reaction releases 80% of its energy in a highly destructive stream for anything that stands in it way, including the reactor itself. Not very efficient or stable. Due to this extreme danger, containment a huge challenge. Even if we do figure out an effective way of containing the damage, it will not be efficient due to the constant need of materials replacement. On top of that, there is also the problem of what happens after the reactor's decommissioning and its subsequent radioactive waste.

He3 advocates claim that it will be non-radioactive, alleviating some of these challenges. There is also the contrarian view that He3-based fusion is not and will not be feasible. A prominent theoretical physicist at Oxford University, Frank Close, has published an article called 'Fears Over Factoids' where he dismisses the He3 dreams as a fantasy. He indicates that in a 'tokamak' (a piece of machinery that generates a magnetic field in order to confine the superheated plasmas necessary for fusion) deuterium "reacts up to 100 times slower with Helium-3 than it does with tritium". In simpler words, he claims that, even if we manage to bring back Helium-3 from the moon, in a standard tokamak the final result will still be deuterium-tritium fusion; so, no change at all. Close also dismisses the claim that we can artificially reproduced anything close to the conditions within the Sun's interior so he stated that: "the lunar-Helium-3 story is, to my mind, moonshine."

Close's objection is primarily based on the assumption that He3 fusion would take place within tokamak-based reactors. To this point, Gerald Kulcinski, a professor of nuclear engineering at the University of Wisconsin, may have an answer. It seems that he has developed the world's only He3 fusion reactor with a less than 1M dollars budget. Kulcinski's reactor, located in the Fusion Technology Institute of the University of Wisconsin, contains a spherical plasma roughly 10 centimetres in diameter that can generate sustained fusion with 200 million reactions per second. Some of the challenges discussed above still apply though: in order to produce a milliwatt of power, it requires a kilowatt of consumption. Close's response comes to confirm his points: "When practical fusion occurs with a demonstrated net power output, I–and the world's fusion community–can take note."

Kulcinski claims that it is still an ongoing learning curve: "We are doing both deuterium-He3 and He3-He3 reactions. We run deuterium-He3 fusion reactions daily, so we are very familiar with that reaction. We are also doing He3-He3 because if we can control that, it will have immense potential. If we used a tokamak to do deuterium-Helium-3, it would need to be bigger than the ITER device, which already is stretching the bounds of credibility. Our IEC devices, on the other hand, are tabletop-sized, and during our deuterium-He3 runs, we do get some neutrons produced by side reaction with deuterium."

A significant upside in Kulcinski's experiments seems to be the He3-He3 fusion reaction that they produce with their IEC-based reactor. In those experiments, two helium-3 nuclei, instead fuse to produce one helium-4 nucleus, consisting of two protons and two neutrons, and two highly energetic protons. Kulcinski says that "He3-He3 fusion has the greatest potential." That's because He3 is nonradioactive, which alleviates the need for the massive containment means. On top of that, the protons it produces be exploited using electric and magnetic fields, which in turn generates electricity directly.

Still, Kulcinski's approaches and successes can only prove the theoretical feasibility of He3-He3 fusion, without any practical and commercial applications within the foreseeable future. That is very hard to advocate for. Meanwhile, he is deeply concerned by the total lack of support and the miscoordination of the public sector. He states: "the NASA folks tell us, 'We can get the helium-3. But you'll never get fusion to work.' While the Department of Energy does not believe fusion is possible. So, DOE doesn't think NASA can do its job, NASA doesn't think that DOE can do its job, and we're in between trying to get the two to work together." His funding so far originates in the private sector.

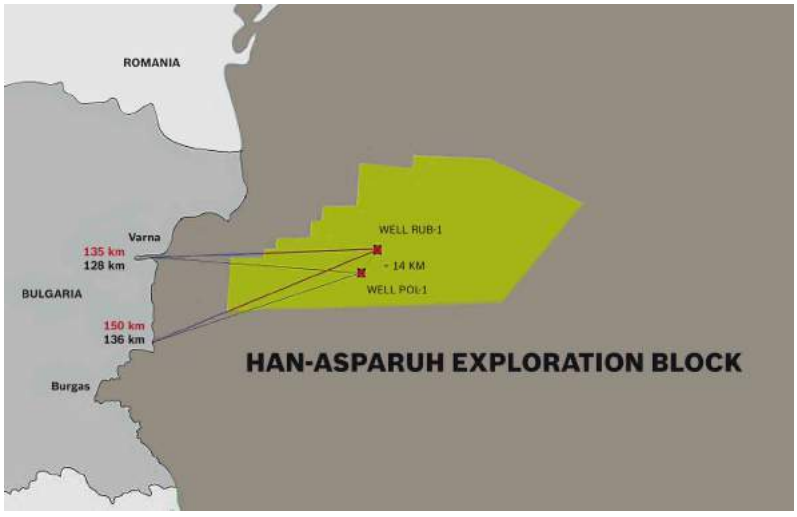
Conclusion

Overall, Helium seems to be an immensely interesting subject bearing incredible opportunities and upside potential. It seems to be the next big thing no one has ever heard about. Global superpowers, the private sector and the scientific community seem to be altogether entangled in a curious story of interstellar harvesting, nuclear fusion and interplanetary gambits; all this is happening due to an element which most people believe is only good for inflating children's party balloons.

Truth is that this potential comes with immense challenges and we can only make projections deep into the future; that being said, it seems that Helium might be able to offer us a little more than just party balloons. ■

OMV Petrom Enters Han-Asparuh Offshore Block in Bulgaria

OMV Petrom, the largest energy company in South-Eastern Europe, completed the transaction for the acquisition of 100% of the shares in OMV Offshore Bulgaria GmbH from OMV Exploration & Production GmbH and enters the Han-Asparuh exploration block in Bulgaria. Following Repsol's exit, the Bulgarian regulator approved the allocation of Repsol's 30% participating interest to the remaining two partners.



Thus, OMV Petrom's share in the block, via OMV Offshore Bulgaria GmbH, is now 42.86%, alongside Total (57.14%) being the operator.

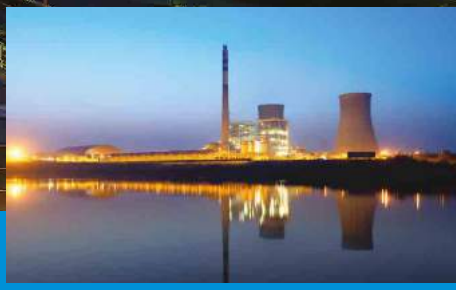
"This acquisition is an important step in our strategy to expand our Upstream operations in the region. OMV Petrom has been active in the Black Sea for over four decades as operator and has gained valuable deep-water experience as non-operator in the adjacent Neptun Deep license in Romania," Peter Zeilinger, member of OMV Petrom Executive Board, responsible for Upstream, stated.

In 2012, the Bulgarian Government awarded the Han-Asparuh exploration block to the consortium of OMV (30%), Total (40%) and Repsol (30%).

Han-Asparuh is located in the western Black Sea in Bulgaria, south of the Neptun Deep Block in Romania and has an area of 13,819 km^2 with maximum water depths of over 2,000 m. Exploration activities started in 2012 and included geological and geophysical surveys and the drilling of three exploration wells. An extensive 3D seismic campaign was finalized in May 2020 covering 5,614 km^2. The seismic data are currently being processed, and, based on the results, future exploration activities will be undertaken by the joint venture.

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 deep-water 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.



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Maintaining Energy

EBRD Invests EUR 20mln in Vestmoldtransgaz

The European Bank for Reconstruction and Development (EBRD) has invested EUR 20mln as part of the capital increase for Vestmoldtransgaz, operator of the newly built Ungheni-Chisinau gas transmission pipeline, within an action aimed to support Moldova in its goal to increase energy security.

Set up in 2014, Vestmoldtransgaz owns and manages the gas pipeline network in the west of Moldova and provides gas transmission services in Moldova. In 2018, it was taken over by Eurotransgaz, a subsidiary of Transgaz, company which operates the Romanian gas transmission system.

The Ungheni-Chisinau gas transmission pipeline, with a length of 120km, will soon become operational and complete interconnection of gas transmission systems in Romania and Moldova by connecting Chisinau to the Iasi-Ungheni interconnection pipeline, between the eastern Romanian city of Iasi and Ungheni, a Moldovan city, at the border with Romania.

The Ungheni-Chisinau gas transmission pipeline will allow Moldova - a country which depends on energy imports at a rate of 90% - to diversify its energy sources.

"As you are aware, in March this year Transgaz and EBRD signed the Memorandum of Understanding on cooperation and support for investments in the energy sector of Romania. The transaction concluded between EBRD and Vestmoldtransgaz (VMTG), Transgaz's subsidiary in the Republic of Moldova, is yet another confirmation of the active partnership between EBRD and Transgaz, a partnership which expresses the bank's interest in supporting Transgaz's strategic investment program in order to develop the interconnection of gas networks in the region, leading to the improvement of safety and security in supply and to the diversification of gas sources. EBRD has assisted VMTG in terms of environmental and social component for the Ungheni-Chisinau gas pipeline project, making sure that the highest standards are observed in the implementation of this project. Between Transgaz and EBRD there is a successful collaboration regarding financing for investment projects and we are convinced that this transaction will contribute to the long-term development of the gas transmission sector in the Republic of Moldova," said Ion Sterian, General Manager of Transgaz.

"The most eagerly awaited project for the energy security and independence of the country has been completed. I am glad to announce you particularly that construction works at the Ungheni-Chisinau gas pipeline have been completed. I take this opportunity to express my gratitude to the Romanian Government, Transgaz and all partners for the successful involvement in this strategic project for the Republic of Moldova," stated Sergiu Railean, Minister of Economy and Infrastructure of the Republic of Moldova.

"This interconnection will increase Moldova's energy security by diversifying gas supply sources, an essential condition for the economic development of the country. The project also helps integrate Moldova in the future major gas infrastructure projects, such as the Trans-Adriatic Pipeline (TAP), as well as the gas sources from hubs in Central Europe, and connects it to Black Sea gas fields. Increasing the degree of integration of European gas markets will allow competition to develop beyond borders, generating important

"The most eagerly awaited project for the energy security and independence of the country has been completed. I am glad to announce you particularly that construction works at the Ungheni-Chisinau gas pipeline have been completed. I take this opportunity to express my gratitude to the Romanian Government, Transgaz and all partners for the successful involvement in this strategic project for the Republic of Moldova," **stated Sergiu Railean, Minister of Economy and Infrastructure of the Republic of Moldova.**

economic benefits for consumers," added Mr. Alain Pilloux, EBRD Vice-President.

Building Ungheni-Chisinau gas transmission pipeline, worth EUR 90mln, was also supported by a loan of EUR 38mln from the European Investment Bank (EIB) and Eurotransgaz's own capital investment.

In 2016, EBRD offered to support the project with a loan in favour of the Government of the Republic of Moldova. After Vestmoldtransgaz privatization, financing was cancelled and funds were provided in the form of working interest in this company.

EBRD is the main institutional investor in Moldova. Since the beginning of its operations in this country, the Bank has invested over EUR 1.3bn in 134 projects in the financial, agro-industrial, energy, infrastructure and production sectors in Moldova.

Background

On April 24, 2019, Transgaz announced that it had signed all contracts necessary for the construction of Ungheni-Chisinau pipeline, the order for the commencement of works being issued on May 2, 2019.

The completion of Ungheni-Chisinau project, declared of national interest in the Republic of Moldova, involves the construction of a gas transmission pipeline with a length of 120km, three gas delivery stations (two in Chisinau and one in Ungheni) and equipping the steering and dispatching centre in Ghidighici.

RESPONSIBLE CONSTRUCTION AT ALL TIMES: UPDATE FROM CLARIANT SITE

Bilfinger Tebodin is providing EPCM services for a commercial-scale plant for the production of 2nd generation bioethanol from agricultural residues. Clariant, a focused, sustainable and innovative specialty chemical company, is building it in the Craiova region of Romania. Here is the newest update from the construction site.

Unique design carried out responsibly

The new plant will be the first 2nd generation bioethanol sunliquid plant of this size in the world.

"The construction of this advanced bioethanol plant is unprecedented for us, this will allow both us and Clariant to boost the experience and knowledge, be among the front-runners and enable us to implement lessons learned in the followup plants to come," says Jorg Gerritsen, Project Director at Bilfinger Tebodin.

On behalf of Clariant, Bilfinger Tebodin provides the complete EPCM scope (engineering, procurement, construction and project management) utilizing the force of an international team of colleagues based in the Netherlands, Romania, Poland, Czech Republic and Ukraine. Bilfinger Tebodin is in charge of overall planning, engineering, contracting, site management and supervision of the bioethanol plant.

Since years ago, Bilfinger Tebodin has developed its systems to working remotely using all required software, the current Covid-19 pandemic has been managed with a minimal disruption to the site works. The worldwide switch from working at the office to working from home caused some problems for many businesses, whereas Bilfinger Tebodin was able to make a smooth transition with regular communication through video calls and all documentation on shared platforms. These systems have been in place and used regularly for a number of years. The final outcome is a

Special procedure for unloading of trucks is in place, respected and controlled by all parties.

Quarantine for the goods that come from abroad remains in place

Site desinfection and special access procedures

full transfer of information between design offices, the site and clients' offices, ensuring quick decision making and allowing the project to progress as planned.

Bilfinger Tebodin is an engineering and consulting company, which is managing industrial projects for 75 years worldwide. It manages the project for Clariant in Romania since 2019. The design is nearly completed and right now the construction works are ongoing. The installation of tanks at the first-of-its-kind cellulosic ethanol plant has recently started.

Managing the construction during a pandemic

As a site supervisor, Bilfinger Tebodin cooperates closely with Clariant to coordinate the work of different contractors (civil, mechanical, electrical and instrumentation) as well as to check the quality of work, and takes care that all the safety rules are implemented and respected.

"Probably, no one can be 100% ready to deal with such an emergency as Covid-19 brought suddenly in 2020. Important is how quickly and professionally you react to this," says Ion Soare, HSE Manager at the Clariant site. "On March 16, 2020, the same day when the National Emergency Situation was enforced in Romania, we developed two scenarios together with Clariant to manage the situation and were ready to act however the situation develops."

The two scenarios that were developed are as follows:

1. Business Continuity Plan to ensure the work continuity. The plan establishes clear measures, responsibilities, and deadlines for all parties involved: client representatives, Bilfinger Tebodin employees, and contractors.
2. Site Emergency Closing Plan in case the site needs to be closed due to an infectious case, or by the authorities' decision to may stop the construction activities as happened in other European countries. This scenario also covers decisive measures on how to preserve the site in case of closure.

Fortunately, the construction was not stopped for any period of time. "I consider this as the result of the combined efforts of Clariant, Bilfinger Tebodin, the civil contractors, and workers safety-respective behavior," says Ion Soare. "Basically, Bilfinger Tebodin in this situation acts as a stable bridge, connecting our own safety procedures, client corporate requirements and governmental regulations into one working and safe process at the site, taking into account the worldwide project experience."

Apart from keeping the general precaution measures like wearing masks, having disinfectant liquids available, and keeping 2 meters distance, there are additional steps HSE undertook to keep the site safely operating. Such steps included logistics issues, e.g. handling incoming goods from countries outside Romania, and goods quarantine, travel policy and site access.

Disinfectant is used for all common spaces. Workers are split into teams and the spaces for taking lunch breaks are enlarged in order to keep the safe distance. HSE manages the site situation from special access procedures (like visitors' and workers' temperature measuring) up to creating conditions for workers' accommodation near the site.

Bilfinger Tebodin safety team is present on the Clariant site to ensure on behalf of Clariant that all the requirements of Project HSE Management System are implemented and respected by all contractors in pandemic and normal time.

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Calik Enerji to Construct Petromidia New Cogeneration Plant

On August 19, the Kazakh-Romanian Energy Investment Fund (FIEKR) signed with Calik Enerji (Turkey) the EPC (Engineering, Procurement and Construction) contract for the turnkey construction of the cogeneration plant on the Petromidia platform. FIEKR is owned by KMG International and the Romanian State through Societatea de Administrare a Participatiilor in Energie - SAPE.

The total investment of the fund in this project amounts to about 148 million USD, the estimated term for the commissioning of the new plant being in the first half of 2023. The project will generate about 11 million USD in taxes paid to the state budget each year.

The activities will start in the last quarter of this year, the first phase aiming land preparation and engineering works.

"The new plant will have a major role in stabilizing the production and distribution of electricity in the Dobrogea region, by ensuring the energy needs of the platform, but also by injecting the surplus electricity into the national system. We want this investment and implicitly the contribution of 'state of the art' technology to be an example for attracting new investors, continuing the program of construction and modernization of production units, reducing energy imports and improving Romania's position in the regional energy market," says Virgil Popescu, Minister of Economy, Energy and Business Environment.

Recently, the Fund completed the general contractor extensive evaluation and selection process, taking into account, mainly, the capacity of interested companies (similar projects completed in the last 10 years - at least 3 projects, the existence of similar ongoing projects, solid financial situation, letters of recommendation, qualified personnel, etc.), the technical criteria and proposals, as well as their financial offers.

In this race, 17 international companies were invited, with experience in implementing similar projects, and 9 of them expressed their interest to become General Contractors or suppliers of equipment and technological solutions for this investment project.

"It is an important moment in the evolution of the strategic partnership between KMG International and the Romanian state through the Energy Investment Fund. It reflects the commitment and involvement of the two parties in continuing the investment program in the Romanian energy sector. The new plant will meet the highest technological, energy efficiency and environmental protection standards," says Beimbet Shayakhmetov, CEO of KMG International.

The new combined electricity and heat production plant will use natural gas as the main fuel and will have two high-efficiency, high-performance Siemens turbines and two heat recovery boilers in the technical configuration. They will generate about 80 MW of electricity, of which about 60-70 MW to fully cover the Petromidia platform's electricity needs, up to 180 tons/hour of technological steam, and up to 20 MW of hot water for Navodari's heating system.

Through the programs of modernization and increasing the efficiency of units and production flows within Petromidia refinery, KMG International has undertaken a constant reduction of electricity consumption. Thus, the surplus generated by the new plant will be sold domestically and will provide additional income for the investment vehicle (SPV) - Rompetrol Energy.

Rompetrol Energy is majority owned by the Kazakh-Romanian Energy Investment Fund, together with KMG International, Rominserv and the Midia Thermal Power Plant.

With a duration of 7 years, the Kazakh-Romanian Energy Investment Fund was established in October 2018 by KMG International and Societatea de Administrare a Participatiilor in Energie, its main and strategic objective being the development of energy projects in Romania.

Currently, the total level of investments of the Fund for approved energy projects amounts to 290 million USD.

About Calik Enerji

Since its establishment in 1998, Calik Enerji has become one of the world's leading energy companies, bringing the energy of nature to the service of people through successful projects conducted across a wide geographic area encompassing the Middle East, Central Asia, Africa and the Balkans in order to create a better and sustainable future. Calik Enerji conducts operations in every field of the international energy sector with its specialized and experienced professionals, generating creative and innovative solutions based on the use of state-of-the-art technologies.

Microplastic - The Invisible Enemy

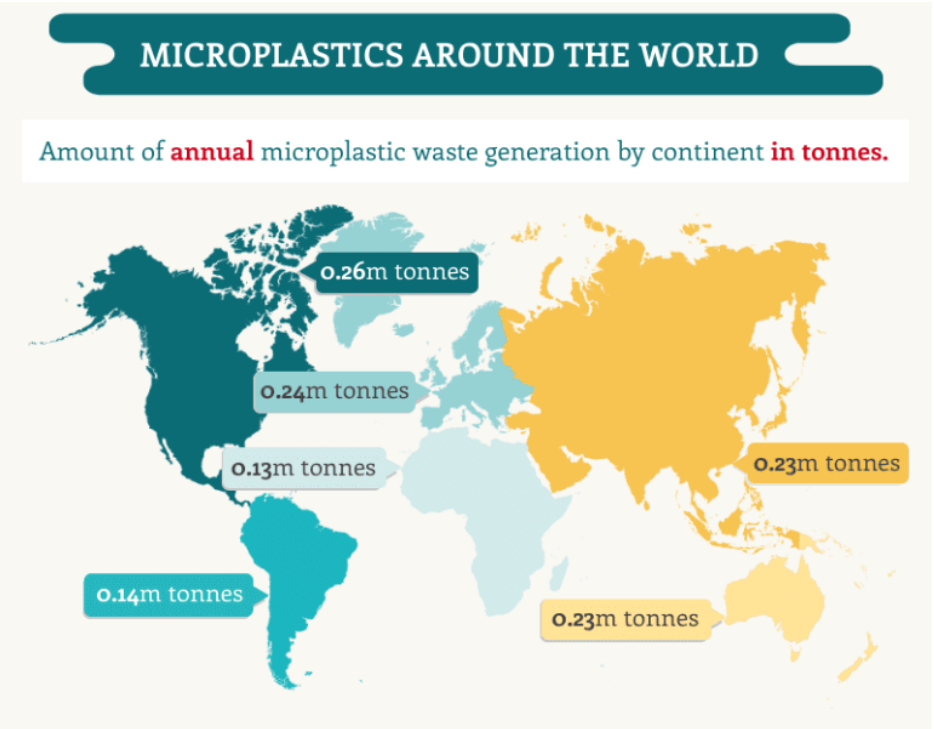
How worried should we be about microplastic? Beyond global warming, considered as the main adverse effect of human activity, the human race still has to fight with an enemy created by itself: plastic. Seen, over a hundred years ago, when it was invented, as an innovative material for a wide range of industries and with multiple uses, plastic has become one of the enemies of the existence of life on Earth and not without cause. Traces and components of plastic are currently found anywhere, from the peak of the highest mountain to the bottom of oceans, from the thickest forest to the driest desert. Of course, plastic is not to blame that it is found everywhere, but it is the fault of humans and their neglect. We see everyday pictures, photos, videos and documentaries showing what ignorance does when we rather leave garbage everywhere, instead of taking it to the trash. Wild animals tangled in fishing nets, birds that can no longer spread their wings because they are trapped in a plastic bag, turtles unable to eat because of a plastic straw stuck in their mouth etc. But this plastic is the visible enemy, which one can remove. No less dangerous is the invisible enemy - microplastic.

by Carol Dan

Eliminating or reducing pollution is one of the most debated topics in almost any part of the world and is undoubtedly one of the biggest challenges of the moment. Moreover, the European Union (EU) is, of all the political and economic organizations on Earth, the mouthpiece of environmental protection, elimination of pollution, use of only energy obtained from sources considered, sometimes erroneously or intentionally erroneously, non-polluting.

The European Commission (EC) classifies microplastics (particles smaller than 5 millimetres decomposed from plastic objects) into two types, primary and secondary. About the primary type says it comes, at a rate of 35%, from washing clothes made of synthetic materials, while other 28% is produced from the abrasion of car tires while driving. But not only car tires are to blame, but also those of scooters, bicycles, and virtually any machine or vehicle equipped with rubber wheels. Electric or at least hybrid cars are seen as means to reduce pollution, but they aren't. The enthusiasm of electric cars apostles is however appeased by researchers, who say that even these redemptive vehicles will pollute with microplastic from brakes and tires. Of course, new standards will be sought for the production of tires, but the movement that supports the elimination of private cars has more and more supporters.

In 2015, MEPs called for measures to reduce or even eliminate factories of clothes from synthetic materials, but given that the issue of plastic pollution is global, China or India should also be persuaded to join this objective. But it seems something more difficult to do than issuing a new European directive. Secondary microplastics come from the degradation of plastic objects such as bags or bottles (PETs) of water or juice. Most microplastics in the world's oceans are caused by these objects. There are also plastics deliberately introduced in some products, such as shower gel, toothpaste, sunscreen or lipstick, or in various fertilizers used in agriculture, which also contribute 2% to global pollution with this type of material. In fact, the European Chemicals Agency (ECHA) claims that these plastics intentionally added to various products cause an annual pollution of 36,000 tons of microplastics in the EU. The problem is that they penetrate even into the tissues and organs of animals, as well as into human bodies, and even into their bloodstream.



Moreover, last year ECHA proposed the elimination of these intentionally added microplastics within five years, and in June this year the Risk Assessment Committee gave the green light to this plan. Next year, Member States are expected to vote on this proposal, and the restriction on the use of added microplastics would come into force in 2022. The term may seem very short, given the sluggishness with which such a large bureaucratic body as the EU sometimes deals with some issues, but perhaps the explanation lies in the fact that there is already a replacement for these microplastics.

However, pollution with these substances is much higher than previously thought. A study conducted off the coast of the United Kingdom (by the way, London is the most polluted city with microplastics in the world), and the United States concluded that in the oceans there are 12 - 125 trillion plastic particles, not 5 - 50 trillion as previously thought. Ingested by marine animals, these particles inevitably reach the bodies of the species at the top of the food chain. In fact, every year 330,000 tons of microplastics arrive in the environment, and they contribute from 15% to 31% to plastic pollution globally. No more, no less, people consume on average at least 50,000 microplastic particles per year and inhale a similar amount, and the actual number could

be much higher, according to the first study of this kind conducted so far. Scientists estimate that an adult consumes about 50,000 microplastic particles a year, and a child about 40,000. However, the health impact of ingesting microplastics is still unknown. That is if these adults and these children do not drink water at all. Because if they drink water, the amount of microplastic ingested increases enormously. According to researchers' studies, bottled water contains 22 times more microplastic than tap water. A person who drinks only bottled water would consume 130,000 particles per year from this source alone, compared to 4,000 for tap water.

In the absence of action, the outlook is not very exciting. It is estimated that by 2040 the world's oceans will contain three times more plastic than at present. That is, 660 million tons compared to 165 million tons now, the equivalent of 50 kilograms of plastic for every square meter of beach. However, how can we get rid of this problem that we humans have created and that seems to have gotten out of hand? If we left it where we find it thrown in nature, the plastic would take up to 1,000 years to decompose, but with the risk of leaving behind the toxic substances from which it was made. Some put their hopes in plastic-eating larvae, which are actually parasites of beehives. Others believe that recycling is the solution to stop the plastic pollution of the planet, but this is not a 100% infallible process either, because not every plastic can be recycled. We might hope that education will solve the problem or at least part of it, but it would be a far too risky bet for the entire planet. There is a chance to reduce plastic production, but it is expensive. If each company used the latest available technologies in its production processes, plastic pollution would be reduced by 80% by 2040. This would involve expenses

of USD 600 billion, but without government subsidies it is hard to believe that companies will have that money.

Romania and plastic waste

Romania, a country where superpowers such as Germany export hundreds of trucks of plastic waste for sorting and recycling, stands out again. Beyond the fact that recycling leaves much to be desired, despite all the commitments made to Brussels, the Danube pours 4.2 tons of plastic into the Black Sea every day, i.e. over 1.5 million tons per year, and each cubic meter of water contains nine microplastic particles. And, for this reason, the Black Sea contains, after the Mediterranean Sea, most marine waste in the entire EU. 90% of this waste is plastic, and 85% of it is PET and disposable bags, according to the European Commission, which aims to completely eliminate plastic pollution of the seas by 2030.

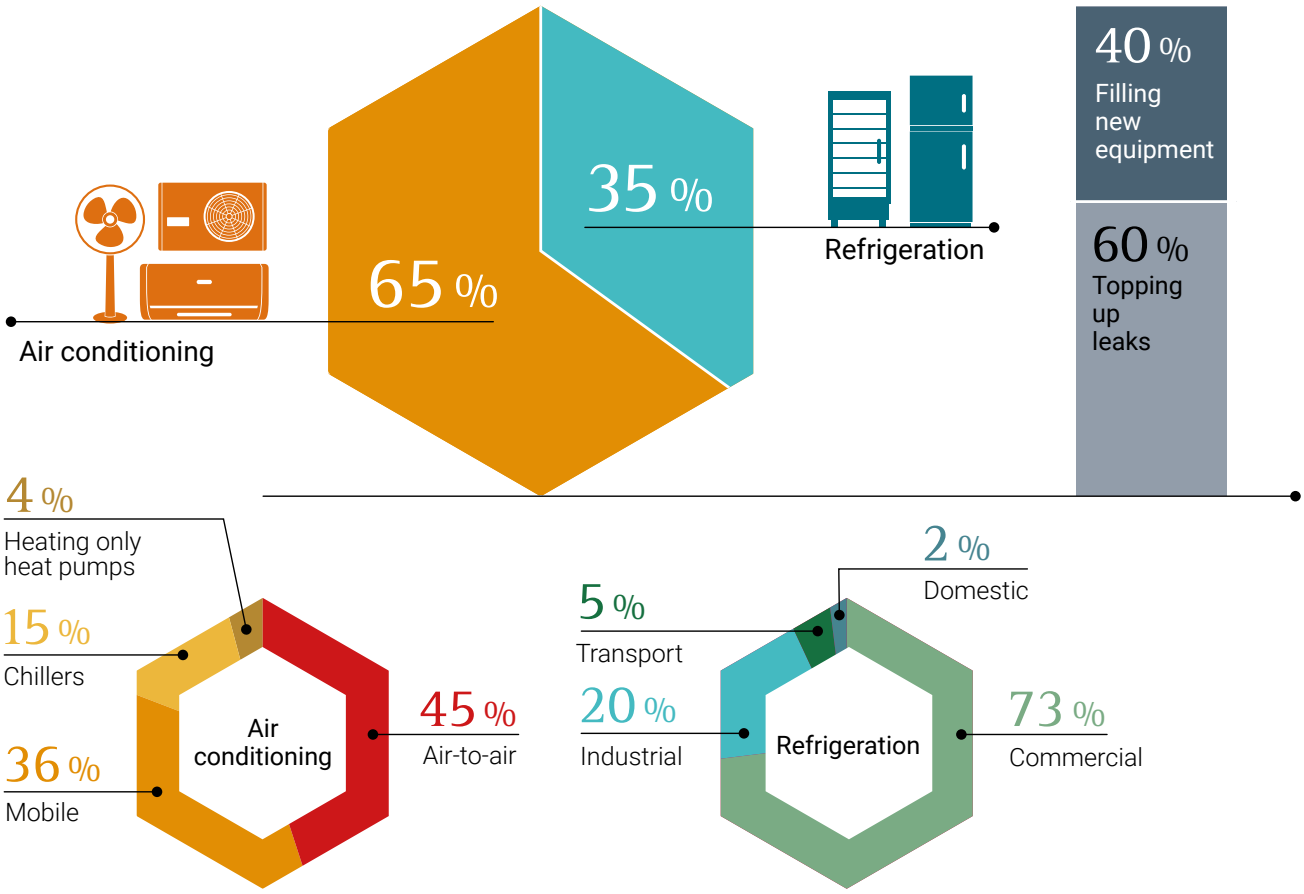
Legislation to reduce pollution

Following the ban on thin and very thin plastic bags from January 1, 2019, the EU is trying to limit the production and marketing of other plastic products, in the hope that it will reduce pollution from these materials. The European Commission has also raised the issue of banning plastic or recycled plastic packaging, but the measure could be too drastic for the EUR 10 billion market of production of these plastic items. But it is complicated or even impossible to reduce plastic pollution as long as you continue to produce that plastic. The same is true with the attempt to reduce pollution caused by cars. That is, there is already a protest vote on diesel, seen as a polluting fuel. A kind of coal for car fuels. On the other hand, the major car manufacturers do not give up the manufacture of diesel engines. Then, how do we want to achieve our goal? Or, in fact, we don't even want to achieve our goal, but just make some noise? However, other EU measures seem more feasible, namely the ban on disposable plastic items which, when thrown into the nature, make a significant contribution to microplastic pollution. The list of these unwanted items consists of nine categories of disposable plastic products, namely ear sticks, cutlery (forks, knives, spoons, Chinese chopsticks), plates, beverage straws, beverage stirrers, balloon sticks or sticks supporting balloons, food containers made of expanded polystyrene (cans, lids), beverage containers made of expanded polystyrene (corks and lids), expanded polystyrene glasses, including their lids.

This decision was made by the EU in May 2019, and Member States have until 2021 to comply. If not, derogations may be granted at any time. Or fines. ■

Streamlining Air Conditioning: CO2e Emissions to Drop by up to 460bln Tons

Global HFC use as share of total on GWP-weighted basis for stationary and mobile refrigeration, air conditioning, and heat pump sectors in 2012.



Source: UNEP 2015c

Air conditioning systems of vehicles emit annually, at global level, around 420 million tons of CO_2 equivalent emissions ($MtCO_2e$). This quantity is estimated to increase to 1.3 giga tons of CO_2 equivalent ($GtCO_2e$) by 2050, in absence of new measures to limit emissions, according to a report by the International Energy Agency (IEA). By increasing the efficiency of air-cooling industry, in the following four decades, at global level, CO_2e emissions could drop by maximum 460 billion tons, a quantity equivalent to eight times the greenhouse gas emissions emitted in 2018.

by **Adrian Stoica**

However, even if by 2050 the number of heavy vehicles in traffic is expected to increase significantly, polluting emissions coming from the air conditioning systems could drop by 20% compared to the current level, following the improvement of efficiency and switching to the use of refrigerants with a low GWP (Global Warming Potential) index. This index, which is a relative measure, indicates the degree of warming of a greenhouse gas in the atmosphere. As of 1 January 2017, the use of all fluorinated greenhouse gases with a GWP greater than 150 in new vehicles placed on the market in the European Union has been completely banned. Globally, air conditioning systems on light vehicles consume between 3% and 7% of total fuel consumption, but can reach up to 40% in areas with hot or humid climate.

Reduction of CO_2e emissions by up to 460 billion tons of CO_2e involves reducing the carbon footprint with a value between 210 billion tons and 460 billion tons and streamlining air conditioning systems and moving to refrigerants with zero impact on the environment.

Additional costs of USD 2,600 billion

Access to the air-cooling systems contributes to the reduction of losses of good and waste quantities, stimulating food safety and reducing the related emissions. The Food and Agriculture Organization of the United Nations (FAO) estimates that wasting food and waste cause up to 8% of total greenhouse gas emissions, and eliminating them would reduce costs by up to USD 2,600 billion per year.

The lack of adequate cooling chains is responsible for about 9% of lost perishable food production in developed countries and 23% in developing countries. Under these circumstances, changing consumer behaviour, improving access to the air-cooling industry and agricultural practices would avoid the release into the air of 93.7 $GtCO_2e$ between 2020 and 2050, of which the potential impact of improving the cooling chains could be 19-21 $GtCO_2e$.

15 Billion units operational by 2050

Currently, it is estimated that, at global level, about 3.6 billion air conditioning systems are operational, and by 2050 their number would reach 15 billion units.

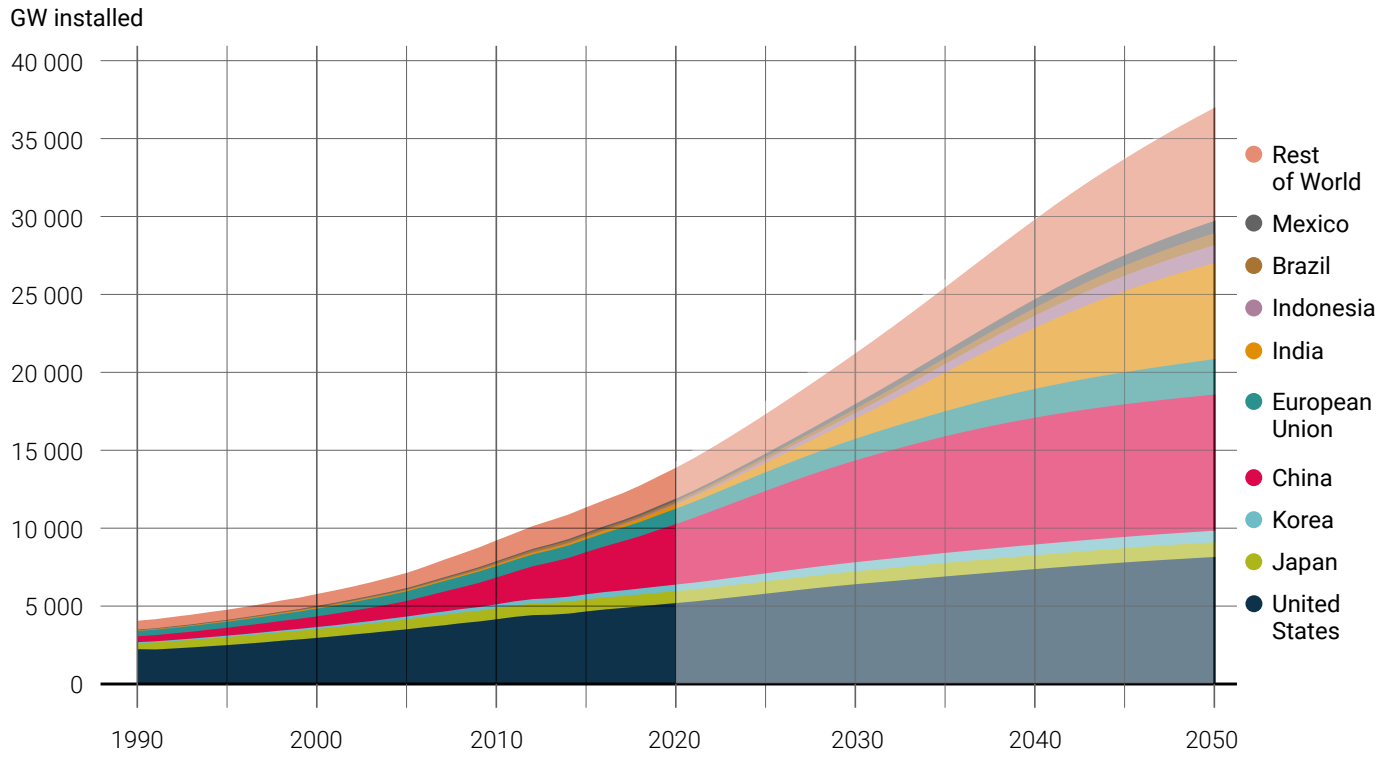
By doubling the efficiency of systems, energy savings could reach 1,300 GW, the equivalent of the entire production in China and India in 2018, used to produce hydrocarbons.

New construction offers the best opportunity for building design optimization, including orientation and window placement to reduce the heat entering a building (IEA 2013). Improvements in the energy efficiency of building envelopes – components of a building's structure such as insulation, walls, roofs and windows – could reduce energy for cooling in hot climates by 10 to 40%.

Low- and no-cost building energy management practices can further reduce energy demand. These include best practices for operations and maintenance, such as replacing filters monthly, cleaning coils and keeping vents clear from obstruction, as blocked vents alone can increase energy use by over 25%. Use of metering systems, for example brought by district cooling systems, make building end-users aware of cooling consumed monthly, thus leading to better management of their internal cooling systems.

Simple measures such as adjustments in thermal comfort levels and better ventilation, along with more active measures such as choosing part-time, part-space equipment rather than centralized cooling equipment, could reduce energy demand by up to 80% (Zhou, Yan and Shi 2017). India has issued guidelines to encourage increasing temperature set points to 24°C in commercial buildings, which can save 20% in annual energy consumption compared to a 20°C set point

Cooling capacity projections for residential and commercial air conditioning in baseline scenario of IEA Future of Cooling (2018a).



Note that global electricity generation capacity in 2016 was about 6,690 TW (IEA 2018b).

(India, Ministry of Environment, Forest and Climate Change 2019). Making roof surfaces and pavements more reflective and increasing vegetation cover helps to counteract the effects of urban heat islands. On a typical sunny summer afternoon, a clean white roof that reflects 80% of sunlight will stay about 30°C (55°F) cooler than a grey roof that reflects only 20% of sunlight (LBNL n.d.). The IEA estimates that well-designed cities could save 25% of the energy used for heating and cooling.

Refrigeration opportunities

The energy use of refrigerating appliances can be improved by 50-60% by using the best technologies on the market compared to average units in countries with existing energy efficiency policies. Developing countries could attain energy savings of more than 60% by discouraging dumping of inefficient equipment in their markets and adopting measures such as minimum energy performance standards.

Supermarkets can improve the energy efficiency of their refrigeration systems by 15 - 77%, depending on type of system in use. Demonstration projects of low-GWP alternatives to HFCs presented by the Climate and Clean Air Coalition (CCAC) calculated energy savings of 15% to 30% and CO2 reductions of 60% to 85% for refrigeration in commercial food stores. Doubling the efficiency of air cooling would reduce the need for 1,300 GW by 2050.

Mobile cooling opportunities

Studies suggest potential energy efficiency improvements of 55-63% in Mobile Air Conditioning efficiency. Innovative technologies like secondary loop MACs allow a greater choice of affordable low-GWP refrigerants while reducing charge size and leak rates, which save consumers money on service and fuel, according to the cited study. ■

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E-Distributie to Invest EUR 100mln in Modernization of Electricity Networks in Romania

E-Distributie companies in Romania will invest, this year, RON 483mln (approximately EUR 100mln) in the modernization of electricity networks in Bucharest and the ten counties where it carries out its activity in the country.

The value of modernization programs this year is added to total investments of RON 2.025bn made by E-Distributie Banat, E-Distributie Dobrogea and E-Distributie Muntenia during 2015-2019.

"E-Distributie companies invest, each year, important funds in upgrading electricity networks in Romania. Our priority remains digitization, to prepare the path towards energy transition. Our modernization programs have a direct impact on the networks' capacity to supply energy to new consumers and improve the management of unplanned interruptions," said Gino Celentano, CEO of E-Distributie Banat, E-Distributie Dobrogea and E-Distributie Muntenia.

The investment programs carried out by E-Distributie are aimed at upgrading transformer substations, by introducing them in the Telecontrol system, which allows remote control of interruption and manoeuvre devices in the electricity network and by replacing the transformers and other equipment. At the same time, E-Distributie invests in the replacement of power lines, in the video surveillance of substations and the installation of smart meters. This year, E-Distributie Muntenia, E-Distributie Dobrogea and E-Distributie Banat will install over 170,000 smart meters, through an investment of over RON 56mln.

All areas served by the three E-Distributie companies will be considered in the investment program for this year.

E-Distributie Banat will invest, in 2020, around RON 127mln in the modernization of electricity networks of the total amount, RON 26mln will be allocated in medium-voltage lines and transformer substations, RON 29mln in low-voltage lines, RON 21mln in transformer substations and RON 28mln in metering equipment.

The projects carried out by E-Distributie Banat include the modernization of several medium-voltage lines in the city of Arad and in the localities of Horia, Pecica, Ususau, Poltura, Nadlac in the county. In Caras-Severin County, the transformer substation in Otelu Rosu will have photovoltaic panels installed, and a number of medium-voltage lines in Resita and Serel will be upgraded. In Hunedoara County, In Orastie, Deva and Simeria, E-Distributie Banat will upgrade three transformer substations. In Timisoara, the company will upgrade a transformer substation, two medium-voltage lines, 8 transformer units and will prepare certain transformer units for mounting smart meters.

E-Distributie Dobrogea also has assigned investments of RON 117mln in 2020, of which RON 13mln in medium-voltage lines, RON 40mln in low-voltage lines, RON 6mln in transformer units, RON 16mln in transformer substations and RON 24mln in metering equipment.

In Constanta County, the company aims to upgrade two transformer substations with impact for the localities of Baba Novac and Eforie Nord,

and in Constanta County several transformer units will be upgraded. In Ialomita County, two transformer substations will be modernized in Slobozia, where works to improve the low-voltage lines will continue.

E-Distributie Muntenia has investments planned worth approximately RON 229mln in the modernization of electricity networks, of which about RON 19mln in 110 KV lines, RON 32mln in medium-voltage lines, RON 41mln in low-voltage lines, RON 38mln in transformer substations, RON 28mln in supply points and transformer units and RON 46mln in metering equipment.

In Bucharest, E-Distributie Muntenia will modernize 9 transformer substations, several upgrades to 20 kV, as well as a number of medium-voltage lines. In Giurgiu County, two medium-voltage lines will be modernized and investments are planned at the low-voltage lines in several localities. In Ilfov, investments are aimed, inter alia, at modernizing a transformer substation and three medium-voltage lines.

Electricity networks operated by the three E-Distributie companies include 286 transformer substations and 23,575 transformer units, which distribute around 15 TWh of electricity each year, through over 128,000 kilometres of high-, medium- and low-voltage lines.

About Enel

Enel is a multinational energy company, one of the integrated leaders on the global electricity, natural gas and renewable energy markets. Enel is one of the largest utilities in Europe in terms of market capitalization and reported EBITDA. Enel Group operates in over 30 countries around the world, having a total installed energy capacity of about 88 GW. Enel distributes electricity through a network of over 2.2 million kilometres, has about 74 million household and corporate customers around the world, representing the largest customer base compared to European companies in the field. The renewable energy division, Enel Green Power, operates production units with an installed capacity of 46 GW from wind, solar, geothermal and hydro power sources in Europe, the Americas, Africa, Asia and Australia. Enel X, Enel's global business division dedicated to advanced energy services, is the world leader in network balancing solutions through energy consumption management, with a total capacity of over 6.3 GW, managed globally; the company has installed 110 MW of storage capacity and, in the electric mobility sector, around 100,000 public and private charging points for electric vehicles around the globe.

About Enel Romania

Enel Romania is one of the largest private energy investors, with operations in the electricity distribution and supply sector, as well as electricity generation from renewable sources, present on the Romanian market since 2005. Enel has approximately 3,100 employees in Romania and provides services to 3 million customers. E-Distributie companies operate networks with a total length of approximately 128,000 kilometres in three important areas of the country: Muntenia South (including Bucharest), Banat and Dobrogea, covering one third of the local distribution market, and develops an investment program for the improvement of service quality, network safety and performance and local implementation of Enel Group's environmental standards. ■

The 3 Electricity Distribution Operators within Electrica Group to Merge

Electrica SA Extraordinary General Meeting of Shareholders (EGMS) approved the Board of Directors' proposals on the draft terms of merger by absorption of the three electricity distribution operators within Electrica Group (SDEE Transilvania Nord, SDEE Transilvania Sud, SDEE Muntenia Nord), as well as the proposals regarding the draft terms of merger of the two energy services companies – Filiala de Intretinere si Servicii Energetice Electrica Serv SA (FISE) and Servicii Energetice Muntenia SA (SEM).

As of January 1, 2021, the new entity resulting in the distribution area will be named 'Distributie Energie Electrica Romania SA' (DEER). In the process targeting the three distribution operators, the acquiring company will be SDEE Transilvania Nord, and in that of energy services companies the acquiring company will be Filiala de Intretinere si Servicii Energetice Electrica Serv SA (FISE). In this context, the role of the distribution activity in the value chain changes, and the main objectives of the strategy defined for this segment envisage improvement and optimization on three levels: operational performance, quality of services and cost optimization at the end-consumer. This comes in addition to the long-term strategic directions, focused on consolidation and development of the business model, in conjunction with preparation of distribution networks to cope with energy transition challenges.

In 2019, the three operators within Electrica Group distributed approximately 17.7 TWh, accounting for approximately 40% of total electricity distributed at national level to end-users. In terms of services, the main goal is to become an integrated supplier of energy solutions, with benefits such as: unitary management and governance, organizational synergies, improved commercial activity, integrated offer for services, as well as transfer of knowledge and development of work execution capacity.

The two proposed mergers are in line with the directions of transformation and optimization of Electrica Group's activity, started with its listing on the stock exchange. In the five years since listing, Electrica Group has become the largest investor in the country's energy infrastructure, with a total of RON 3.4bn invested, plus the plan in progress for 2020, worth RON 600mln.

"With listing on the stock exchange, the plans of Electrica Group have become increasingly ambitious and envisaged moving the business to the next level, so that our consumers benefit from services at the highest standards. Today we stand before a new stage in the life of the Group, which marks acceleration of the transformation process it is going through and generates new synergies that bring added value to all stakeholders. The positive opinion of our shareholders for the two proposed mergers is yet another important step in implementing the Electrica Group's strategy for 2019-2023 and contributes to the fulfilment of our objective of becoming a more robust, efficient and effective organization," said Corina Popescu, CEO of Electrica SA. ■

KAESER COMPRESOARE®

Turbo Blowers: Oil-free, Efficient, Reliable

Pillaerator turbo blowers from Kaeser Kompressoren are the ideal choice for high air demand aeration processes in biological water treatment applications. Using cutting edge technology, they provide energy-efficient and reliable operation to assure low life cycle costs.

Thanks to contactless and lubricant-free magnetic bearings, Pillaerator turbo blowers from Kaeser provide exceptional efficiency and are completely wear-free.

Photo: KAESER KOMPRESSOREN SE

With flow rates from 50 to 275 m^3/min and differential pressures up to 1.3 bar, Kaeser turbo blowers can be used wherever low-pressure process air is required. Turbo blowers provide the perfect solution for delivery of large volumes of air necessary for aeration in industrial and municipal wastewater treatment settings. They are equally well-suited to other industrial applications, such as flotation, fermentation, fluidisation and the generation of blowing air for air knives.

These machines are not only exceptionally efficient, but are also intelligently designed. The turbo impeller is directly driven by a high-speed motor inside a shaft supported by magnetic bearings, which makes the system completely wear-free. This means no lubrication is required, saving both time and costs when it comes to maintenance. Smart magnetic bearings, which are protected against unexpected power failure, actively control the rotor position so as to maintain it within its orbit, even in the event of fluctuating operating parameters. The bearings operate independently of speed, thereby allowing a wide control range.

Cooling of key components is performed independently of the outside ambient air. They are therefore protected against the ingress of any fine particles, which in turn assures long-term uninterrupted operation. In order to ensure that Pillaerator turbo blowers always operate at optimum efficiency, versions are available for three different pressure ranges: L (600 mbar), M (800 mbar) and H (1000 mbar). Slightly higher pressures are required for special applications.

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EUROPE'S NEW BET Geothermal Energy

Like a gambler never satisfied by the past and present gains, the European Union (EU) makes a new bet in the energy sector - geothermal energy. Or, more accurately said, in the sector of environmental protection and the definitive abandonment of classical sources and ways of producing energy. Progress, some would say, damnation, would others say. The fact is that, with each such bet, there are many losers and few benefit from the gains. Usually, those who lose must also pay fines to Brussels.

by Carol Dan

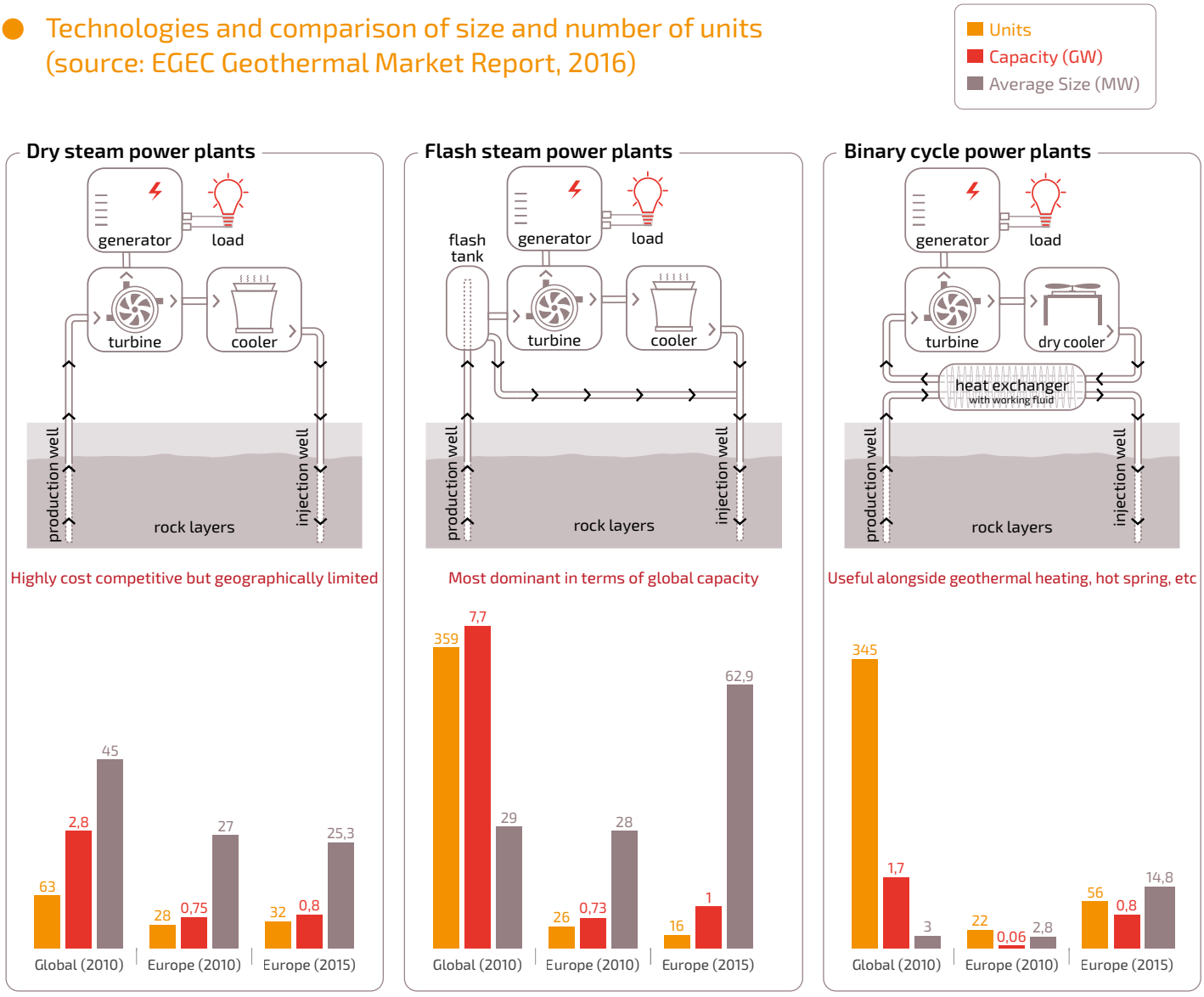
Year after year, the European Commission (EC) pushes it a little further and imposes, as an effect of alleged tough, but honest negotiations between its extremely disparate members, new targets in terms of share of renewable energy in the final energy consumption of each Member State. Some flagship states of green energy, such as the Netherlands, Finland or Germany, are those that come up with the most ambitious plans, and all these desires of a minority become an obligation imposed on the majority.

10-15 years ago, wind energy was seen as the saviour of the planet, and therefore, as both target and conclusion, all EU members were forced to adopt it. The famous 20/20/20 third, which meant a 20% reduction in EU greenhouse gas emissions compared to 1990 levels, a 20% improvement in energy efficiency and ensuring that 20% of energy consumed comes from renewable sources (wind, solar, biomass) is about to materialize.

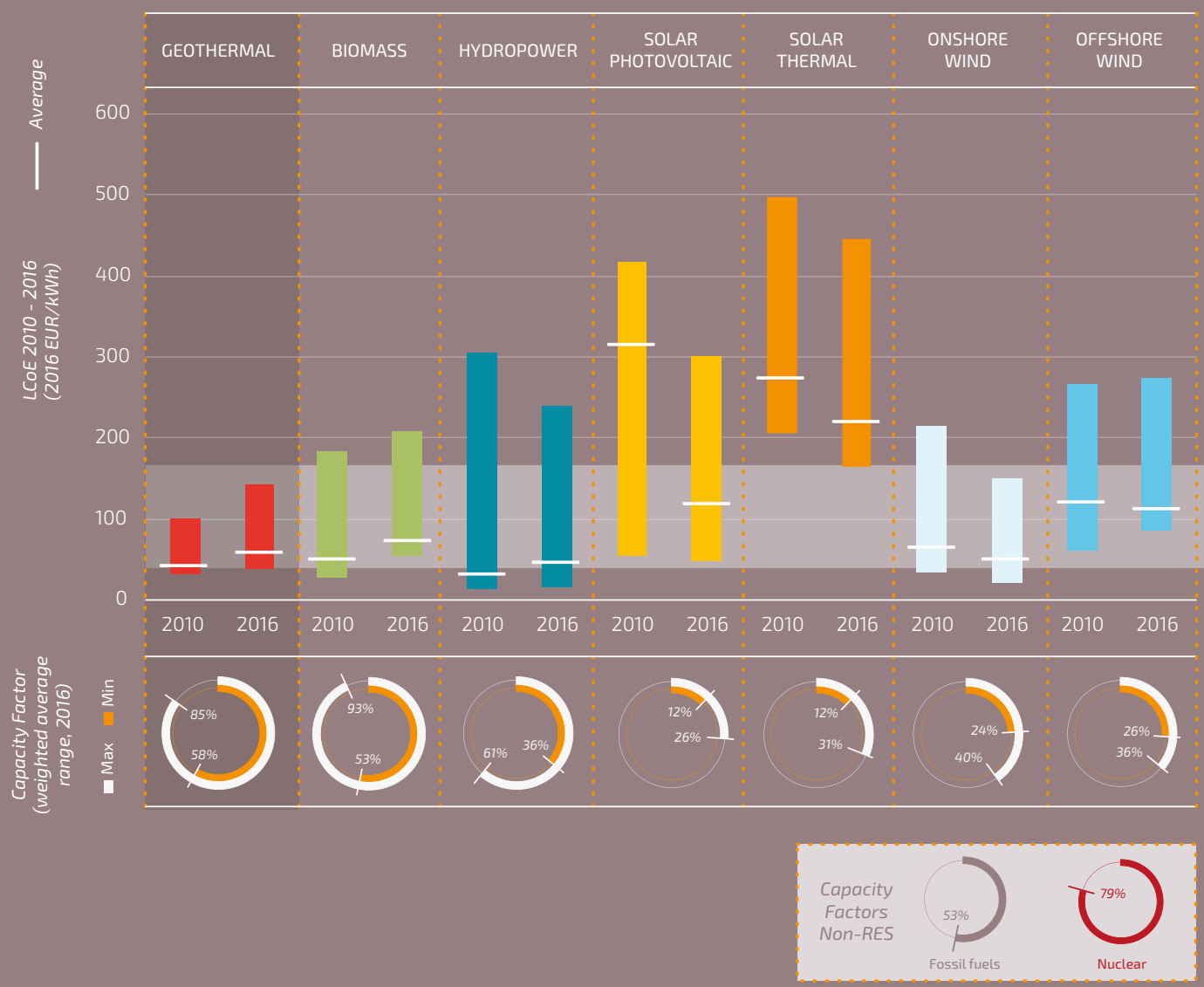
According to EC statistics, energy from renewable sources accounted for 18.9% of energy consumed in the EU, so very close to the proposed level. Whether this level is reached or, who knows, exceeded, we will see most likely next year.

In the meantime, more than half of the 2020 has already passed, and the EU has set other objectives, even more ambitious than the famous 20/20/20. Therefore, the new target, included in the European Green Deal, meaning for the year 2050, should represent an EU released from the yoke of polluting energy sources, such as coal, or, as it is increasingly felt at the level of the Community political sensitivity, natural gas. Nuclear power is

● Technologies and comparison of size and number of units (source: EGEC Geothermal Market Report, 2016)



GEOTHERMAL IN EUROPE



already an outcast. At the time, the EU shouldn't, according to politicians in Brussels, emit any molecule of greenhouse gas, and this would be obtained through a number of strategies which, if they are also implemented, will radically change especially how we produce and consume energy in the EU. The main industries to be impacted by these European aspirations are that of the energy production and automotive, the latter being overwhelmingly remodelled into a socialism of mobility by the fact that holding a car will become a rarity.

And, because this transition from coal to wind and solar power to whatever energy source will be considered non-polluting and trustworthy (from a political point of view)

- Since geothermal energy is constantly provided, the Capacity Factor (i.e. actually produced energy with respect to the full capacity) is much higher than for other renewable energy sources (sources: Renewables 2017 Global Status Report, REN21; EUROSTAT), resulting in a total cost (LCoE) comparable or lower than for other energy sources (source: IRENA, 2017)

at the level of 2050 will make victims in everything that means economic life, the EU will provide a financial support of EUR 100 billion and technical assistance during 2021-2027 to help the citizens, companies and regions that are most affected by transition to green economy. What will these regions be? Definitely those in Central and Eastern Europe, where countries such as Romania, Poland, Hungary, Bulgaria or the Czech Republic are still dependent to a great extent on coal and natural gas. In fact, Romania is only starting to discover natural gas, metaphorically speaking, given the little use for this resource, which it has almost in abundance.

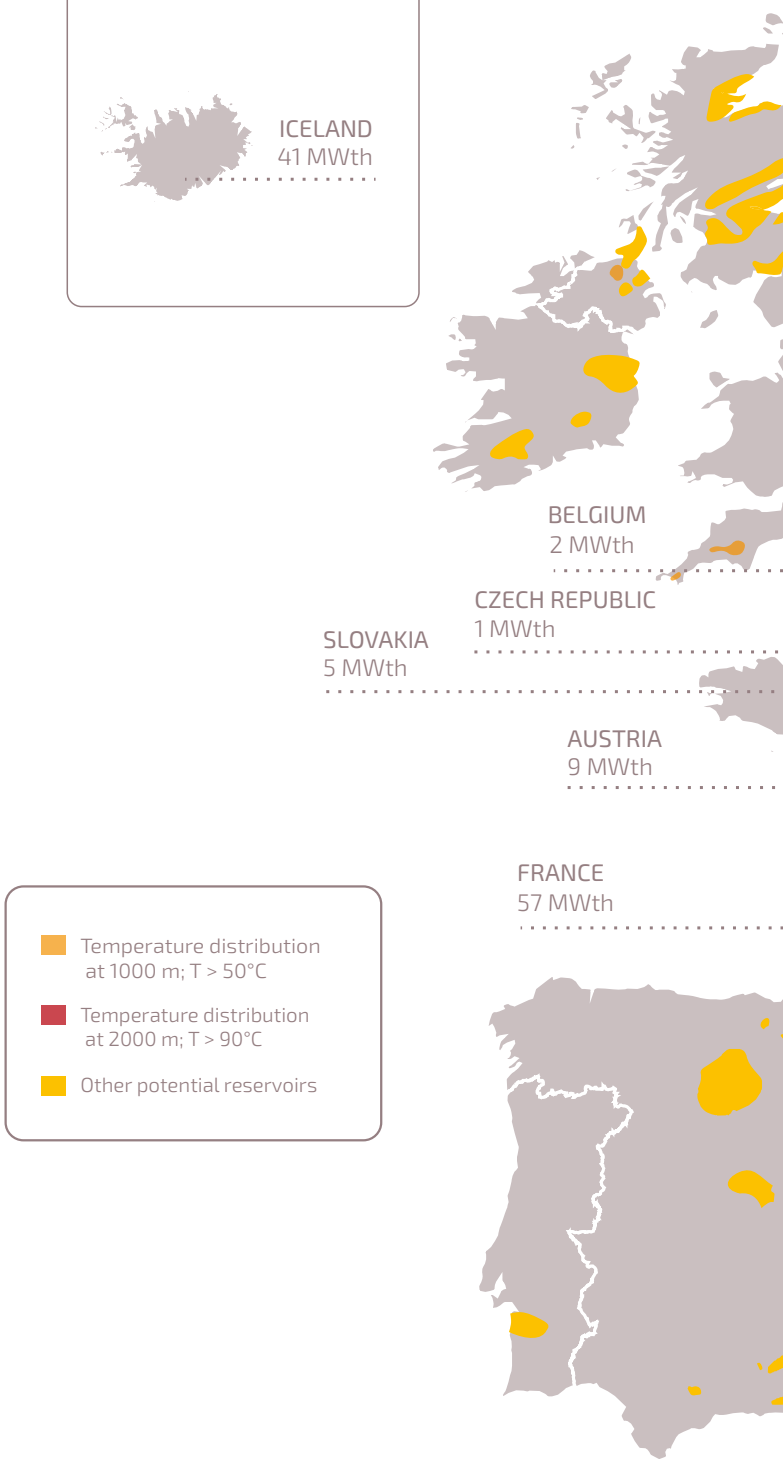
One of the smaller ambitions (small probably due to the lack of significant reserves of raw material) of the EU are directed towards geothermal energy.

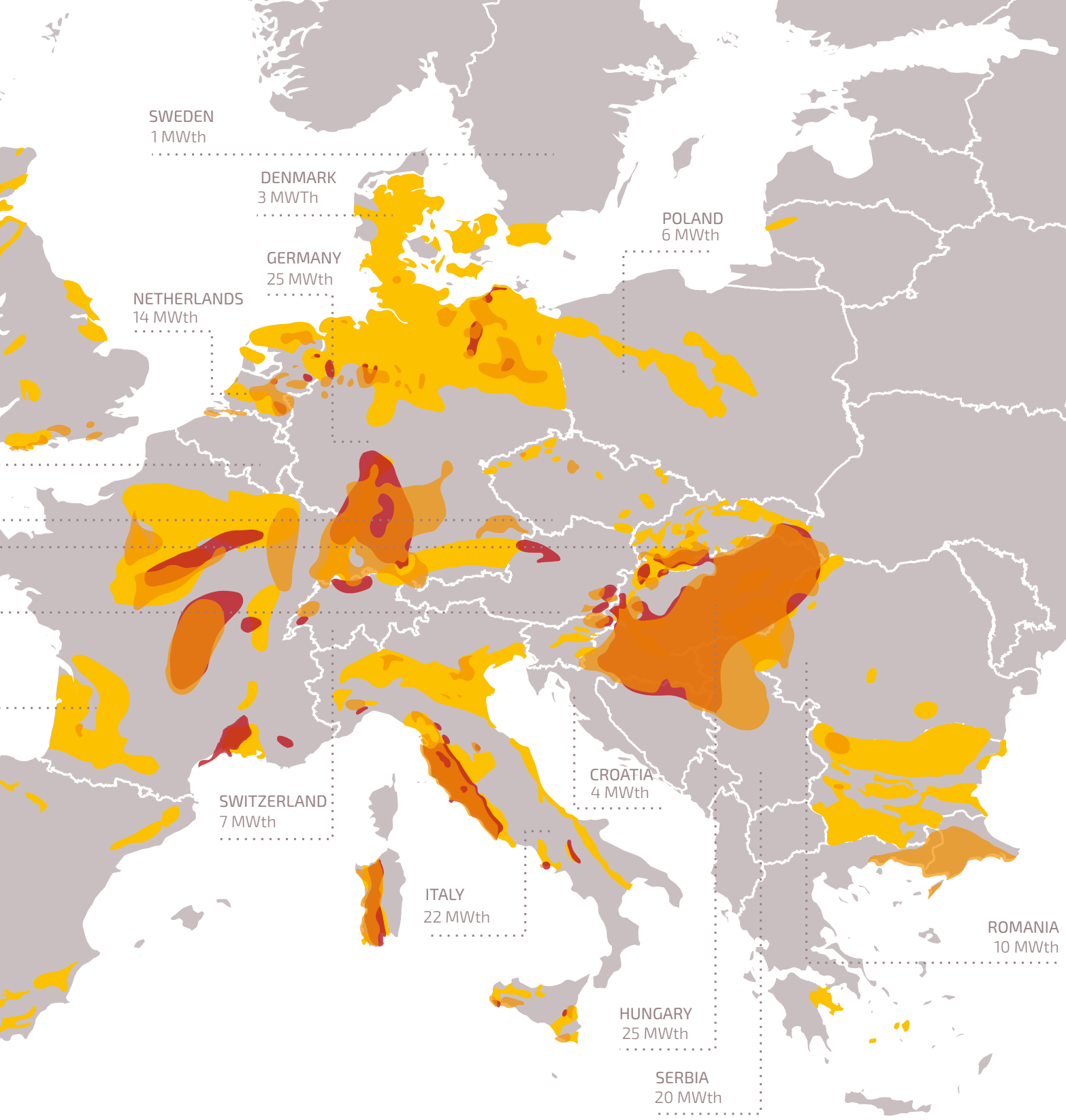
In a project called Geothermica, which involves specialists, analysts and financiers from 13 countries, the EU throws in a budget of EUR 30 million for small and large projects using geothermal energy for heating, cooling and electricity generation. Like the wind, the boiling water from the ground would have the potential to contribute to the 'greening' of the air we breathe. As in the case of any other energy source considered, for various social, economic and especially political arguments, as 'saviour', geothermal energy is still dressed in the in the garb of non-polluting righteousness. But, in terms of geothermal water, the EU does not hold such substantial reserves as to witness a new gold rush, as it happened with wind energy. However, this resource is already used in the EU, even if by few Member States, and rather experimentally. Maybe this is precisely what the EU wants to correct?

If the EU expects to create trends globally, in various economic sectors, in terms of geothermal energy it could be said that it rather learns from others, because geothermal energy is not a novelty for other countries on other continents. Because, while the EU only now discovers geothermal energy, other countries, such as Kenya or Morocco, have done it a long time ago, since the eighth decade of the last century.

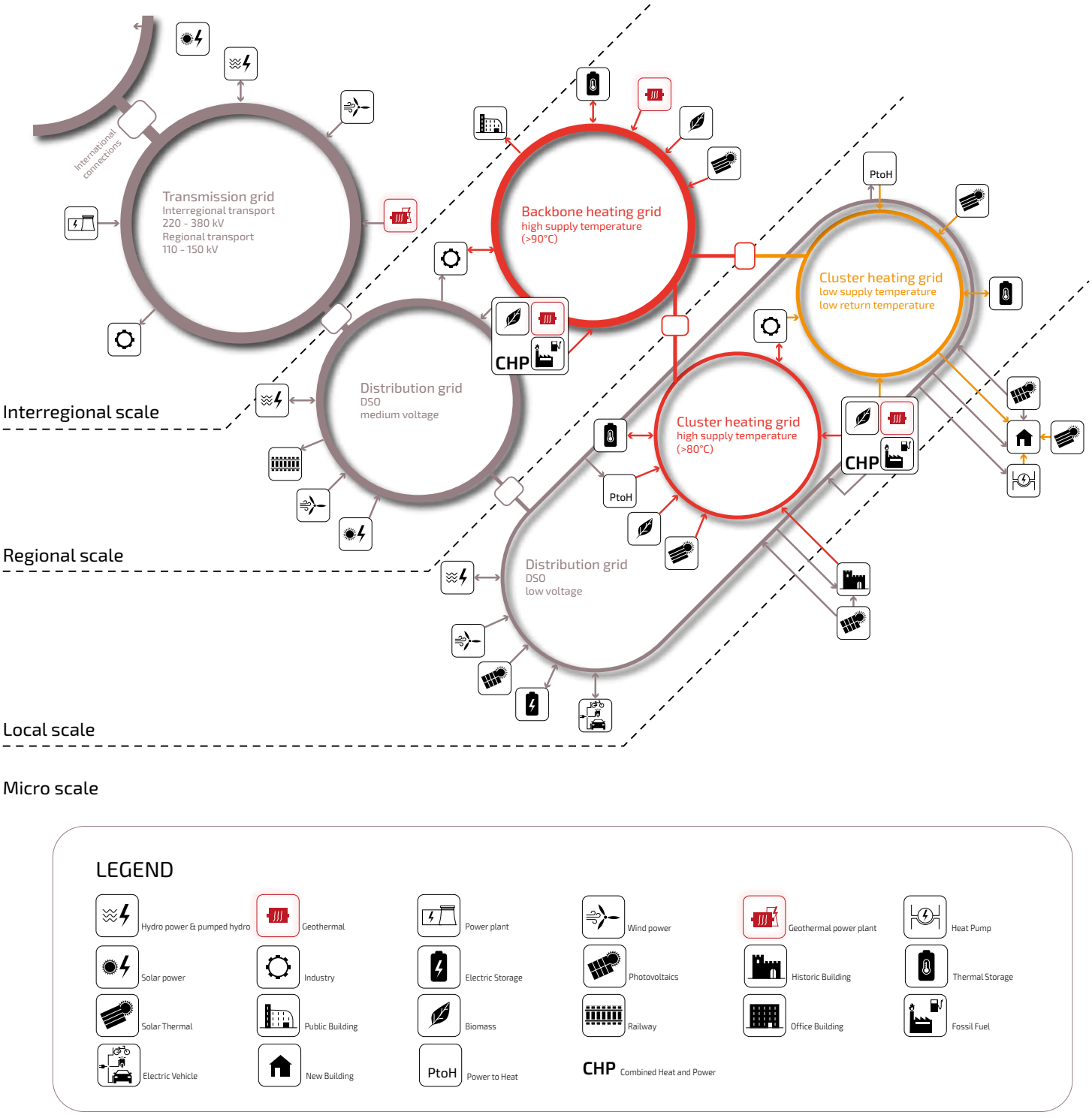
At global level, the public figures show that geothermal energy could generate up to 8.3% of the electricity needs. Moreover, if this energy were to be used to the maximum, 39 countries in Africa, Central Europe, South America and the Pacific could cover entirely their electricity needs.

The world leader in the use of this type of energy is the US, which, with an installed capacity of 3,639 MW (about half of the production capacity of Hidroelectrica, the largest electricity producer in





● Areas suitable for geothermal heating and cooling networks (combination of high heat demand and areas where the temperature at 2 km depth is higher than 60°C. Source: update GeoDH, 2014, and available data), and actual geothermal district heating installed capacity (Source: EGEC Geothermal Market Report, 2016).



Romania), produces 16.7 billion kWh per year (about as much as Hidroelectrica produces in an average hydrological year).

Ranking second, but with chances to overtake the US, is Indonesia, with an energy production capacity from geothermal sources of 1,948 MW, followed by the Philippines, with geothermal plants of 1,868 MW in 2018.

Next in line are Turkey, Mexico, New Zealand or Japan.

- In the interconnected energy networks based on renewable energy sources, geothermal and underground thermal storage play an important role (courtesy of DNV GL, based on: Noordhoff Uitgevers B.V., 2012)

The few European states that fall into such a ranking are Iceland or Italy, with almost 1,000 MW, the leader of the EU bloc in this respect. Germany also has a number of intentions to use this type of energy, but for now at small scale, with existing units of less than 40 MW, while Portugal holds 30 MW in geothermal energy. The geothermal energy installed in the EU can supply about 2 million homes.

In other words, the EU is very poorly represented in this hierarchy, and for things to put the Union in an even less favourable position, many of these power plants were commissioned in in 1981 (a power plant in Kenya), 1984 (Mexico), 1994 (Indonesia) or 1996 (the Philippines).

Geothermal energy is certainly not a missed train for Europeans, but it is clear that it is not a pioneering industry. Or, a term more appropriate for the civilizing claims of Brussels, a missionary industry.

But there are also other states that hold such geothermal resources and are starting to invest in their use. An example is Ethiopia, which, in the first half of this year, signed an agreement to contract a loan of USD 10mln for an investment in a geothermal power plant with a power of 50 MW. The plan would be operational in 2024.

Taiwan has also signed an agreement with Swedish energy technology company Climeon for the construction of the country's first commercial geothermal power plant.

Globally, in 2019 there were almost 370 units producing energy from geothermal sources, totalling a production capacity of 15,406 MW. New geothermal projects brought last year 759 MW in addition to the global installed capacity, this being the largest annual growth of the installed power in the recent years, a similar level being recorded in 2014.

It remains to be seen how the political class in Brussels and each national government will turn geothermal energy, which is not an extremely rich resource on the Old Continent, into a probable obligation whose non-compliance will, according to already known models, be punished by fines and in the mainstream media, as with the star of renewable energy, the wind.

Romania is one of the countries that have this resource in their energy portfolio. Moreover, Romania holds, in various proportions, all energy sources, both polluting and revolutionary clean, but, nevertheless, has become a net importer of energy in the last year. As we are already accustomed, Romania has little of everything. Including geothermal energy, which it has been using since before the politicians in Brussels negotiated new definitions of green energy and new ceilings of clean energy in the final consumption of each Member State.

Geothermal energy in Romania

In Romania, research has been conducted and wells have been drilled in search for geothermal water sources since the 1900s, and the conclusions are that such reserves of geothermal waters are found in the west, in Bucharest and in Dobrogea.

There are already two localities, Oradea and Beius, that use this resource. Moreover, Beius is the only city in Europe, except for Island (the richest country in this resource), which uses geothermal water entirely in the district heating system.

Because I mentioned Iceland, this country uses geothermal water to heat 90% of the almost 400,000 inhabitants, a performance due to the unique specificity of the basement of this island state. The installed power of this country in geothermal power production facilities is about 800 MW.

The city of Beius, Bihor County, is the only city in the country where district heating is exclusively based on geothermal water. In Beius, geothermal water used to heat over 100 blocks of flats and several public institutions is extracted from depths of 2,500 - 3,000 meters by two wells and is delivered to consumers through a system of 17 kilometres of pipelines. According to information from Transgex, the operator of the heating system in Beius, a third well reinjects into the ground the thermal wastewater. The two wells extract annually over 420,000 cubic meters of geothermal water, the equivalent of 17,000 Gcal, at temperatures varying between 70 and 84°C.

In Bucharest, a city that is said to be on a geothermal water lake, discussions on the exploitation of geothermal resources have existed since at least 2009. At that time, geothermal water was used in a swimming pool at the Press House (which no longer exists) and to heat the Ana Aslan Institute.

The subject of geothermal water reappeared in 2013, but again without any real effect. However, Beius is not the only place in Romania where the potential of geothermal waters is used, active projects already existing in Oradea (where an entire neighbourhood is heated with this resource), Bors, Cernavoda, Olt Valley, north of the Capital or some hotels in Calimanesti - Caciulata. Probably the most well-known use of geothermal water is the one at Baile Felix (now in ruins) or the Therme Bucharest complex (expanding).

In other words, geothermal energy is not a novelty for Romania, but its use is not part of a national or at least regional strategy, but was the result of independent initiatives independent of the government. And an initiative assumed by the government on the exploitation of geothermal water does not exist at this time, although this resource has been vaguely mentioned in multiple attempts at national energy strategies. But it will certainly exist from now on, once the EC has turned its eyes to the Community basement. ■

Global Investment in Offshore Wind Power Rises Fourfold in H1 2020

The allocation of funds for renewable energy from January to June outperformed data from most economic reports in the world, which can largely be attributed to offshore wind power. The sum of investment decisions in the subsector jumped 319% to USD 35 billion on an annual basis, topping the result from entire last year, according to the latest figures from research company Bloomberg NEF (BNEF).

The effect of the coronavirus and the measures to contain the pandemic have crippled the economy worldwide, but investment in renewable energy production capacity showed great resilience.

Overall investment in new renewable energy capacity without hydroelectric facilities over 50 MW came in at USD 132.4 billion for the first half of the year. It is 5% more in rounded terms than the revised figure for the same period of 2019, dominated by offshore wind power.

Onshore wind investment slipped 21% to USD 37.5 billion and solar wind fell 12% to USD 54.7 billion. Conversely, the offshore wind power sector spiked 319% to USD 35 billion.

Geothermal energy jumped a stunning 594%, but only to USD 676 million. Of note, Turkey is among the top countries in installed capacity and investment on a global scale, according to the quoted source.

Deals on 28 sea-based wind farms

Funds allocated for offshore wind power plants already exceeded the result for all last year, when they reached an all-time high, by 9.7%. The report documented deals on 28 sea-based wind farms.

The largest offshore wind farm so far is planned

to be built in the Netherlands. It includes the record 1.5 GW planned for the Vattenfall Hollandse Zuid in the Netherlands. The wind power plant will cost USD 3.9 billion. Next is the 1.1 GW SSE Seagreen, a site off the coast of the United Kingdom. The project is worth USD 3.8 billion. Seventeen installations were announced in China, led by the Guangdong Yudean Yangjiang Yangxi Shapaat of 600 MW, at a cost of USD 1.8 billion.

Cost reduction

"We expected to see COVID-19 affecting renewable energy investment in the first half, via delays in the financing process and to some auction programs. There are signs of that in both solar and onshore wind, but the overall global figure has proved amazingly resilient – thanks to offshore wind," said Albert Cheung, head of analysis at BNEF.

Offshore wind is benefitting from the 67% reduction in levelized costs achieved since 2012, and to the performance of the latest, giant turbines, according to Tom Harries, the research company's head of wind analysis. "But the first half of this year also owed a lot to a rush in China to finance and build, in order to take advantage of a feed-in tariff before it expires at the end of 2021. I expect a slowdown in offshore wind investment globally in the second half, with potentially a new spike early next year," he asserted.

Slump in other renewable

On the flipside, investment in new biomass and waste-to-energy plants fell 34% to USD 3.7 billion.

Hydropower projects of less than 50 MW attracted an estimated USD 576 million, down 14%, while the biofuel item landed at USD 250 million, down 82%. China leads the way with offshore wind projects. Geographically, China was again the largest market with total investments of USD 41.6 billion in the first half, up 42% year on year, and offshore wind power was the biggest factor. Europe followed with USD 36.5 billion, which is a rise of 50%, while the United States dropped 30% to USD 17.8 billion.

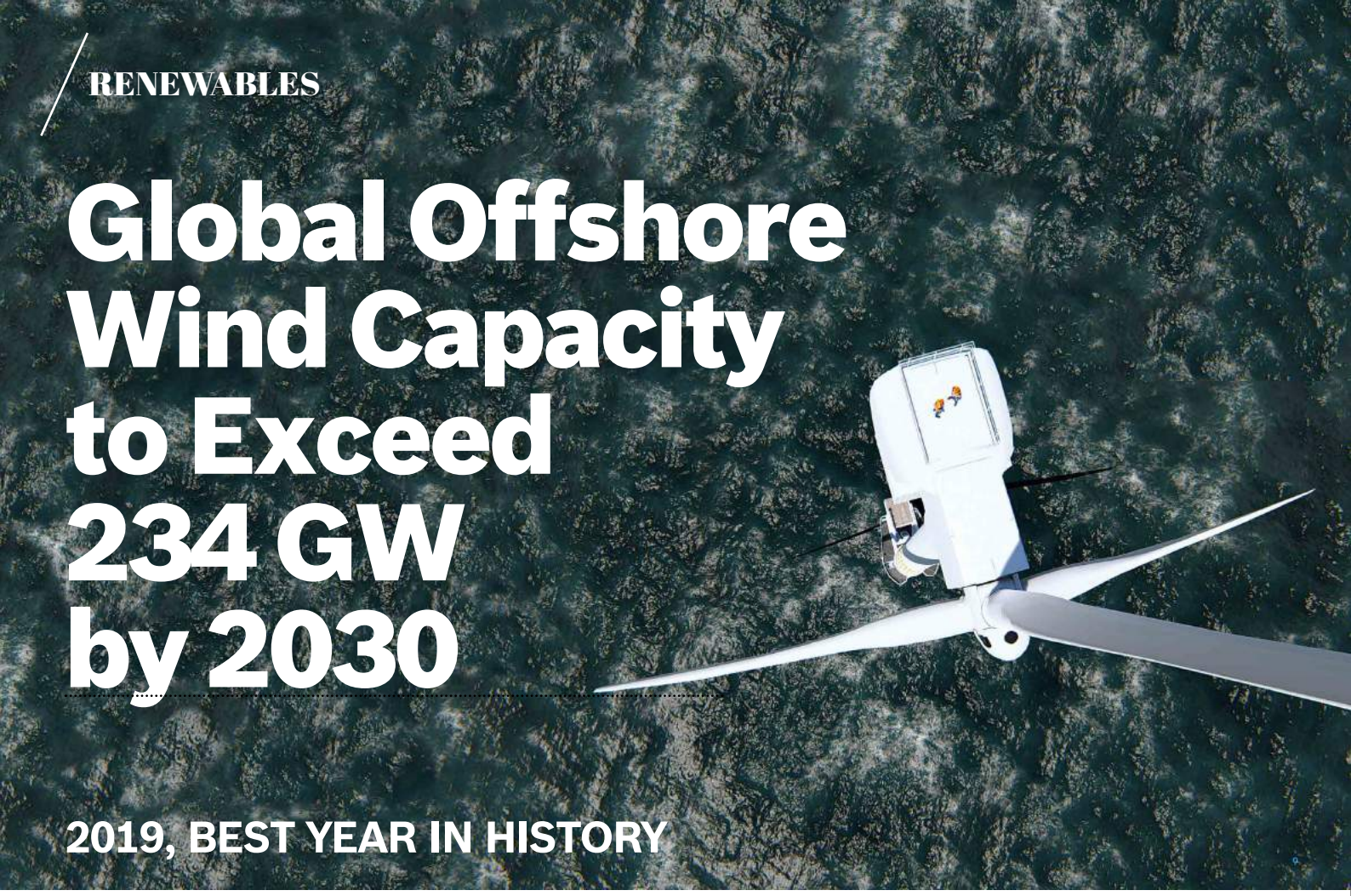
Full-year data to be more reliable

Angus McCrone, chief editor at BNEF, said that a clearer picture of the impact of COVID-19 on green energy investment will come with the full-year 2020 figures. "Renewables have been helped by vastly improved competitiveness and by investor appetite for assets offering secure cash flows. However, project developers face the challenge that key people, whether at the permitting, financing or construction stages, can't meet face-to-face. And buyers of small-scale solar systems are sensitive to changes in consumer confidence," in his words.

Including corporate-level equity deals, the figure was USD 137 billion in the first half of 2020, up 4% year over year.

Hidroelectrica SA, Romania's state-owned hydro-power producer and largest energy producer in the country, has recently revived the idea for the first offshore wind power plant in the Black Sea. ■

Global Offshore Wind Capacity to Exceed 234 GW by 2030



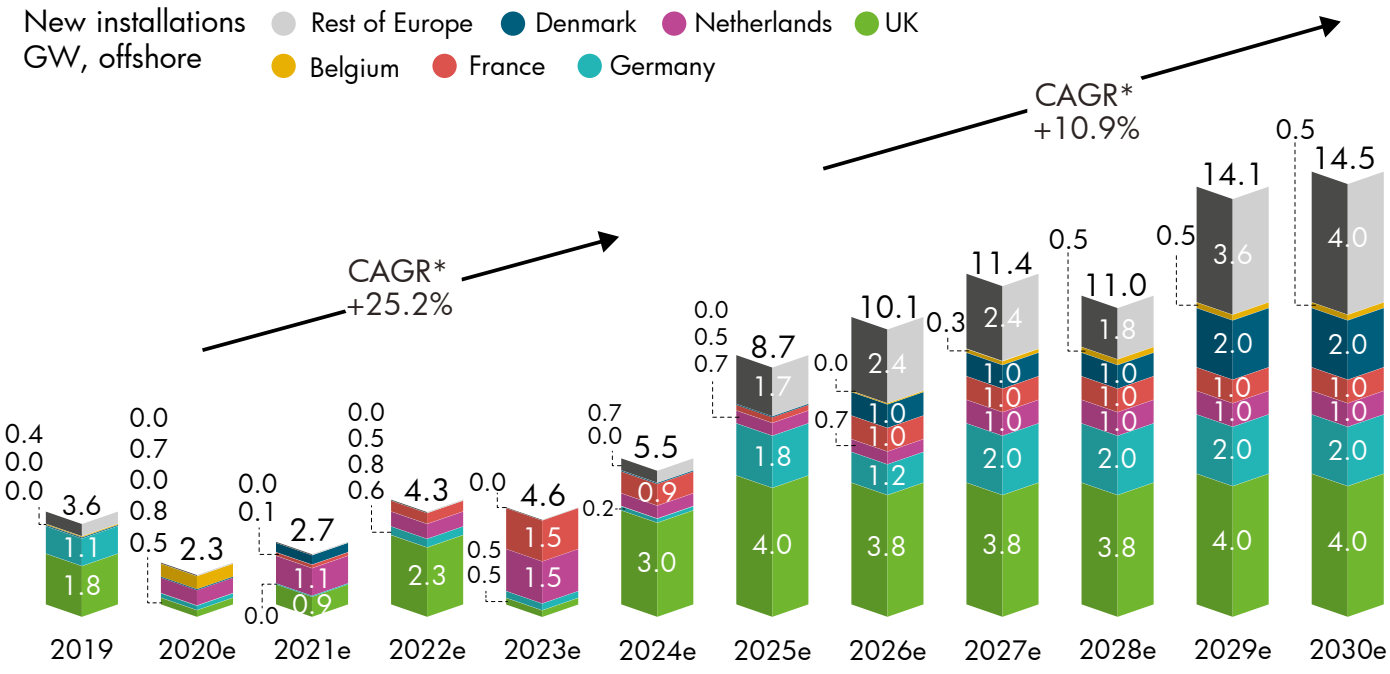
2019, BEST YEAR IN HISTORY

With 6.1 GW new capacity added, 2019 was the best year in history for the global offshore wind industry. The global offshore market grew on average by 24% each year since 2013, bringing the total installations to 29.1 GW, which accounted for 5% of total global wind capacity as the end of 2019, according to Global offshore wind report 2020, published by the Wind Energy Council in early August. The second edition of GWEC's Global Offshore Wind Report provides a comprehensive overview of the offshore wind sector globally with the latest data and analysis on market growth, industry forecasts to 2030 and data-based insights on emerging markets.

- Europe remains the largest offshore market as the end of 2019, making up 75% of total global offshore wind installation.
- However, the activity level in Asia keeps increasing with China taking the lead followed by Taiwan, Vietnam, Japan, and South Korea.
- North America has only 30 MW offshore wind in operation in the US as of 2019 but deployment will accelerate in the coming years.
- The top five offshore wind market in total installations are: The UK, Germany, China, Denmark and Belgium.

The global offshore wind market outlook to 2030 has grown more promising over the past year as governments raise their ambition levels and new countries join the market. With an average annual growth rate of 18.6 percent until 2024 and 8.2 per cent up to the end of the decade, new annual installations are expected to sail past the milestones of 20 GW in 2025 and 30 GW in 2030. GWEC Market Intelligence expects that over 205 GW of new offshore wind capacity will be added over the next decade. Three-quarters of this new volume will be installed in the latter half (2025-2030), as projects currently in planning get connected to the grid. Offshore wind already accounted for 10 percent of global new wind power installations in 2019. Buoyed by expansion into new markets and acceleration of the global energy transition, GWEC Market Intelligence foresees offshore wind playing an increasingly important role in the overall growth of the global wind market, and expects offshore wind to contribute more than 20 percent of total wind installations by 2025. As the world's largest regional offshore wind market, Europe is expected to maintain steady growth, but new installations outside Europe, predominantly from Asia and North America, are likely to surpass Europe in 2020 for the first time and continue exceeding volume in Europe through 2030. In the near-term (2020-2024), the

Global offshore wind growth to 2030 in Europe



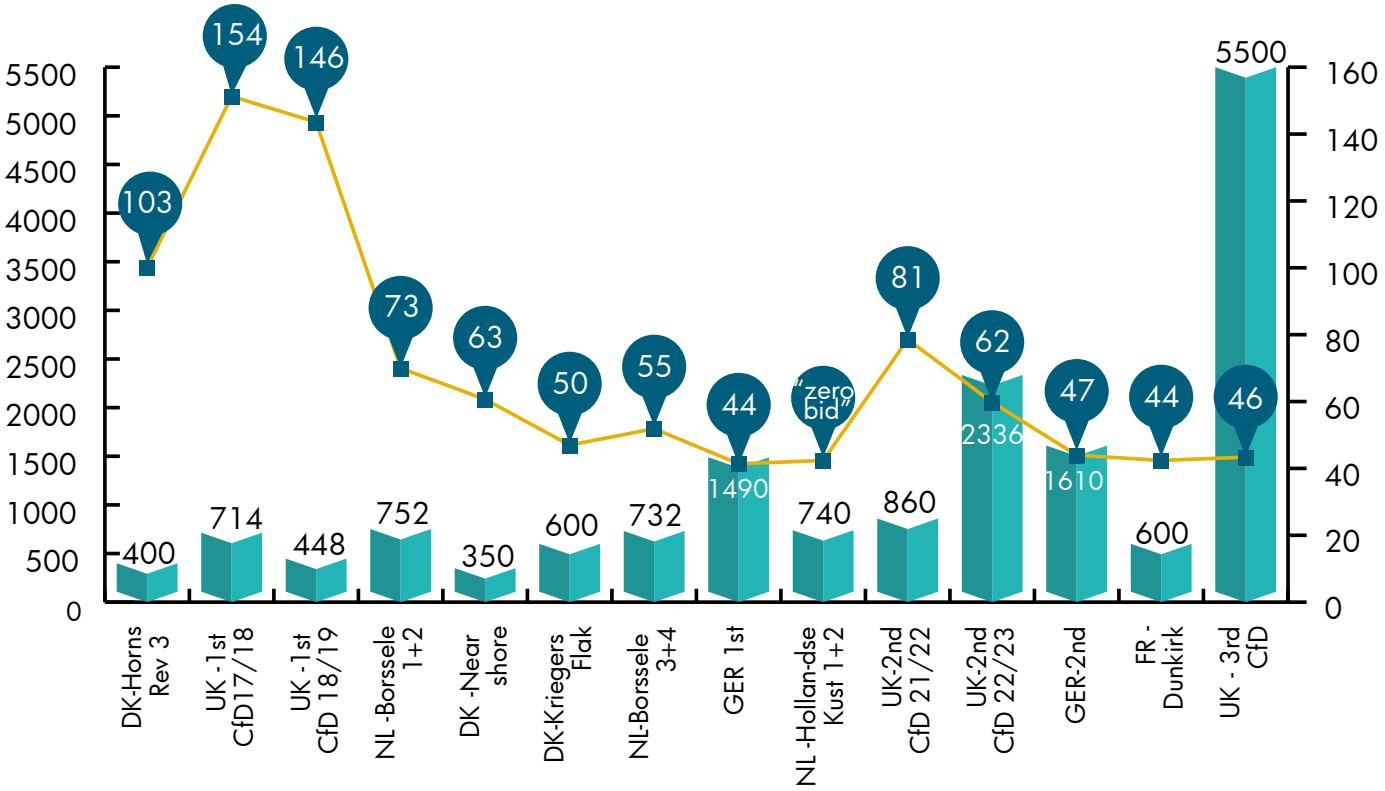
* CAGR = Compound Annual Growth Rate
Source: GWEC Market Intelligence, June 2020

majority of growth outside of Europe will primarily come from China and Taiwan, with the contribution from the US becoming sizeable from 2024 when the first utility-scale offshore project comes online. The near-term offshore wind market outlook was built using a bottom-up approach and is based on GWEC Market Intelligence's global offshore wind project database, which covers projects currently under construction, global auction results and announced offshore wind tenders worldwide. For the medium-term market outlook, aside from existing project pipelines, a top-down approach has also been used, which takes into account existing policy, support schemes and national level offshore wind targets.

Europe

Europe is the birthplace of the offshore wind industry. Since the world's first offshore wind turbine was installed in Denmark in 1991, Europe has been taking the lead in both offshore wind installations and turbine technology innovation. After three decades of research and development in Europe, offshore wind has established itself as a cost competitive power generation of choice for governments and a mature industry. Through collaboration among European markets and experienced stakeholders, a robust offshore wind supply chain has been built in countries neighbouring the North Sea and Baltic Sea. In the past decade, the European offshore wind market enjoyed double-digit annual growth (11 percent), making it the world's largest regional market as of the end of 2019. Looking at potential growth in the decade ahead, GWEC Market Intelligence forecasts that the European offshore wind market will continue to grow strongly, as new offshore wind projects are both cheaper to build and operate than new nuclear power and gas-fired power plants, making it a core energy source to help Europe to meet its NDCs and achieve carbon-neutrality goals by 2050. The European Commission estimates that total offshore wind installations between 240 and 450 GW will be needed by 2050, making offshore wind a crucial pillar in Europe's power mix. In GWEC Market Intelligence's pre-COVID market outlook, 2020 and 2021 were expected to be relatively quiet years, with new installations below 3 GW in Europe. This growth forecast is unchanged in

European executed offshore tenders/ auctions 2015-19
Awarded capacity (GW), average winning bid (EUR/ MWh)*



• Tenders above 100MW capacity and no innovation auctions, tenders in order of execution from 2015 to end of 2019
Source: GWEC Market Intelligence, GWEC Auction Database May 2020

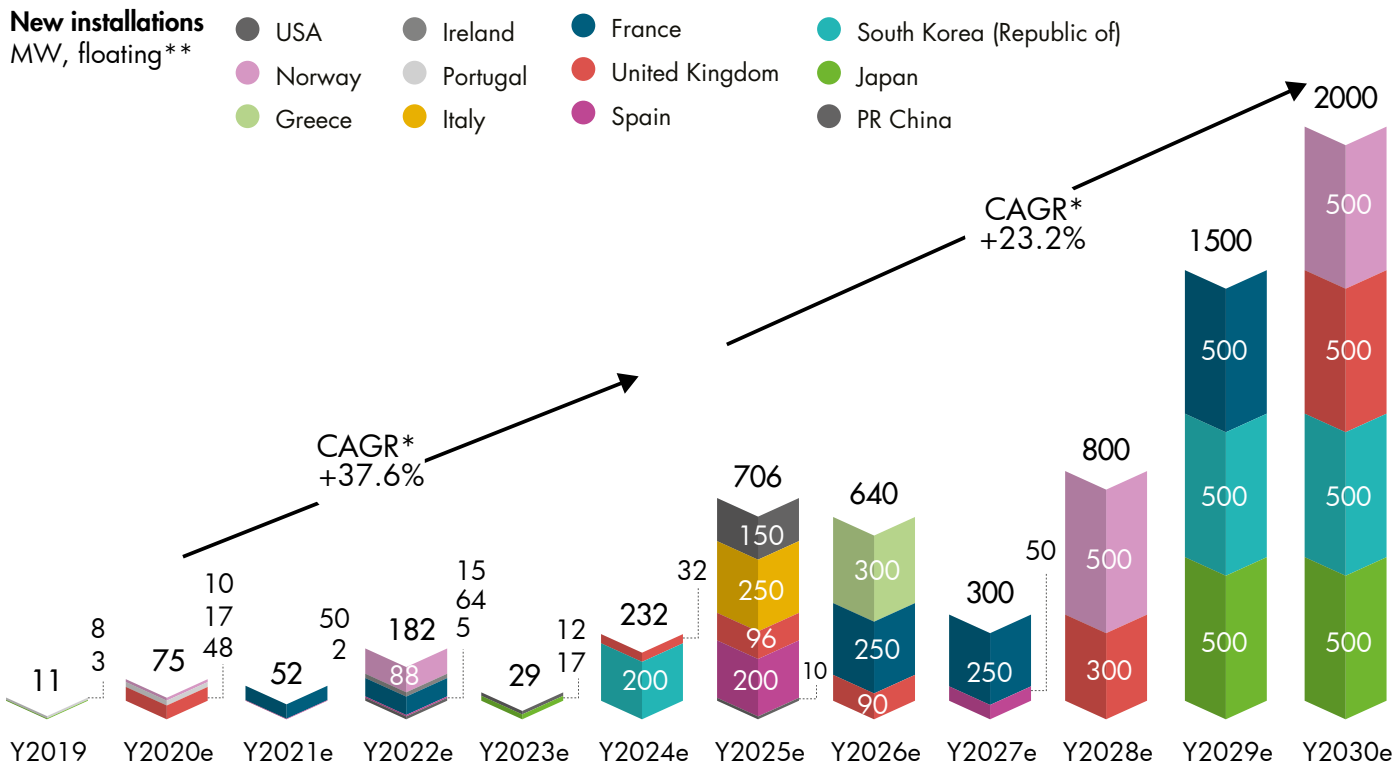
their post-COVID scenario.

After a slow start in the beginning of 2020s, however, the European offshore market is likely to bounce back in 2022 when all the UK's CfD 2 projects will come online. New installations in Europe are likely to reach 8.7 GW in 2025. Taking into account recently increased or proposed offshore wind targets from established markets and activities in new European markets, such as those around the Black Sea, GWEC Market Intelligence expects more offshore wind to be built in the second half of the decade. New installations are likely to exceed 20 GW in 2026 and then potentially reach 15 GW by 2030.

Floating Offshore Market Outlook to 2030

The world's first MW scale floating offshore wind turbine was grid connected by Equinor in Norway in 2009. As of the end of 2019, a total of 66 MW of floating wind capacity has been installed worldwide. After a decade of development, floating offshore wind is no longer simply an R&D area. With more oil majors such as Shell and TOTAL starting to focus on floating wind, this sub-section of offshore wind is ready to progress quickly to full commercialisation. At present, the 2030 floating offshore wind forecast ranges from 3 GW to nearly 19 GW, depending on how quickly LCOE can be brought down to an affordable level and its adoption by new markets, according to the quoted report. GWEC Market Intelligence predicts 6.2 GW of floating wind is likely to be built in the next 10 years. This outlook is primarily based on the existing global floating offshore project pipeline as well as announced investment plans. Out of the 6.5 GW floating wind installations, GWEC expects less than 10 percent to be built in the first half of this decade; the majority of new volume will come online in the latter half, when large-scale floating wind projects tendered through auctions

Floating Offshore Market Outlook to 2030



* CAGR = Compound Annual Growth Rate
** Note: this floating wind outlook is already included in GWEC's global offshore wind forecast
Source: GWEC Market Intelligence, June 2020

are expected to be installed. Currently, the UK, Portugal and Japan are the top three markets in total floating wind installations. By the end of this decade, South Korea, France and Norway are likely to replace those markets as the top floating markets. Considering the tremendous wind resources available at shallow water depths, at present GWEC expects only demonstration floating wind projects to be built in China. Floating wind's current contribution to total wind installations is fairly small, but it will play an increasingly important role toward the end of this decade, accounting for 6 percent of global new wind installations in 2030. GWEC Market Intelligence expects that floating wind will prevail when it is commercially viable as another foundation solution, rather than a sub-sector of offshore wind. Consolidation of floater designs and modularisation of production will be the keys to bringing down LCOE.

Impact of COVID-19 on Global Offshore Wind Market

The COVID-19 pandemic has shocked the global energy sector, forcing projects to suspend work to comply with social distancing regulations, challenging the investment conditions of markets bracing for economic recession and slashing power demand by up to 10% in some regions in 2020, is shown in the report.

The size of that decline is around seven times greater than during the 2008 - 2009 global financial crisis, according to the IEA, and has hit demand for oil, natural gas and coal the hardest. But renewable energy will see an overall increase in its share of global power generation this year, due to its cost-competitiveness and priority dispatch in many markets.

And the offshore wind sector, with longer project development timelines, will largely be shielded from the short-term supply chain disruptions which impacted project execution in onshore markets across the world. In 2020, the wind capacity lost to the pandemic is estimated by GWEC Market Intelligence at around 15 GW – most of the downgrade will affect onshore wind, with volume shifting to come online by 2021 instead.

Romania Revaluing its Mineral Reserves

Romania is a country rich in mineral resources, but the reality is that we no longer know how much this wealth hidden in thousands of deposits is worth. The last quantitative revaluation was made 15 years ago. Since then, the increasing demand for raw material has led to a massive exploitation of mineral resources, and new deposits have been discovered in parallel. At the level of the National Agency for Mineral Resources (NAMR) a quantitative, qualitative and value revaluation action is in full swing, for over 700 deposits of solid minerals, then following to move to mineral waters and oil reserves. However, it is difficult to quantify the value of these deposits in money, but for specialists the value of a deposit is given by its size and quality.

by **Adrian Stoica**

Within this action, carried out by NAMR, about 60 deposits of ore, coal, building materials etc. have been revalued and tens of government decisions have been drawn up aiming at the registration of the real reserves at the current level of detail and knowledge. The new values of reserves are registered in the inventory of assets in the public domain of the state, in conditions in which there are deposits whose reserves have never been valued, having only an initial homologation thereof.

The first database, in 1925

In 1925, Romania made its first database on deposits. After more than 40 years, in 1968, geological data was introduced for the first time in a computer purchased from the U.S. Subsequently, in 1971, another computer was purchased, also from the U.S., for data storage. During 1997-1999, NAMR had made one of the most performing databases in the oil industry. Today, all data stored at the time with great effort is lost. Now, it must be re-uploaded.

Gold is no longer exploited

Gold and silver ore reserves are estimated at 760 tons, according to data available. But in Romania gold hasn't been exploited since 2007, after all exploitations had been closed because they were no longer profitable due to outdated technologies and high production costs. In the years to follow, technologies have improved, new ones have emerged, but Romania no longer opened the gold mines. In a top of the largest untapped 50 gold mines and deposits in the world, published in 2012 by Natural Resources Holdings, the deposit in Rosia Montana ranked 17, being valued at 18.5 million ounces of gold. Another deposit, the one in Rovina, was estimated at 6.96 million ounces of gold and ranked 47 in the top. Now, the only gold exploited is the one that appears in association with polymetallic ores.

Non-ferrous processing industry, destroyed

Copper deposits are estimated at around 2 billion tons, and the state-owned company Cupru Min holds the rights of exploitation for the largest deposit in Romania, the one in Rosia Poieni, where 60% of the country's reserves are located. Although Romania is the European country with the largest copper reserves, the manufacturing industry is missing. It existed, but was destroyed after 1990,

and now the copper ore concentrate is exported and processed products are imported. In 1990 there were 3 plants where processing was made, but one by one they have all been destroyed by failed privatizations. While Sometra Copsa Mica, Apelum Zlatna and Phoenix Baia Mare (formerly Cuprom) became history, our neighbours, Bulgaria and Serbia, have developed over the past few years a strong non-ferrous metals manufacturing industry.

90 million tons of polymetallic ores

Another important resource is represented by polymetallic ores. According to the Economic Encyclopedia of Mineral Resources, there are 90 million tons of polymetallic ores in Romania. One ton of polymetallic ore contains 10 grams of molybdenum, 30 grams of nickel and cobalt, 50 grams of chromium, 300 grams of gallium, 1,000 grams of titanium, 2,500 grams of vanadium and 5,000 grams of grams of arsenic.

Yellow hydrogen can save coal

Romania's coal reserves are large, but the new environmental policy of the European Union, known as the Green Deal, requires the abandonment of polluting technologies. The current data shows that Romania has hard coal reserves of about two billion tons, of which 600 million tons are in exploited perimeters. Also, Romania's lignite resources are estimated at 690 million tons, of which exploitable in leased perimeters, 290 million tons. This vital resource for the Romanian energy system will have to be replaced with less polluting sources, but coal might not be removed completely, already having technologies that can transform it into syngas, synthetic diesel and hydrogen (yellow H2 - coming from fossil fuels). Hydrogen, as an energy alternative, hasn't been only a topic of discussion in Europe for a long time. There are already many plants that produce green hydrogen (coming from biomass) and Germany has recently allocated EUR 9bn to develop the hydrogen industry. Romania is still contemplating the idea.

BP evaluations

According to BP evaluations, Romania has proven oil reserves of around 100 million tons and gas reserves of 100 billion cubic meters, excluding the offshore area. NAMR has not evaluated the mineral resources of the country, highlighted in the inventory of assets in the public domain of the state, managed by the authority, so assets in the nature of petroleum resources were recorded on December 31, 2015 with a 'zero' inventory value, according to a report of the Court of Auditors issued last year.

We have rare metals, but we don't exploit them

Romania is one of the few countries in Europe that holds rare metal resources. For example, before 1989, Romania was the sixth country in the world, after the U.S., USSR, China, Japan and France, to produce zirconium, from which the capsules in which the nuclear fuel for the Cernavoda plant is stored are manufactured. Titanium, which was used in the aerospace industry, was also mined. Another metal was vanadium, which is now included by the European Commission in the list of 30 critical raw materials for the EU. Vanadium is used to make special steels, and vanadium alloys are used in nuclear reactors, due to the poor interactivity of the element. Another ore passed on the U.S. list. is graphite, the raw material from which graphene is produced, a material up to 200 times stronger than steel and 1,000 times lighter than a sheet of paper. It is the best conductor of electricity, and the energy industry uses it more and more. The only graphite mine in Romania, located in Gorj County, produced about 40,000 tons per year in the 1990s, but is now closed. A lesser known element is tellurium, which in Europe is found only in Romania and Sweden, and globally China, USA, Canada and Australia still have reserves. It is a rare metal used in the manufacture of atomic bomb casings, in the aerospace and energy industries, but in Romania it is no longer extracted.

List of critical materials, extended to 30

The European Union's reliance on imports of raw materials threatens key industries and exposes it to blockades by China and other resource-rich states, shows a report by the European Commission, according to international media. Thus, the lack of raw materials used to produce batteries and equipment used in the field of renewable energy could also jeopardize the objective of the EU to achieve climate neutrality by 2050. The European Union estimates that in order to reach the climate neutrality target, the EU bloc would need 18 times more lithium and five times more cobalt by 2030. Forecasts for 2050 show that the EU will need 60 times more lithium and 15 times more cobalt, according to international media. Under these conditions, the list of critical raw materials for the EU was expanded to 30 materials, from 27, with four metals being added, while helium gas was removed. ■

CE Oltenia's Restructuring Plan, Another Via Dolorosa?

Polluting emissions are some sort of Via Dolorosa for CE Oltenia, given that each year the company must pay tens of millions of RON because it operates and, therefore, it pollutes. Annually, depending on the amount of electricity produced, the company must purchase up to 16 million allowances, whose cost can reach RON 50-60mln, depending on the quotation of allowances on the European market. Moreover, almost half of company's total expenses are those with the acquisition of CO2 allowances. Currently, the company has an ambitious restructuring plan, worth EUR 3.54bn.

by **Carol Dan**

If we don't privatize, we close. If we don't close, we modernize. If we don't do anything, we give some money to the budget to save inefficient units. But all according to a strategy, which we never get to apply. This is how we could summarize, maybe in a cynical way, the everlasting plan of the Government of Romania, irrespective of the political colour or ideological orientation, to make Complexul Energetic (CE) Oltenia, the largest coal-fired energy producer in Romania, competitive and viable in a domestic energy market misconfigured for 20 years. In fact, in Romania, the term 'restructuring' was used so often that it lost its meaning. As the terms 'anticorruption' or 'development'. No matter how many attempts the Romanian state has to make its companies viable, they are doomed to an almost inevitable failure. That's also because, in fact, remediation did not necessarily mean something good for a state-owned company, but only ensuring the electoral support for political formations. CE Oltenia has never been an exception, because the votes of almost 13,000 employees and their families cannot be ignored, right? But remediation did not fail only for political reasons. In fact, the main problem created by the political class and remaining unsolved so far is how the Romanian electricity production market is structured.

The error made by the Government in 2000, when it split the energy giant Conel into companies has never been repaired, although there have been opportunities in this respect. Let's recall that in 2000 several companies were split from Conel, separated on types of activities and types of fuels. Therefore, Termoelectrica took over the coal-, heavy fuel- and gas-fired power plants, Hidroelectrica took over the hydropower plants, Nuclearelectrica remained with (then) the only nuclear reactor at the Cernavoda power plant, Electrica took over the power distribution networks and Transelectrica remained

with the high voltage lines for power transmission. In the meantime, in 2007, integration with the EU with its unbundling and competition rules took place, and direct intervention by the state in this market, to repair the error from 2000, couldn't be made in a discretionary manner, like before 2007. But there wasn't even an attempt. And this was another issue.

The Romanian state is the majority owner of conventional power producers, namely Hidroelectrica, CE Oltenia and Nuclearelectrica, of the power transmission operator Transelectrica and of the last energy distribution companies that haven't been privatized, all under the umbrella of Electrica brand. This is the image of the Romanian energy production sector, and the single-fuel structure is its main shortcoming.

While the major energy groups, with which the Romanian producers are supposed to be in competition in an energy market that tends to full integration at European Union level, have constantly diversified their activities and energy production sources, Romanian producers have each remained dependent on their single energy source. Although there have been attempts to regroup these companies into new commercial structures with diversified energy sources, they were never taken seriously - and this is seen by the fact that such restructuring did not actually exist - not even by the initiators. In turn, there was a preference for political control, plundering these companies through dubious sinecures and doubtful daily allowances and their use for political purposes, not infrequently with a scent of criminal offenses.

But there is another reason why each Government and each Economy or Energy Minister is so concerned with mining regions, as is the one in which CE Oltenia is located: the fear of social revolts. There is a history of the use of mining as a political weapon in the miners' rampage cases in the 1990s, which resulted in material destruction, injuries and deaths, and a social discontent that justice ignores.

If the Government wants to truly restructure the sector, it should start with reorganization (yes, we all hate this word) of these single-fuel energy producers. While the European Union puts increasing pressure to drop the use of coal, Romania continues to allocate money for mining exploitations without future and make from their closure/opening a sinister political game, depending on who has the power at one time or another. At least in the case of CE Oltenia, if such real restructuring had been made, it wouldn't be necessary now, right? However, this is happening and the company has a new restructuring plan.

This latest restructuring plan of CE Oltenia, from a number of similar plans not materialized in reality, is worth EUR 3.54bn. It is definitely one of the most ambitious restructuring plans of the mining giant, but the risk to be only an electoral stake - Romania has two

rounds of elections in 2020, local and parliamentary - is quite high. If we look further, the image of a new plan doomed to failure becomes clearer: according to the Government, financing this restructuring program will be ensured with EUR 1.5bn from company's revenues, and the difference will be allocated either from the state budget or from the Modernization Fund managed by the Ministry of Economy, Energy and Business Environment, an institution that owns a 77.15% stake in the coal and power producer based in Targu Jiu, Gorj County.

Beyond political reasons, this restructuring plan is also reasoned by an obligation: returning a rescue aid of RON 1.2bn, contracted by the company in February this year. The equation is simple: CE Oltenia must either return this amount or undergo restructuring. Given that in 2019 the company posted losses of RON 860mln, returning the money becomes at least unlikely. And if we also consider that in 2018 CE Oltenia's losses amounted to RON 1.13bn, preparing a so-called restructuring plan becomes the only option. Otherwise, the Government should submit to the European Commission a plan for CE Oltenia's winding-up, which would be both an economic and political, but especially a social drama. At the same time, 20% of the electricity available would disappear from the national energy mix, which would put the economy in the extremely difficult position of not having enough electricity to operate normally, especially that Romania does not have backup units, and energy imports are already made close to the maximum physical capacity of energy transmission networks.

This latest restructuring plan of CE Oltenia provides for the phasing out of coal and switching to renewable energy and natural gas, i.e. the diversification of energy sources needed by all Romanian electricity producers. The provisions of this plan would be applied from 2021 to 2026 and, even if the company continues to use coal to generate electricity, even after 2030, year considered by Brussels the reference for entry in a new energy era, greener and less polluting, in the long run its share will drop significantly. Specifically, the company plans to replace half of the energy it currently produces from coal with other sources.

This plan also includes projects for the investment in new production units, with a total installed capacity of 2,000 MW. For the sake of enumeration, we recall the projects that Oltenia Energy Complex says its wants to implement: 8 photovoltaic parks in Turceni, Rovinari and Isalnita, with a total installed capacity of 700 MW, rehabilitation of a small hydro-power station of 10 MW in Turceni, construction of gas-fired power plants with a total installed power of 1,300 MW in Turceni and Isalnita. According to official statements, all these investments will be made in parallel with the staged closure of certain production capacities and mining exploitations, as well as with the outsourcing of some activities. The goal is that, at the end of all these efforts, CE Oltenia gives up the production of energy from a single source, lignite, and gets closer to what the European energy companies have been doing for a long time now, meaning to have a mix of resources - coal, natural gas, green energy - and thus reduce their CO2 emissions by 38%.

As already stated, CE Oltenia is no stranger to attempts to diversify activity. Unfortunately, each time it got stuck in the phase of their implementation. But that's also because almost always the company's management was too close or too controlled by the political leadership of the country, which has often meant divergent objectives regarding the company's destiny. In 2013, the company took over the assets of a hydrocarbon-fuelled power plant in Braila, in account of debt of RON 30mln. Of course, the 437 MW power plant taken over by CE Oltenia has never worked, and how the transaction was made has raised the suspicions of the Court of Auditors, which conducted an investigation.

In the end, if there is an actual desire for this company to survive and be restructured, CE Oltenia management and the Government should keep their eyes on 2050, year when the EU aims, under the Green Deal treaty, to reach the point of neutrality in terms of polluting emissions. For CE Oltenia, the efficiency of the current restructuring plan is crucial. A potential failure would also mark the disappearance of the company from the national energy landscape.

But CE Oltenia isn't the only energy producer controlled by the state that aims high (forced to do so). Other RON 26bn would be invested in Hidroelectrica by 2025, in several other projects, such as onshore and offshore wind farms, photovoltaic parks, biomass-fired power production, hydrogen production by hydrolysis, development of e-mobility networks. If the last two projects are as topical and eco-friendly as possible, the first two are déjà vu. The company has announced similar plans several times over the past few years, but without materializing them.

Romania was always good in making plans for the future. Besides this ambitious plan of CE Oltenia, PM Ludovic Orban raised with an even more daring plan, in two directions: investments of EUR 40bn in the transport infrastructure, sector in which Romania has huge shortcomings compared to any EU Member State, and other EUR 25bn in energy. All these huge investments would take place in the following ten years. But, as mentioned, Romania's plans in terms of energy are some of the most ambitious. By the way, Romania has set the most ambitious target in terms of renewable energy in the entire EU: 30.7% of consumption in 2030. Energy consumers hope they will not be the ones to pay the gross of this unjustified ambition, as it happened with the wind boom in 2011-2013, when Romania granted the largest subsidies in the EU for wind energy, a generosity that set the energy bills of citizens on fire. ■

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Ph.D. Prof. Eng. Sorin Mihai Radu

MINING IS NOT JUST ABOUT COAL

by **Daniel Lazar**

Ph.D. Prof. Eng. Sorin Mihai Radu, Rector of the University of Petrosani, is a mechanical engineer and graduated valedictorian at the Mining Institute of Petrosani in 1983, the Faculty of Mining Equipment and Installations, with a double distribution. In 1996 he completed a master's program in the Reconversion and Reconstruction of Industrial Regions in Nancy (France). Since 1985 he has been a teacher, first being an assistant, lecturer (since 1991), associate professor (since 1998) and university professor (since 2003). Since 2007 he has been a PhD supervisor in the field of Mines, Oil and Gas, already having 22 PhD graduates with the Minister's order signed. He is the author and co-author of over 30 books, has over 300 papers published at the international conferences attended, on all 5 continents. He is Doctor Honoris Causa of the Petroleum-Gas University of Ploiesti, of the University of Management and Engineering in Chisinau, member of prestigious academies abroad and an associate member of the Romanian Academy of Technical Sciences.

"After 1990 I participated in a competition and I was among the first 100 scholarship holders of the French Government in Romania, conducting, for a year, studies and research at the École des Mines in Paris for my doctoral thesis, which helped us open Petrosani University's collaborations with universities in France and throughout Europe, conducting research visits to universities in Germany and Belgium. Together with our colleagues, we realized international research papers based on European programs or research in

such a way as to make Petrosani University known, both through our graduates (there are over 5000 worldwide in the 72 years of higher education in the Jiu Valley and over 40,000 in Romania), being, together with the Oil and Gas University of Ploiesti, unique in Romania. We had and continue to have students from Australia, Canada, Latin America, Chile, Peru, Ecuador, Bolivia, we have graduates who come from African countries and returned there, as well as from the Middle East, China, Vietnam, Korea," says the rector of Petrosani University.

The mining industry is in a permanent transformation, on one hand due to the technologies of extraction of useful mineral substances, which are constantly being improved, and on the other hand, especially because some fossil fuels, and here we are talking about coal, used in thermal power plants for the production of electricity, are a factor of environmental pollution. Work is now underway to use filters at coal-fired power plants.

On the other hand, there is a desire to streamline coal mining in Romania. While until 1997-2000 the underground exploitation of coal, especially from the Jiu Valley, could be achieved even with economic losses, now this is no longer possible, and the underground activity has diminished. "I think that at present the exploitation of surface coal in the Oltenia Mining Basin needs to be continued because we have thermal power plants specialized in this type of coal, and the exploitation of coal through quarries is still efficient at the moment," said Rector Mihai Sorin Radu.

Mining is not just about coal, because people focus Romania only on this, but mining also means the underground exploitation of salt, which is used both for the food sector and for the salt mixture used in winter for snow removal. Then we have ornamental rock quarries in our country, we have copper that is mined at Rosia Poieni (Abrud), we also have a uranium deposit, it's true, a smaller one. There are chances that some surface gold mines will reopen, now there are problems with environmental permits.

"But we must not forget that even mineral waters are resources that mean, after all, mining. Also, in order for the quarry stone to be used for infrastructure systems, not only in Romania, but anywhere in the world, we need to have a specialized mining engineer in each quarry. Whether he is a full-time or part-time employee, a stone quarry cannot function in Romania according to current legislation. And we need more and more such rocks due to the rise, we hope, of the construction sector in road infrastructure. Mining is, therefore, complex and I would also say that the reanalysis of the situation of tailings dumps resulting from mining operations in Maramures, Transylvania and throughout the country must concern us. At present we have advanced technologies that can extract from these tailings dumps, which are already on the surface, and we no longer have to remove the deposit from the underground and we find here rare metals that are needed in everything that means cutting edge technologies, from mobile phones and up to any electronic device. If 60-70 years ago these tailings dumps were considered unprofitable, now they contain all these rare metals needed in many fields of activity," pointed out the Rector of Petrosani University.

Like any higher education institution concerned with the continuous change on the labour market, the University of Petrosani has also adapted its educational offer to the existing requirements on the labour market. While until 1990 the tradition was in mining engineering, mining machines and equipment, currently the institution has 3 faculties, 22 specializations with a license, 20 master's fields and 4 doctoral fields. The fields of study are extremely broad, from mining, environmental or occupational health and safety engineering to transport and traffic engineering or computers and automation, 4 economic specializations, social work, public administration, sociology, which are tempting for all students, no matter their gender, so that they can then find jobs in the labour market as soon as possible.

"Now we are preparing the accreditation for medical engineering, which is in high demand on the market due to the equipment that is used more and more in medicine. As such, we must have engineers who build this equipment, and on the other hand they must maintain it and take care of its proper functioning. This equipment is used to diagnose diseases, but also for surgery that exists in modern medicine. We also have foreign students, 350 of whom come from Bessarabia, for bachelor's, master's and doctoral courses and we started to regain the markets lost in the '90s, such as Africa, the Middle East (Jordan, Lebanon), but also the EU or Europe. It is no less true that there are also Romanians who live abroad and come to study in Romania," metioned Rector Sorin Mihai Radu.

Petrosani University has a number of projects that have been completed within the Horizon 2020 research program with European partners, and through the Erasmus+ Program sends about 140 students in Europe, both to universities and companies, where they do both internships, as well as courses, the exams passed being recognized. The university has previously participated in other European projects, Tempus, Socrates, Leonardo de Vinci, and was recently selected among the European university consortia along with two universities in Germany, UK, Austria, Greece, Spain and Poland, being among the top 10 universities in Romania included in European consortia.

"I hope through these programs we will have our courses identical to those of other European universities in such a way that the diplomas obtained in one of the universities in the consortium are the same as at the University of Petrosani," concluded Rector Mihai Sorin Radu. ■

‘Green’ Vehicles – Trend or Necessity?

Electric cars are gaining ever more ground against the conventional ones, with gasoline or diesel engines. Whether we talk about increasing environmental responsibility, constraints that already apply or have been announced by the municipalities of the major cities at global level, a marketing trend or simply for ideological reasons, electric or hybrid cars area increasingly often a topic of conversation (and not only) all over the world. But if we consider that the autonomy of batteries is relatively limited, the travel speed cannot be compared yet with that of the existing muscle cars, and the resources allocated to produce one battery are significant, as well as the price to replace it, we might think that gasoline and diesel engines still have a lot to live.

by **Daniel Lazar**

Increase in the number of ‘green’ vehicles in Europe

Purchases of ‘green’ vehicles (electric & hybrid) in Europe witnessed a significant increase in the first quarter of 2020, although the general evolution of the automotive market was negative. In Romania they reached a market share of 5.7%, compared to only 4.1% in the similar period of 2019, according to data from the Automotive Manufacturers and Importers Association (APIA).

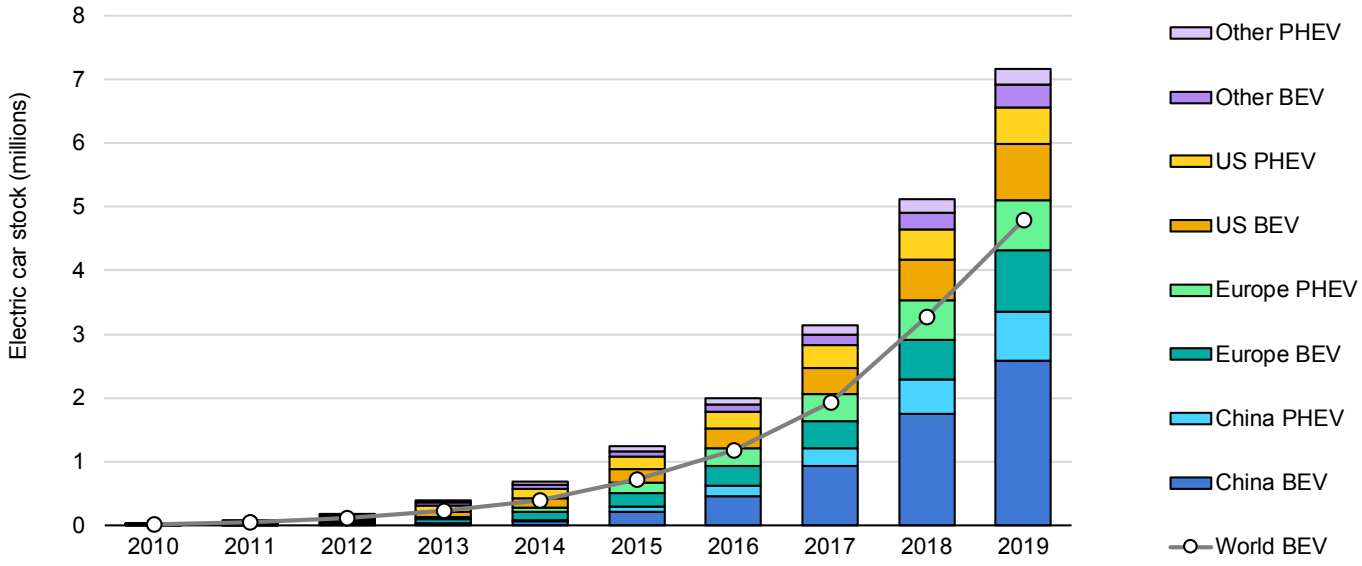
“Recent publicly available analyses show that in the context of the COVID-19 pandemic purchases of ‘green’ vehicles (electric & hybrid) in Europe (but also in Romania) witnessed a significant increase in the first quarter of 2020, although the general evolution of the automotive market was negative (-26.3% overall for the EU+EFTA+UK, with -22.2% in Romania). Therefore, according to the JATO study or that of PwC, recently published, electric vehicles recorded in Europe constant growth in both March and for the entire first quarter, Europe being in Q1/2020 global leader in the ‘green’ automotive market (PwC). In this context, electric vehicles in March 2020 recorded an increase in registrations by 15%, which corresponds to a market share of 17.4%, respectively +10.1% compared to March last year (JATO),” according to a statement by APIA.

Positive trend in Romania

In Romania as well, APIA says, evolution in the first quarter of 2020 of ‘green’ vehicles is positive, reaching a market share of 5.7%, compared to only 4.1% in the previous year, both as a result of decline in the volumes of heat engine (gasoline, diesel) vehicles and due to a higher volume than that recorded last year (1,575 in 2020, compared to 1,469 in 2019).

“As it can be noticed, in the first two months ‘green’ vehicles recorded a positive evolution, contrary to that recorded by those with conventional heat engines, and in March, when

Global electric car stock, 2010-19



the impact of the COVID-19 pandemic started to be felt, in conjunction with waiting for the start of the Rabla Plus Program, the declines, although important (-26.3% for EV and -15.6% for HEV) were lower than those recorded by those with conventional engines (-35% gasoline and -29.8% diesel). However, in the following months, after the actual start of the Rabla Plus Program (at the end of March), purchases of 'green' vehicles are expected to return to important growth. This estimate is the result of the fact that, in the same period since the beginning of the program (number of days), this year 372 reservations were already made for the acquisition of BEV and PHEV vehicles, by 72.2% more than in 2019, when, in the same period, there were only 215 reservations," the statement shows.

Moreover, it should be noted that this important increase in interest for electric vehicles takes place in the context of the COVID-19 pandemic and difficulties caused by the restriction of activity in many institutions involved in the process of carrying out this program.

"In this context, openness shown by both the Ministry of Interior and the Ministry of Environment is welcomed in this context, as, understanding the need for mobility of citizens and employees in this period, they have assured, under the legislative acts issued, a continuation of the Rabla and Rabla Plus programs and keeping the participant economic operators operational," APIA also mentions.

Top brands sold in 2020 in Romania

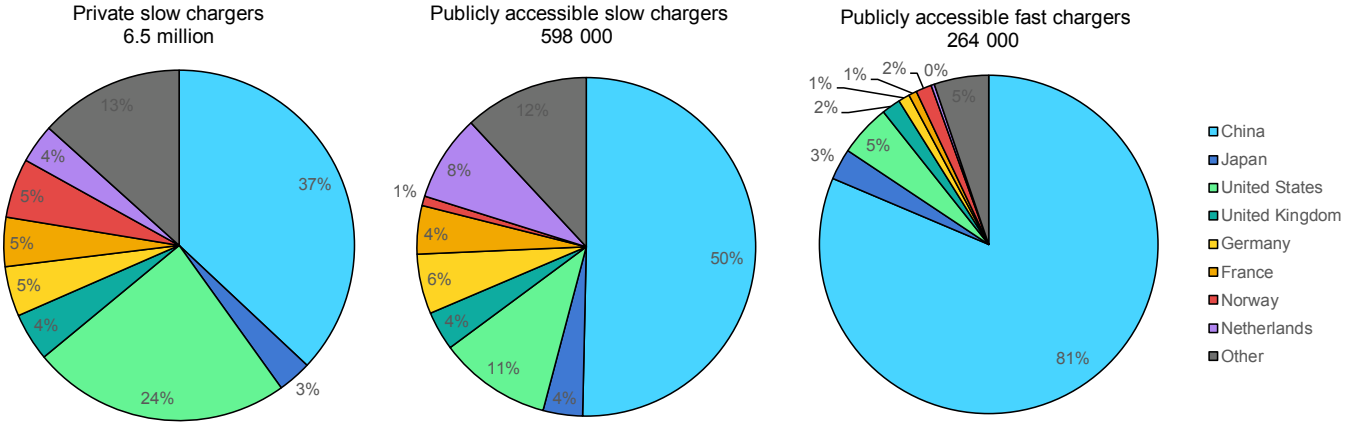
In Romania, in an automotive market that has compressed significantly after the first seven months of this year (-34.2%), electric cars (BEH, PHEV) continue their growth (+53.6% y/y). Although in July this year (according to DRPCIV data) fewer vehicles were registered compared to the similar month of last year (-42.4%), if we relate to this year's evolution, we can say the automotive market shows signs of recovery (+22.9% compared to the volume recorded in June, after in June we also witnessed an increase by 38.9% compared to May this year).

In terms of purchases of new vehicles in the EU, the situation of Western Europe countries is relevant, with a 2.2% increase in July compared to the similar month of last year, thus offsetting to some extent the declines so far. However, after the first seven months of 2020, for the whole of this group (according to LMC Automotive www.lmc-auto.com), there was a negative general evolution (-35%) compared to the same period of 2019.

The general ranking by brands (passenger cars + commercial vehicles) after the seven months of 2020 is led by Dacia, with 20,252 units, followed by Volkswagen, with 5,779 units, Renault 5,667 units, Skoda 5,000, Ford 4,905 units and Hyundai with 4,064 units.

In terms of passenger cars, at the end of the first seven months of 2020, Top10 is led by Dacia, with 18,950 units (-33.8% compared to

Private and publicly accessible chargers by country, 2019



2019, market share 30.7%), followed by Skoda 5,000 units (-34.6%, market share 8.1%), Volkswagen with 4,880 units (-24.5%, market share 7.9%), Renault 4,678 units (-44.3%, market share 7.6%) and Hyundai 4,064 units (-8.9%, market share 6.6%).

Dacia has presented its new electric model

Two and a half years after Renault had presented the K-ZE concept of a mini-class electric car designed specifically for emerging markets, Dacia presented the first images with the future model that will be available in Europe starting with 2021.

The Dacia Spring concept, considered the most affordable electric car in Europe, was designed based on the Renault K-ZE with which it shares several design elements. Moreover, the presentation takes place ten years after Dacia launched at the Geneva Motor Show the Duster SUV, the model with the greatest impact on the Mioveni plant in the last decade.

Dacia Spring forecasts a mini segment model with 5 doors and 4 seats, benefiting from a 100% electric engine. The series version aims for a range of about 200 km, which guarantees a versatile use, both in the urban environment and on interurban routes. For the first time, Dacia Spring announces that the future model will have headlights with LED technology, which consumes less electricity than halogen ones.

Diesel versus gasoline

Depending on the type of fuel of passenger car acquisitions, we notice that, in July 2020, the share of diesel cars is higher than in the previous month of 2019 (22.7% in June). For the whole period, diesel cars recorded an increase in the market share in 2020, respectively 28.3% compared to 26.6% recorded in 2019.

For the first seven months of 2020 as a whole, diesel cars continue to hold the largest share, i.e. 65.6% of the total (down compared to the share recorded last year, 69.5%).

'Green' cars, increase by 3.6%

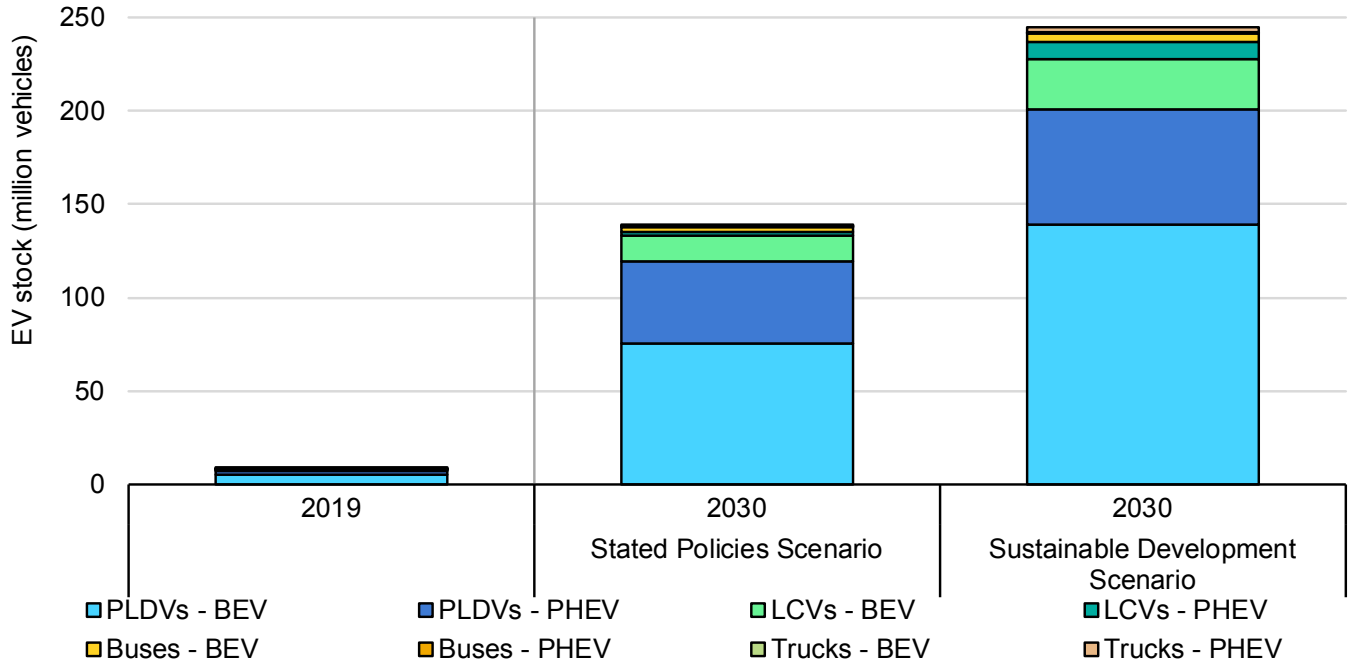
As far as 'green' vehicles are concerned, respectively the electric ones (100% and hybrid plug-in), as well as the hybrid ones (which have electric propulsion without charging from an external source), although after the first seven months of 2020, the automotive market is in a sharp decrease, this category of cars registers, as a whole, an increasing volume (+ 3.6%), compared to the similar period of last year.

On sub-categories, an important growth is recorded, of 38.6%, for 100% electric vehicles and a much more consistent one, of 115.1%, for hybrid plug-in vehicles. On the other hand, hybrid vehicles with electric propulsion (the multi-hybrid ones are not included here) register after the first seven months of 2020 a negative evolution (-11.5%), according to DRPCIV data, processed by APIA.

In terms of top brands in the first seven months for electric vehicles (100% + hybrid plug-in), which are stimulated by the Rabla Plus Program, the largest volumes are recorded by Renault (285 units), Skoda (213 units) and BMW (132 units).

In this context, in 2020 purchases of 'green' vehicles are expected to register significantly higher volumes than in the previous year, these being, to a

Global electric vehicle stock by scenario, 2019 and 2030



Notes: PLDVs = passenger light-duty vehicles; LCVs = light commercial vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle.

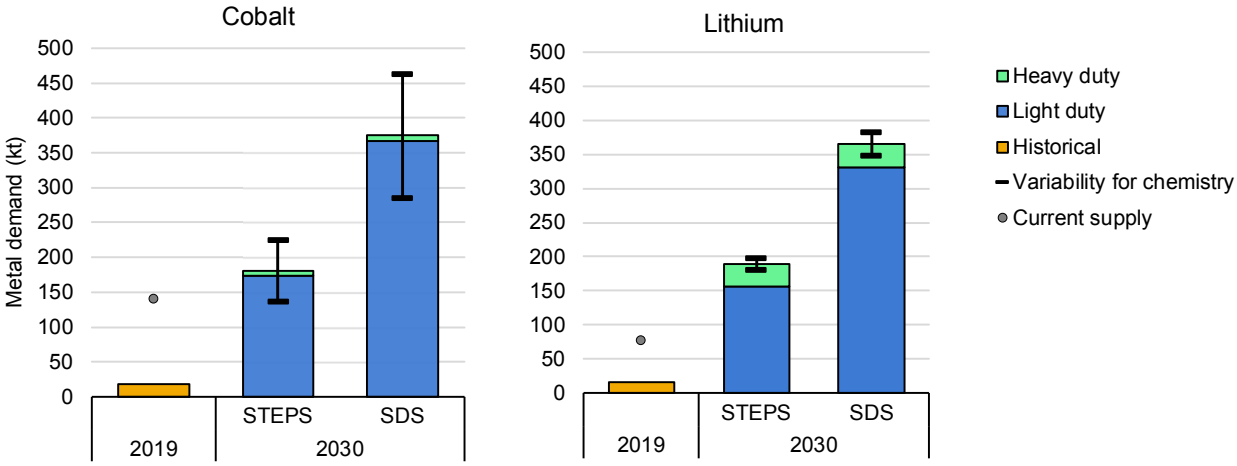
Source: IEA analysis developed with the IEA Mobility Model.

great extent, stimulated by the Rabla Plus Program (on this date, the program registers over 1,400 electric and hybrid plug-in vehicles reserved compared to only 800 years (+75% purchase intention).

E.ON Energie and MOL Romania to install 40 charging stations in 2020

E.ON Energie and MOL Romania will install this year 40 fast charging stations for electric vehicles, within the NEXT-E project. So far, E.ON Energie Romania has installed 17 stations: Iasi, Tg. Frumos (Iasi County), Cristesti (Iasi County), Roman (Neamt County), Piatra Neamt, Tasca (Neamt County), Gheorgheni (Harghita County), Sovata (Mures County), Targu Mures, Bacau, Suceava, Adjud (Vrancea County), Bucharest (three stations), Ramnicu Valcea and Constanta. The charging stations most recently opened, in Constanta, has a maximum power of 77 kW. Therefore, the average time for charging an electric vehicle will be approximately 40 minutes for 80% of the battery. In the location a fast charge station is installed, of 1x50 kW (direct current connectors CCS or CHAdeMO) + 1x22 kW (alternating current connector Type 2), which benefits from two parking spaces. The initiative is part of the NEXT-E project, co-financed from European funds through the Connecting Europe Facility (CEF) program through which E.ON Energie Romania aims to install 19 fast charging units for vehicles, another 21 following to be installed by MOL, one of the partners in this project. So far, through the NEXT-E stations installed by E.ON Energie Romania, the owners of electric or hybrid vehicles have used approximately 30,000 kWh of electricity and have traveled over 200,000 km. Most charges were made at the stations in Roman, Suceava and Iasi. The pan-European NEXT-E network will include six different countries, and 40 electric charging stations out of a total of 252 in the NEXT-E project will be installed in Romania and located on the routes: Suceava-Bacau-Calarasi, Constanta-Bucuresti-Timisoara and Iasi-Targu Mures-Alba Iulia. NEXT-E project was selected by the European Commission, in July 2017, for co-financing through the Connecting Europe Facility (CEF) program. The NEXT-E consortium will receive EUR 18.84 million for the implementation of the project, this being the largest CEF funding granted to a project for electric vehicles. Within it, a number of 222 multi-standard fast charging stations

Annual lithium and cobalt demand for electric vehicle batteries, 2019-30



Notes: kt = kilotonnes; STEPS = Stated Policies Scenario; SDS = Sustainable Development Scenario. Error bars show the variability arising from varying assumptions related to the development of future battery chemistries.

(50 kW) and 30 ultra-fast charging stations (150-350 kW) will be installed by 2020 along the main European corridors and the Trans-European Transport Network (TEN-T). The consortium consists of companies within the E.ON Group, MOL Group (the subsidiaries in the six participating countries), Hrvatska elektroprivreda from Croatia, PETROL (in Slovenia and Croatia), as well as Nissan and BMW. The network developed by this consortium aims to create an infrastructure in the Czech Republic, Slovakia, Slovenia, Hungary, Croatia and Romania.

Enel X Romania launches EV charging points network in Bucharest and surrounding areas

Enel X Romania has installed and put in operation a network of 34 charging points in Bucharest and surrounding areas, as part of its plan to build a wide charging infrastructure for electric vehicles across Romania.

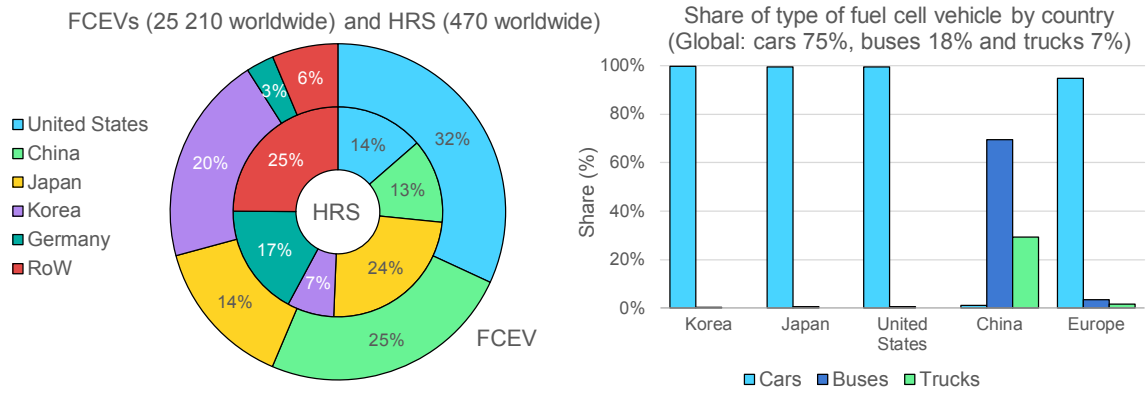
"The sales of electric and hybrid vehicles is constantly increasing, even during the difficult period that we are facing, and in a context that sees the auto market massively decreasing overall. However, we are confident that the electric segment will maintain its ascending course, in Romania in particular also due to the relaunch of Rabla Plus governmental program, which has proved to be of real value for the customers. We are very happy to allow users of EVs in Romania more flexibility for their mobility needs, and help improve access to charging infrastructure for more adopters of electric mobility, following our pledge to enable transportation anywhere in the country in a cleaner and more sustainable way", said Marius Chiriac, Head of Enel X Romania.

The charging infrastructure installed is based on the new, intelligent charging solutions of the Enel X global business line. The majority of the first series of charging points are 2x22 kW units, named JuicePole, which allow for the recharge of two electric vehicles simultaneously and for the charge of up to 40% of the battery levels in 30 minutes, depending on the car model and specifications. The Enel X installed charging solutions account also for the fast charging JuicePump, which is 50 kW DC, 22 or 43 kW AC, and allows the recharge of two electric vehicles at the same time.

Users will be able to recharge their vehicles at the Enel X charging points using the JuicePass mobile app - the single interface for Enel X customers to access a network of over 50,000 public charging points across 18 European countries, leveraging on the interoperability partnership with charging network operators IONITY and SMATRICS. The app can be downloaded from Google Play or App Store, and an installing guide can be accessed on enelx.ro website.

Drivers can check the locations and status of Enel X charging points on an interactive map either on JuicePass app, or on the website, here. They can see in real time if a charging station is available, occupied or in maintenance, as well as its type (fast, ultra-fast), the charging cable type, power, accessibility and distance to reach it.

Global shares of fuel cell electric vehicles and hydrogen refuelling stations, and shares by vehicle mode and country, 2019



Notes: FCEVs = fuel cell electric vehicles; HRS = hydrogen refuelling stations; RoW = rest of world. Global fleet shares include fuel cell electric passenger cars, buses and trucks.

Source: All fuel cell vehicle data reported in this figure and section are based on the annual data submission of the Advanced Fuel Cell Technology Collaboration Platform (AFC TCP) to the IEA secretariat (AFC TCP, 2020).

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 of the country's regions up to 2023, involving an overall investment of approximately 15 up to 20 million euros.

The installation of Enel X charging points will continue with other units in Bucharest, Timisoara, Sibiu and Constanta. The plan covers all of Romania's regions, and is aimed at adapting the distribution and installation of charging stations 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 on the premises of 'Recharge Partners' - 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 areas.

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.

Electric vehicles around-the-world

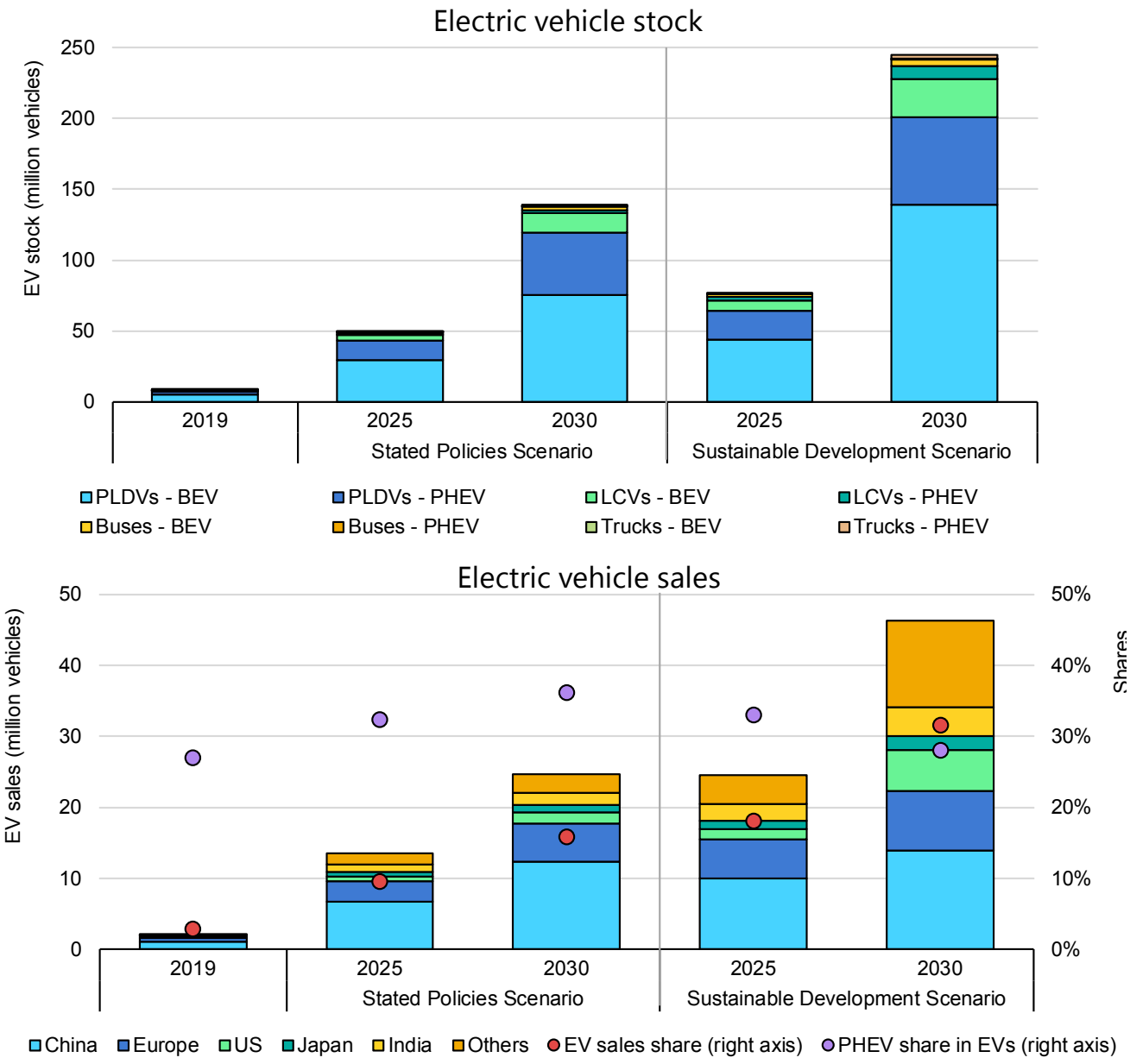
Renault will invest EUR 128mln in a joint venture in the electric vehicles sector with China's Jiangling Motors. The French group will hold a 50% stake in JMEV, a JMCG division launched in 2015. The joint venture will build a new series of vehicles, the companies following to tap into a market that has increased four-fold in the last six years.

China's YinLong Group also plans to launch production of two bus models in Serbia, after completing the acquisition of insolvent Ikarbus, announced the CEO of the company, Aleksandar Vicentic. Only the batteries of the two models will be made in China.

From Asia also comes the news according to which the South-Korean company Kyungshin Cables plans to invest EUR 20mln in the construction of electric vehicle charger cable sets in Serbia's Smederevska Palanka. Works at the new factory will be completed next year, 700 employees following to work here.

The deal under which Fiat Chrysler Automobiles pools its fleet with Tesla to be able to comply with stricter emissions regulations in Europe is in fact equivalent to a financing of the future electric car factory in Germany of the U.S. manufacturer. The Italian-U.S. manufacturer has concluded a deal with Tesla that could cost Fiat EUR 1.8bn by 2023.

Global EV stock and sales by scenario, 2019, 2025 and 2030



Notes: PLDVs = passenger light-duty vehicles; LCVs = light-commercial vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle. EV sales share = share of EVs (BEV+PHEV) out of total vehicles sales. PHEV share in EVs = share of PHEV sales out of EV (BEV+PHEV) sales.

Source: IEA analysis developed with the Mobility Model (IEA, 2020).

Europe beats China in terms of number of electric vehicles

Europe has surpassed China for the first time in terms of number of electric vehicles registered, according to data collected by analysts from the largest markets in Europe. Germany, France, Spain, Italy and the UK have managed to sell, in the first quarter of this year, more electric vehicles than China, according to a study by PwC.

According to this data, only in the five European markets, also known as the 'Big 5', 79,300 electric vehicles have been registered, to which those from the remaining European countries are added. In China, the volume sold, due to blockage caused by the coronavirus crisis, but also by factors that slowed down the market in the last year, amounted to 77,256 units. It is for the first time when Europe surpasses China, a country where electric vehicles witnessed a real explosion, with the help of emission restrictions imposed by the Government, and also as a result of the low price that locally manufactured electric vehicles have. Unfortunately for the Chinese automotive industry, car sales, including EV, collapsed more than half this year.

Instead, Europe this year witnessed a substantial increase in sales of electric vehicles, despite the coronavirus epidemic and the fact that dealer networks were closed in most countries. Financial incentives and the more drastic emission targets, as well as the expansion of the number of charging stations and the apparition of batteries with a higher range determined Europeans to prefer such a vehicle. If in the category of low-emission vehicles hybrid cars are also included, then Europe categorically overtakes China, where this type of vehicles is not equally popular.

Poland will present, by the end of this year, the first electric vehicle that it will produce and which will be designed by Italy's Torino Design, in two versions, hatchback and SUV. The experience of the Italian company has been proven so far by designing cars for Ferrari, Fiat, McLaren and BMW. The whole project envisages the production of five models: three are in the C segment, which will be adapted to the expectations of Polish drivers, and then it will move to smaller vehicles in the B segment and more models for families. In Poland, the automotive industry was hardest hit by the coronavirus crisis, with car production falling by 99% in current terms. The automotive industry is equivalent to a significant part of the economy, representing 11% of industrial production and 4% of the country's GDP. The sector has 130,000 employees and produces 8-9 hundred thousand light vehicles annually, while the production of larger commercial vehicles amounts to 70-90 thousand units per year. Most of the production is destined for export, mainly to the EU. The largest part of the sector is controlled by Western companies and financed by foreign investments, such as Fiat, Opel, Toyota, Volkswagen, MAN, Volvo and Scania.

Moreover, the Warsaw government wants one million electric vehicles to run on national roads by 2025. With production units for electric buses and a major battery factory for electric vehicles, Poland wants to become the engine of transport electrification in Europe. Under the new legislation adopted in the field of electro-mobility, local authorities are empowered to play an important role in the development of this field. To this end, subsidies are provided for the construction of charging infrastructure for public transport and charging stations for electric vehicles used by local authorities.

A significant increase in the number of electric vehicles in circulation on the roads of the Czech Republic is forecast for the coming years. The country's largest carmaker, Skoda, plans to sell 2,500 cars next year.

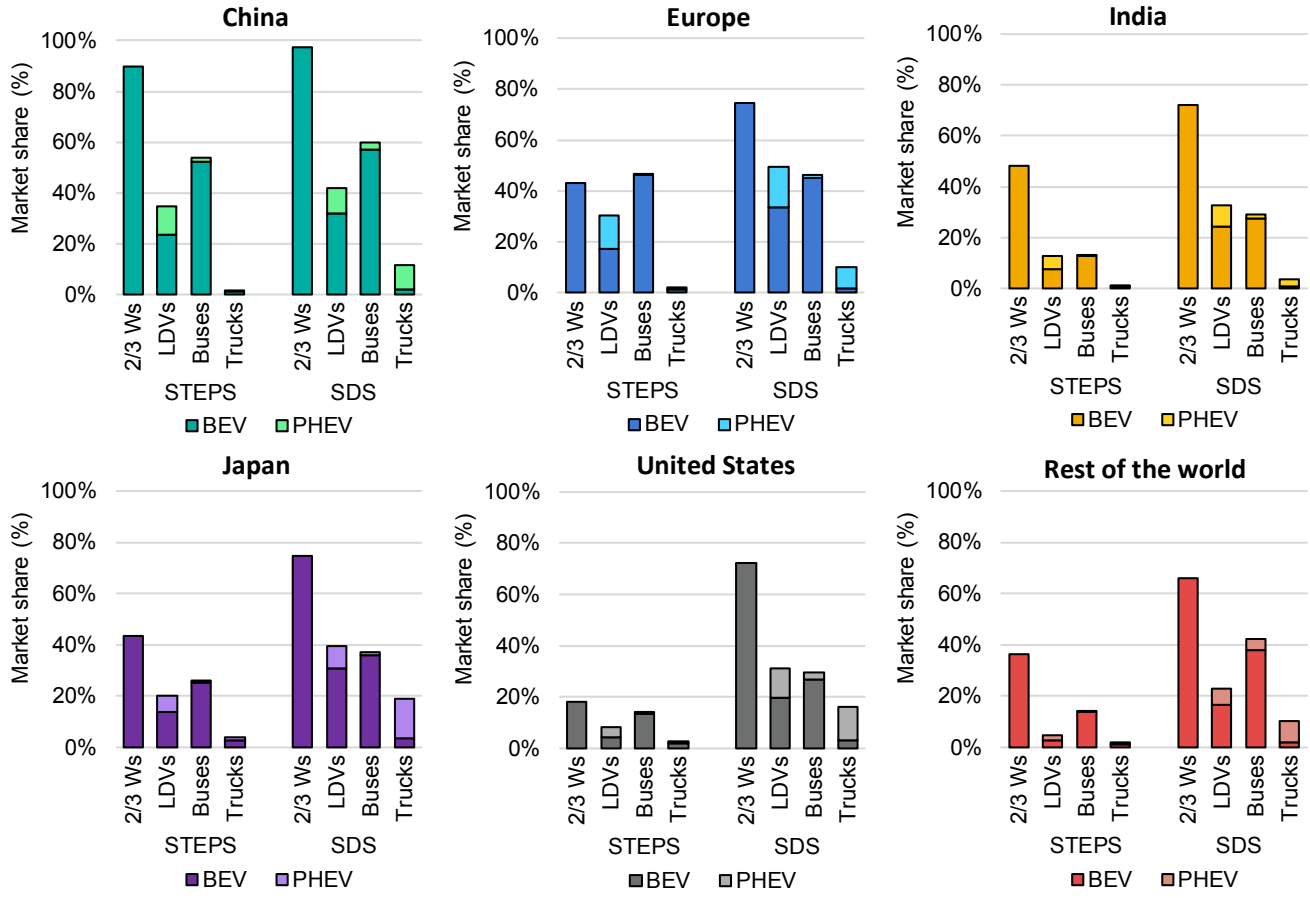
A survey conducted by the German economic institute Ifo, which highlighted an index of sentiment in the automotive industry, found that the automotive industry in this country remains pessimistic, and companies in the sector rate their current business situation as weaker than during the crisis of 2009. "The industry is down in a dark cellar, and although it's managed to climb back up a few steps, there's still no sign of light," said Klaus Wohlrabe, head of surveys at Ifo. Demand is lower than at any time since 1991, but good news is that the production expectations index has risen rapidly, which means that several companies have announced that they wanted to expand their production, which is currently at a very low level. The export expectations indicator also increased, a sign that companies believe that from now on their exports will decrease more slowly. However, as far as employees are concerned, problems have only begun.

State aid of EUR 3.2bn from the European Commission

At the end of last year, the European Commission approved a state aid of EUR 3.2bn from seven member states for research and innovation in the field of battery technology. Therefore, the Government of Germany will grant a support of EUR 100mln for the BASF project, which has chosen to invest in Brandenburg city to build its second electric vehicles battery materials factory in Europe, part of an investment plan of EUR 400mln to capitalize on the growing market of electric vehicles.

Bulgaria also has plans to produce vehicles and produce batteries for electric vehicles, holding discussions with Tesla for a potential investment in the neighbouring country south of the Danube. Greece is also negotiating the production of electric vehicles with the German carmaker Volkswagen.

EV share of vehicle sales by mode and scenario in selected regions, 2030



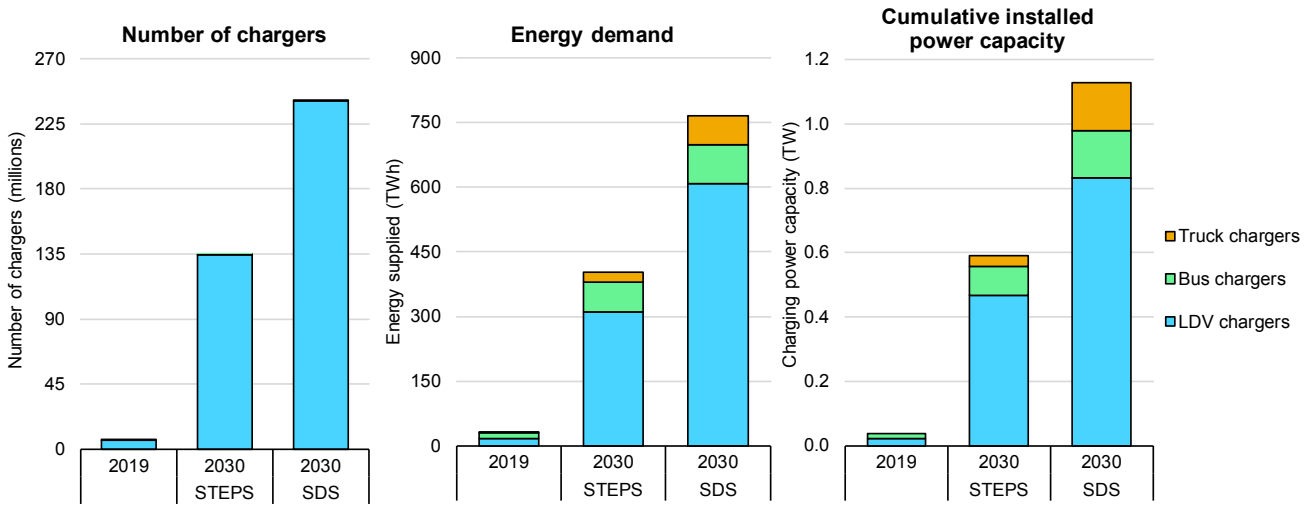
Notes: STEPS = Stated Policies Scenario; SDS = Sustainable Development Scenario; 2/3 Ws = two/three-wheelers; LDVs = light-duty vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle. Europe includes the countries of the European Union plus Iceland, Norway and the United Kingdom.

Source: IEA analysis developed with the Mobility Model (IEA, 2020).

Moreover, Germany's BMW has purchased a land of 400 hectares in Debrecen, Hungary, at 95 kilometres from the capital Budapest, to build a new factory, following an investment of EUR 1bn. However, the pandemic has postponed by one year the plan of the German group to start the investment scheduled for this spring, which will create here 1,000 jobs and produce 150,000 cars per year.

The BMW Group announces that it intends to sell over 7 million electric and hybrid plug-in vehicles in the next 10 years, of which more than half will be fully electric. BMW announces a 10-year sustainability plan, stating that it wants to bring forward the Paris Agreement on climate change, the main target being the expansion of electric mobility. The company says that, at the moment, BMW and MINI electric and PHEV sales account for 13.3% of the European car market, according to IHS Markit data. BMW says that the percentage represents 1.5 times more electrified cars than the average share of European brands, respectively 8%. However, BMW aims to increase this value to one third in 2021 and to 50% in 2030. Currently, the electrified vehicles of BMW and MINI are sold in 74 markets around the world, with a volume of over 500,000 units, at the end of 2019. By the end of 2021, the BMW Group claims it will exceed 1 million vehicles. By 2030, the amount

Number of private chargers, associated energy demand and cumulative installed charging power capacity in 2019 and by scenario in 2030



Note: STEPS = Stated Policies Scenario; SDS = Sustainable Development Scenario.

Source: IEA analysis based on Mobility Model (IEA, 2020).

of these vehicles will exceed 7 million, according to company's representatives, of which more than 60% will be fully electric. Emissions produced by BMW Group vehicles per kilometer will be reduced by about 40%, according to the BMW plan. BMW confirms on this occasion some of the future electric models: Series 7, Series 5 and X1, which will have the same multi-energy strategy, launched this year on the X3 SUV with the iX3 variant. It was presented for the first-time last month and will be launched in world markets starting this year. The BMW Group is also developing its charging infrastructure. The company will provide different types of charging stations, for home installation, offers and access cards for public stations, to over 155,000 charging points in Europe, while expanding the network of corporate charging stations to approximately 4,100 points in Germany alone. Last but not least, starting this year, the BMW Group claims it will supply all production sites around the world with 100% 'green' electricity.

Battery recycling centre in Finland

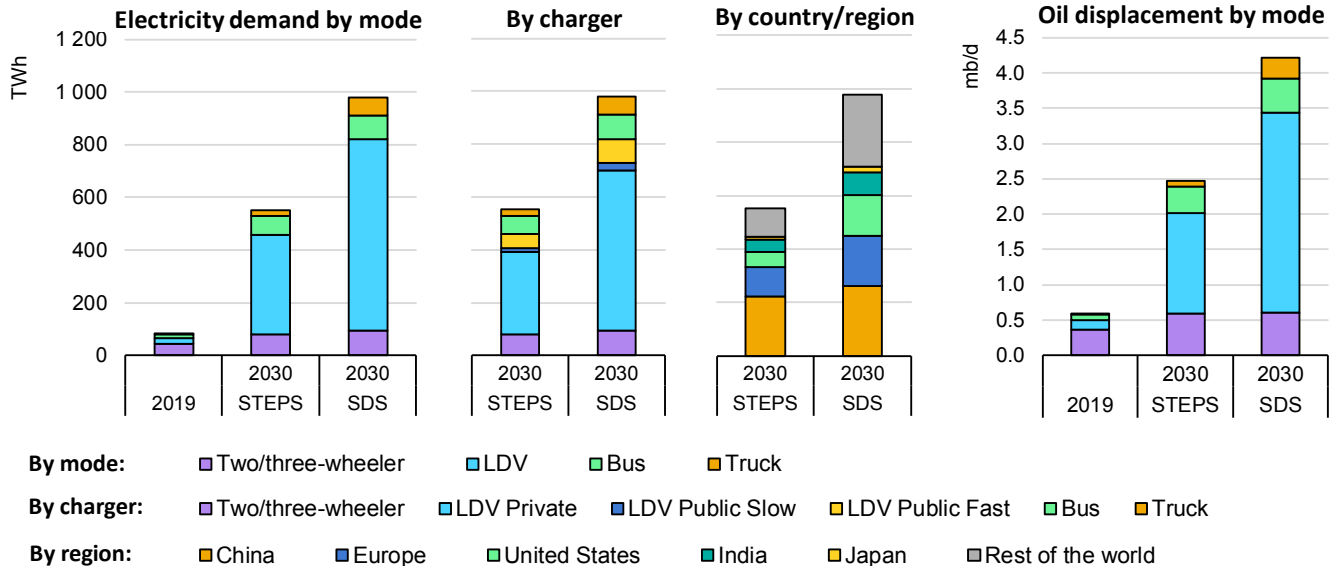
German giant BASF, Russia's Norilsk Nickel and Finland's Fortum have signed an agreement to build a battery recycling centre in Finland that will serve the electric car market. The companies plan to use the metals in recycled batteries to produce battery material using renewable energy sources.

Electric batteries manufactured in Bucharest

In 2019, Rombat, an established company on the domestic car battery market, acquired 35% of the shares of Prime Motors Industry Bucharest, a manufacturer of Li-Ion batteries and electric vehicles, controlled by businessman Adrian Polec. Battery tests are currently being carried out here, so that, from 2022, they can be delivered to European electric car manufacturers. Rombat has invested EUR 12mln in the factory founded by Adrian Polec and will produce the cells for the new batteries. The two companies are not at the first collaboration, as they developed in 2018 the electric version of Dacia Logan, this being one of the first steps that Rombat took in the field of batteries for electric vehicles and energy storage.

"We currently export worldwide for industrial, energy storage and automotive applications. We have already talked to several car manufacturers in Europe, but most start series production in 2022-2023. But to get to mass production you have to produce for 3-4 years to be approved. We now have an installed capacity of 200 MWh and we can produce one million cells," says Adrian Polec.

Electricity demand from the EV fleet by mode, charger type, country/region and oil displacement, 2019 and 2030



Notes: mb/d = million barrels per day; STEPS = Stated Policies Scenario; SDS = Sustainable Development Scenario; LDV = light-duty vehicle. Electricity demand by EV mode is calculated using the following assumptions (where the range indicates the variation across countries). Fuel consumption (in kWh/km): PLDVs 0.20-0.26; LCVs 0.31-0.42; buses 1.2-1.74; minibuses 0.35-1.49; medium trucks 0.87-1.11; heavy trucks 1.46-2.08; two-wheelers 0.03-0.04. Annual mileage (in km): PLDVs 8 000-18 000 km; LCVs 11 000-31 000; buses and minibuses 15 000-45 000; medium and heavy trucks 22 000-91 000; two-wheelers 4 000-7 600. Charging losses are 5% and the share of electric driving for PHEV is 70% of the annual mileage.

Source: IEA analysis developed with the Mobility Model (IEA, 2020).

Taking into account on average a 58kWh battery, as much as a Volkswagen ID.3 with a range of 420 km, then the factory can deliver batteries for about 3,500 cars per year.

Draexlmaier to manufacture batteries in Timisoara

Germany's Draexlmaier has also announced its intention to build a factory for electric cars batteries in Timisoara, where the company holds a land of 130,000sqm and has a development plan for a 15-year period. The development is designed for two stages, the first in 2020-2021, which involves the construction of the first production hall with an area of 10,125sqm, and the second stage, during 2022-2030, and where the central building of 15,300sqm and the following production spaces will be built. Germany's Draexlmaier produces in Romania, in the factories from Codlea, Hunedoara, Pitesti, Satu Mare and Timisoara, electrical wiring, electrical and electronic components, high voltage wiring, interiors (cockpit, centre consoles and door panels). The main beneficiaries are BMW, Jaguar, Mercedes-Benz or Maserati.

Instead of conclusion

Perhaps it is not unimportant that the most valuable brand in the world that produces cars is Tesla, a company focused on the manufacture of electric cars. With a market value of USD 183bn, the brand founded by Elon Musk is followed by Toyota - USD 176bn, Volkswagen - USD 84bn, Honda - USD 45bn, Daimler - USD 44bn, Ferrari and BMW - each with USD 42bn. ■

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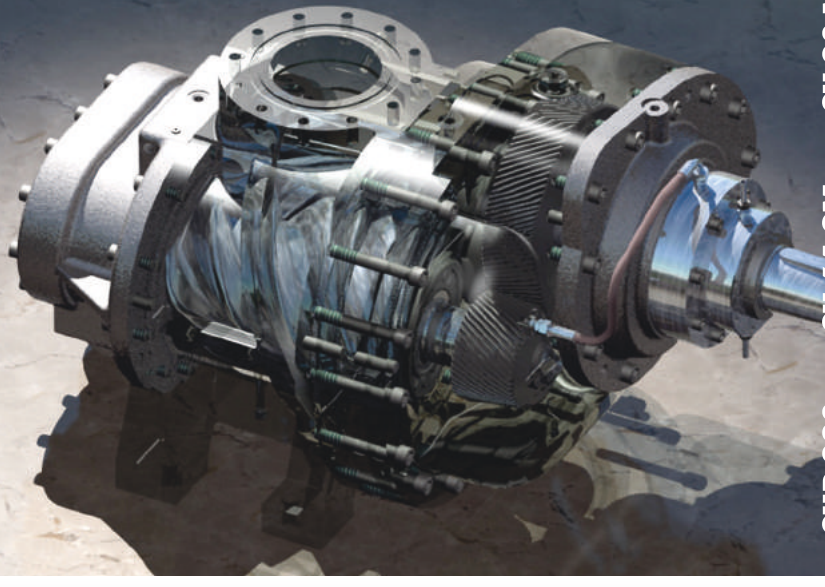

CU 90 M

Nominal Parameters:
Inlet pressure: **4÷9 bara**
Delivery pressure: **max. 45 bara**
Flow: **1,000÷1,800 Nm³/h**
Electric drive: **132÷250 kW**

CU 64 GM

Nominal Parameters:
Inlet pressure: **4÷9 bara**
Delivery pressure: **max. 45 bara**
Flow: **600÷1,600 Nm³/h**
Electric drive: **75÷160 kW**

CHP 220

Nominal Parameters:
Inlet pressure: **4.5 bara**
Delivery pressure: **45 bara**
Flow: **5,000 Nm³/h**
Electric drive: **700 kW**

APPLICATIONS

PETROM
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ROMGAZ
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- delivery gas in national pipelines
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