Roudi Baroudi: Μπλε οικονομία στη Μεσόγειο

Οι χώρες της Μεσογείου πρέπει να είναι από τους μεγαλύτερους νικητές στη μετάβαση από τα ορυκτά καύσιμα στις ανανεώσιμες πηγές ενέργειας, δήλωσε ειδικός σε θέματα ενέργειας την Τετάρτη σε ένα βασικό συνέδριο πολιτικής.

«Εδώ στην περιοχή της Μεσογείου, η μετα-άνθρακα εποχή έχει στην πραγματικότητα τεράστιες ευκαιρίες όσον αφορά την μπλε οικονομία», δήλωσε ο βετεράνος της βιομηχανίας **Roudi Baroudi** στο εικονικό All Things Energy Forum. Πρόσθεσε ότι ενώ η συμβατική αιολική και ηλιακή ενέργεια θα έχουν «βασικό ρόλο να διαδραματήσουν», η εγγύτητα της θάλασσας προσέφερε μια άλλη διάσταση.

“Υπάρχουν και άλλες πολλά υποσχόμενες ενεργειακές τεχνολογίες, όπως η βροχή, τα κύματα και η παλιρροϊκή ενέργεια, καθώς και η υποθαλάσσια γεωθερμία”, δήλωσε ο κ. Baroudi, ο οποίος έχει διετελέσει σύμβουλος σε κυβερνήσεις, πολυμερείς οργανισμούς και μεγάλες διεθνείς εταιρείες για την ενεργειακή πολιτική.

«Μερικές από τις πιο υποσχόμενες αντικαταστάσεις για τα ορυκτά καύσιμα περιμένουν στη θάλασσα, αν μόνο έχουμε τη σοφία και

την προνοητικότητα να τις αναπτύξουμε».

Η μεγάλη εγγύτητα μιας μεγάλης θάλασσας όπως είναι η Μεσόγειος δίνει στα παράκτια κράτη της βασικά πλεονεκτήματα σε σχέση με άλλα κράτη που είναι εγκλωβισμένα στην ξηρά, εξήγησε, επειδή έχουν πολλές περισσότερες επιλογές για παραγωγή ηλεκτρικής ενέργειας χαμηλής ή χωρίς άνθρακα.

Ο 40χρονος βετεράνος της περιφερειακής ενεργειακής σκηνής προέβλεψε ότι με ισχυρή ηγεσία, **οι περιφερειακές χώρες θα μπορούσαν να χρησιμοποιήσουν αυτό το δυναμικό για την πλήρη ηλεκτροδότηση όλων των κατοικημένων περιοχών τους.**

Αυτό το είδος πρόσβασης, στην ηλεκτρική ενέργεια, αποτελεί βασική προϋπόθεση για το είδος της οικονομικής ανάπτυξης που θα βοηθήσει εκατομμύρια ανθρώπους – ακόμη και δεκάδες εκατομμύρια – από τη φτώχεια», δήλωσε.

«θα μειώσει επίσης τη ροή των Αφρικανών μεταναστών που δεσμεύονται για την Ευρώπη δημιουργώντας νέες οικονομικές ευκαιρίες για αυτούς στην έδρα τους».

Ο κ. Baroudi προειδοποίησε, ωστόσο, ότι παρέμειναν σημαντικά εμπόδια εάν η περιοχή επρόκειτο να πραγματοποιήσει το πλήρες δυναμικό της για υπεράκτια παραγωγή ενέργειας, κυρίως επειδή περίπου τα μισά από τα θαλάσσια σύνορα της Μεσογείου παραμένουν αδιευκρίνιστα.

Όπως και με τις προοπτικές για υπεράκτιο φυσικό αέριο, εξήγησε, οι επενδυτές αποφεύγουν τέτοια διαφιλονικούμενα σύνορα επειδή η αμφισβητούμενη ιδιοκτησία μιας περιοχής ενέχει πολύ μεγάλο κίνδυνο. Για αυτόν τον λόγο, είπε, και επειδή η πίεση χτίζεται για μορατόριουμ για την ανάπτυξη νέων πεδίων πετρελαίου και φυσικού αερίου, **οι περιφερειακές χώρες χρειάστηκαν να υιοθετήσουν τη διπλωματία και να καταρτίσουν συνθήκες που ορίζουν τις αντίστοιχες αποκλειστικές οικονομικές ζώνες τους.**

Δεδομένου ότι το φυσικό αέριο αναμένεται να παραμείνει βασικό

καύσιμο μετάβασης για τουλάχιστον δύο δεκαετίες, εξήγησε, περιφερειακές χώρες θα μπορούσαν επίσης να κερδίσουν δισεκατομμύρια έσοδα από υπεράκτιες καταθέσεις – αλλά ορισμένες εξακολουθούν να χρειάζονται συμφωνίες ΑΟΖ για να ξεκινήσουν.

Δεν υπάρχει ανάγκη να είναι πιο πιεστική, ειδικά επειδή ο διάλογος και οι συμβιβασμοί που απαιτούνται όχι μόνο θα ανοίξουν την ανάπτυξη του φυσικού αερίου, αλλά θα έθεταν επίσης τα θεμέλια για στενότερη συνεργασία σε άλλους τομείς – αυτό ακριβώς απαιτεί η Μπλε Οικονομία για να αξιοποιήσει πλήρως τις δυνατότητές του», δήλωσε ο κ. **Baroudi,** ο οποίος είναι επί του παρόντος διευθύνων σύμβουλος της Energy and Environment Holding, ανεξάρτητης συμβουλευτικής εταιρείας στη Ντόχα.

Τα πλεονεκτήματα από την ηρεμία στη Μεσόγειο

«Ως μπόνους, μια πιο ήρεμη, φιλικότερη Μεσόγειος θα επέτρεπε επίσης την κατανομή ευθυνών και τη συγκέντρωση πόρων και δεδομένων, τα οποία θα βελτιώσουν σημαντικά τα αποτελέσματα σε όλα, από τη μετανάστευση, την πρόγνωση καιρού και την αναζήτηση και διάσωση σε συστήματα προειδοποίησης για τσουνάμι και την προστασία καλωδίων επικοινωνίας», είπε.

«Τότε θα μπορούσαμε απλώς να δούμε ολόκληρη την ευρωμεσογειακή περιοχή να γίνει ένας από τους καλούς γείτονες, ένα μέρος αμοιβαίων στόχων, διευθετημένων παραπόνων και ακόμη και γεωστρατηγικής συνεργασίας.

Τολμώ να το πω, κυρίες και κύριοι, η Μεσόγειος θα μπορούσε να είναι απόλυτα ειρηνική στη ζωή μας”.

Η εκδήλωση, της οποίας οι ομιλητές περιελάμβαναν διακεκριμένους ακαδημαϊκούς και ανώτερους ηγέτες επιχειρήσεων και ενέργειας, καθώς και βασικούς κυβερνητικούς υπουργούς,

πραγματοποιήθηκε την Τετάρτη.

Ο Roudi Baroudi έχει περισσότερα από 40 χρόνια εμπειρίας στον τομέα της ενέργειας και βοήθησε στη χάραξη πολιτικής για μεγάλες διεθνείς εταιρείες πετρελαίου, κυβερνήσεις και πολυμερείς θεσμούς. Σήμερα υπηρετεί ως Διευθύνων Σύμβουλος της Ενέργειας και Περιβάλλον Διαθέτοντας ανεξάρτητη συμβουλευτική εταιρεία.

Renewables boom unleashes war over talent for green jobs

Clean energy giants are finding a shortage of workers with the skills needed to support their ambitious growth plans.

The renewables jobs market is heating up and candidates with

the right abilities are becoming harder to find, according to Miguel Stilwell, chief executive officer at Portuguese clean-energy firm EDP Renovaveis SA. The company is one of the world's top installers of green power and plans to hire 1,300 employees over the next two years.

"There's a war over talent globally," Stilwell said in an interview on May 28. "The renewable sector, given the massive amount of growth that is expected, doesn't have enough people."

As countries funnel billions of dollars into developing renewable power, policymakers are banking on the sector to create new jobs that are crucial for the post-pandemic economic recovery. Solar generation capacity is expected to triple by the end of the decade, while wind capacity is expected to more than double over the same period, according to clean energy research group BloombergNEF.

Green supermajors such as NextEra Energy Inc, Iberdrola SA, Enel SpA and EDP are leading the race to electrify the global economy. But some large oil companies are starting to get into the sector too, with BP Plc announcing last month it's looking to fill 100 offshore-wind jobs in the U.K. and the U.S., a figure that could double by the end of the year.

Engineering skills such as energy assessment, project management and project design are in high demand, EDP's Stilwell said. Good business developers who understand clean energy technologies are also a scarce resource. Other roles, such as managing mergers and acquisitions, or back office tasks, can easily be hired from other industries.

"We're having to bring in people from other sectors, whether it's oil and gas or other parts of the energy industry, or recruiting directly from universities," Stilwell said. "There's a lot of competition out there."

Engineering and chemistry graduates working on a masters

degrees in renewables at the Universitat Politecnica de Catalunya in Barcelona are often hired while they're still in school, or right after they finish, according to Professor Jordi Llorca. The university has partnerships with other colleges in Europe and students often get hired to work in other countries like the U.K. or Denmark, said Llorca, who is also the director of an engineering research center at the university.

"We need to be fast to adapt the contents of our programs on the energy transition and renewable energies to make sure our graduates are competitive in the market," Llorca said. "We're constantly looking at the contracts and agreements we have with different industries to see what's needed."

The university launched a masters in hydrogen energy last year after professors realized very few people have the skills in mechanics and chemistry that the fast-growing sector will need very soon. "There's always a moment of vacuum whenever a new technology comes in, but we're able to put together new programs in just a few months."

Offshore wind farms are another growth area. The projects involve erecting and maintaining wind turbines the size of skyscrapers miles out to sea. A single turn of one of the massive blades could power a house for two days. The industry was pioneered in Europe, but is now rapidly expanding to Asia and the east coast of the U.S.

Those new markets don't have people with experience. That means that developers are often sending British and European employees to lead the way, according to Clint Harrison, director at renewable energy-focused recruitment firm Taylor Hopkinson. But as business takes off there's pressure to hire locally.

The limits of a well-trained workforce could end up being a bottleneck in an industry that is key to slashing emissions.

“There’s a sense of urgency,” Harrison said. “The market is growing very, very quickly and we need to ensure we have the right people across various projects and regions to ensure projects move forward and aren’t delayed.”

In the U.K. alone, around 200,000 skilled workers will be needed in the offshore energy sector by 2030, up from 160,000 today, according to a recent report by the Robert Gordon University in Aberdeen. About half the jobs are expected to be filled by people transferring from the oil and gas sector and about 90% of current workers in the fossil-fuel sector can be retrained for renewables, said author Paul de Leeuw.

“Demand for courses on renewable energy and the energy transition is ramping up rapidly and at the same time we see demand for oil courses declining,” he said. “It’s a societal and industry shift mirroring in the education system.”

BLUE ECONOMY IN THE MEDITERRANEAN

ATHENS, Greece: Mediterranean countries should be among the biggest winners in the transition from fossil fuels to renewables, an energy expert told a key policy conference on Wednesday.

“Here in the Mediterranean region, the post-carbon era actually holds enormous opportunities in terms of the Blue Economy,” industry veteran Roudi Baroudi told the virtual All Things Energy Forum. He added that while conventional wind and solar would “have a key role to play,” the proximity of the sea offered a whole other dimension.

“There are other promising energy technologies too, including rain, wave, and tidal power, as well as undersea geothermal,” said Baroudi, who has advised governments, multilateral institutions, and major international companies on energy policy. “Some of the most promising replacements for fossil fuels are waiting out at sea, if only we have the wisdom and the foresight to develop them.”

The very proximity of a large sea like the Mediterranean gives its coastal states key advantages over landlocked counterparts, he explained, because they have many more options for low- or no-carbon power generation. The 40-year veteran of the regional energy scene predicted that with

strong leadership, regional countries could use this potential to fully electrify all of their populated areas.

“That kind of access [to electricity] is a key requirement for the kind of economic growth that would lift millions of people – even tens of millions – out of poverty,” he stated. “It also would reduce the flow of African migrants bound for Europe by generating new economic opportunities for them at home.”

Baroudi cautioned, however, that significant hurdles remained if the region was to realize its full potential for offshore energy production, mainly because about half of the Mediterranean’s maritime boundaries remain undefined.

As with the prospects for offshore natural gas, he explained, investors avoid such unsettled borders because contested ownership of an area and/or resource poses too great a risk. For this reason, he said, and because pressure is building for a moratorium on developing new oil and gas fields, regional countries needed to embrace diplomacy and hammer out treaties that define their respective Exclusive Economic Zones. Since gas is expected to remain a key transition fuel for at least a couple of decades, he explained, regional countries could also earn billions in revenues from offshore deposits – but some still need EEZ deals to get started.

“No need is more pressing, especially since the dialogue and compromises required would not only open up gas development, but also lay the groundwork for closer cooperation in other fields – which is exactly what the Blue Economy demands in order to realize its full potential,” said Baroudi, who currently serves as CEO of Energy and Environment Holding, an independent consultancy in Doha.

“As a bonus, a calmer, friendlier Mediterranean would also allow the sharing of responsibilities and the pooling of resources and data, which would significantly improve outcomes in everything from immigration, weather forecasting, and

search and rescue to tsunami warning systems and protecting communication cables," he said. "Then we could just see the whole Euro-Med region become one of Good Neighbors, a place of mutual goals, settled grievances, and even geostrategic cooperation. Dare I say it, ladies and gentlemen, the Mediterranean could be fully at peace in our lifetimes."

The event, whose speakers included noted academics and senior business and energy leaders, as well as key government ministers, on Wednesday.

Roudi Baroudi has more than 40 years of experience in the energy business and has helped design policy for major international oil companies, sovereign governments, and multilateral institutions. He currently serves as CEO of Energy and Environment Holding an independent consultancy based in Doha, Qatar.

A global incentive to reduce emissions

• A fair proposal for reducing emissions would go some way towards reassuring that we do not live on another planet. And it would give everyone a greater incentive to save this one

With President Joe Biden’s administration recommitting the United States to the Paris climate agreement, and with a major United Nations climate-change conference (COP26) coming later this year, there is new hope for meaningful global policies to meet the challenge. But while mounting evidence of increasing climate volatility – unprecedented wildfires in Australia, droughts in California and Sub-Saharan Africa, intensifying hurricane and cyclone seasons – suggests that we must move fast in curbing planet-warming greenhouse-gas (GHG) emissions, there are serious impediments to concluding any new global accord.

Economists generally agree that the way to reduce GHG emissions is to tax them. But such taxes almost certainly will cause disruptive economic changes in the short run, which is why discussions of imposing them tend to run quickly into free-rider or fairness problems.

For example, industrialised countries such as the US are concerned that while they work hard to reduce emissions, developing countries will keep pumping them out with abandon.

But at the same time, developing countries like Uganda point out that there is profound inequity in asking a country that emitted just 0.13 tonnes of carbon dioxide per capita in 2017 to bear the same burden as the US or Saudi Arabia, with their respective per capita emissions of 16 and 17.5 tonnes.

The least costly way to reduce global emissions would be to give every country similar incentives. While India should not keep building more dirty coal plants as it grows, Europe should be closing down the plants it already has. But each country will want to reduce emissions in its own way – some through taxation, others through regulation. The question, then, is how to balance national-level priorities with global needs so that we can save the one world we have.

The economic solution is simple: a global carbon incentive (GCI). Every country that emits more than the global average of around five tonnes per capita would pay annually into a global incentive fund, with the amount calculated by multiplying the excess emissions per capita by the population and the GCI. If the GCI started at $10 per tonne, the US would pay around $36 billion, and Saudi Arabia would pay $4.6 billion.

Meanwhile, countries below the global per capita average would receive a commensurate payout (Uganda, for example, would receive around $2.1 billion). This way, every country would face an effective loss of $10 per capita for every additional tonne that it emits per capita, regardless of whether it started at a high, low, or average level. There would no longer be a free-rider problem, because Uganda would have the same incentives to economise on emissions as the US.

The GCI also would address the fairness problem. Low emitters, which are often the poorest countries and the ones most vulnerable to climatic changes they did not cause, would receive a payment with which they could help their people adapt. If the GCI is raised over time, the collective sums paid out would approach the $100 billion per year that rich countries promised to poor countries at COP15 in 2009. That would far exceed the meagre sums that have been made available

thus far. Better still, the GCI would assign responsibility for payments in a feasible way, because big emitters typically are in the best position to pay.

Moreover, the GCI would not snuff out domestic experimentation. It recognises that what a country does domestically is its own business. Instead of levying a politically unpopular carbon tax, one country might impose prohibitive regulations on coal, another might tax energy inputs, and a third might incentivise renewables. Each one charts its own course, while the GCI supplements whatever moral incentives are already driving action at the country level.

The beauty of the GCI is its simplicity and self-financing structure. But it would require one adjustment in how per capita emissions are computed. What is consumed is as important as how it is produced, so there will need to be some accounting for the portion of emissions embedded in imported goods; these will need to be added to the importer's emissions tally and subtracted from the exporter's.

Also, most experts would regard a $10 GCI as too low. But the point is to start small in order to get the scheme going and iron out the kinks. After that, the GCI can easily be raised by common agreement (or reduced, if there were some miraculous breakthrough in emissions-reduction technology). But to avoid creating uncertainty after an initial period of calibration, changes might be considered only every five years or so.

What about alternative proposals that have global effects? Some industrialised countries plan to impose a domestic carbon tax alongside a border-adjustment tax, effectively applying the same tax rate to goods coming in from countries that do not have a carbon tax. The border taxes might push other countries to impose their own carbon taxes, but it certainly would not improve fairness. On the contrary, they would let large importing countries impose their tax preferences on poor exporting countries and might serve as a Trojan horse for protectionism.

To be sure, the bureaucrats who dominate international

meetings will want to dismiss this proposal as “interesting but simplistic” (or words to that effect). The most powerful countries are also the biggest emitters, and few want to pay into a global fund, especially in these times of massive budget overruns.

But a GCI is by far the best option available. As rich countries cast about for remedies to domestic inequality, they should spare a thought for inequality between countries, which the pandemic and the unequal vaccine rollout will only worsen. Developing countries feel abandoned today. A fair proposal for reducing emissions would go some way toward reassuring them that they do not live on another planet. And it would give everyone a greater incentive to save this one.

— Project Syndicate

• *Raghuram G Rajan, former governor of the Reserve Bank of India, is Professor of Finance at the University of Chicago Booth School of Business and the author, most recently, of* The Third Pillar: How Markets and the State Leave the Community Behind.

Le premier parc solaire flottant en haute altitude au monde est en Suisse

Dans les Alpes valaisannes en Suisse, le lac des Toules accueille le premier parc solaire flottant en haute altitude au monde. Ses panneaux produisent 50% d'énergie en plus que ceux installés en vallée.

"Ce projet pilote produit 800 000 kWh par an," explique Maxime Ramstein, responsable de projets chez Romande Energie, l'entreprise, premier fournisseur d'électricité de Suisse romande, qui est à l'origine de cette installation. *"Ce qui correspond aux besoins de 220 foyers,"* précise l'ingénieur.

Des conditions avantageuses en montagne

A 1810 mètres d'altitude, les coûts de mise en place plus élevés sur l'eau qu'au sol sont en partie compensés par des conditions plus avantageuses : en effet, en montagne, le rayonnement solaire est plus fort.

"Le rayonnement solaire est meilleur en montagne," souligne Maxime Ramstein. *"Les températures plus faibles entraînent de meilleures performances et il y a aussi l'albédo, cet effet réfléchissant du rayonnement solaire, qui est très élevé au*

sol, sur la glace et sur la neige,” fait-il remarquer.

Limitation de l’impact environnemental

Le parc solaire est installé sur un réservoir artificiel pour la production hydroélectrique et non sur un lac naturel, limitant ainsi son impact environnemental.

“Il se vide chaque année et il se remplit à la fonte des neiges au printemps et en été,” indique le responsable de projets. *“Donc il y a très peu de flore et de faune et l’impact est très faible sur l’environnement,”* dit-il.

“Une durée de vie de 50 ans”
En cas de succès, ce projet pilote mis en service en décembre 2019 sera agrandi pour produire de l’énergie pour couvrir les besoins de plus de 6000 foyers.

“Nous avons développé une structure d’une durée de vie de 50 ans avec deux cycles de 25 ans pour les modules solaires,” déclare Guillaume Fuchs, codirecteur Solutions Energie chez Romande Energie.
“On compte agrandir ce projet sur le lac des Toules, mais aussi reproduire ce type de technologie sur un autre lac,” annonce-t-il.

LNG Makers Get Hint to Go Greener From U.S. Energy

Secretary

The days of promoting liquefied natural gas as “freedom gas” or “molecules of freedom” have ended at the U.S. Department of Energy.

During a Friday visit to Houston, U.S. Secretary of Energy Jennifer Granholm said the Biden administration would rather promote and sell a cleaner version of the superchilled power plant fuel. The statement marks a policy shift from the Trump administration, which rolled back environmental regulations and heavily promoted U.S. LNG around the world.

The energy industry has been under mounting pressure from investors and governments to step up efforts to reduce greenhouse-gas emissions, with some spectacular victories for activists over Big Oil this week. U.S. LNG makers are seeking to green their image in order to land supply deals with environmentally conscious customers in Europe and Asia.
The Biden administration, Granholm said, is looking closely at carbon capture and sequestration technology, which would take

emissions from LNG plants and other facilities, move them by pipeline and then inject them underground.

“We want to be able to promote and sell clean technologies,” Granholm said following a tour at an Air Liquide SA hydrogen plant in La Porte, Texas. “That could be natural gas that has been decarbonized, or that could be natural gas where the methane flaring has been eliminated.”

Houston-based Cheniere Energy Inc., the largest U.S. LNG exporter, recently announced that it would be including carbon emission tags with its cargoes, allowing customers to audit the environmental footprint of a shipment. One of the company’s LNG tankers recently participated in a study analyzing emissions on a roundtrip between Texas and Europe.
Arlington, Virginia-based Venture Global LNG announced Thursday that it plans to implement carbon capture and sequestration at three export terminals in Louisiana, where one is already under construction and expected to produce its first drops of the fuel later this year.

Still seeking to sell enough contracts to support its proposed Rio Grande LNG export terminal in South Texas, Houston-based LNG developer NextDecade Corp. has also pledged to add carbon capture and storage to its plant.

Spain to invest 1.5B euros in ‘green hydrogen’

Spain will spend 1.5 billion euros ($1.8 billion) from a European Union recovery fund to develop green hydrogen production over the next three years, Prime Minister Pedro Sanchez said Monday.

Spain will spend 1.5 billion euros ($1.8 billion) from a European Union recovery fund to develop green hydrogen production over the next three years, Prime Minister Pedro Sanchez said Monday.

The goal is for Spain to become Europe’s leading hydrogen producer using renewable sources instead of fossil fuels to curb greenhouse gas emissions and create jobs, he said.

“The Spanish government is firmly committed to green hydrogen,” the Socialist premier said at a ceremony in Toledo, just south of Madrid.

His government expects the outlay will stimulate 8.9 billion euros of mainly private-sector investment to develop the technology by 2030.

Madrid has already received over 500 “green hydrogen” project proposals from energy firms, a government statement said.

Creating “green” or emissions-free hydrogen is seen as a key step towards developing sustainable energy sources and slashing carbon emissions.

One reason for the strong interest in hydrogen technology is when used to fuel motors, the only emission is water vapour.

But it is expensive to produce and the electricity needed generates a lot of carbon dioxide emissions or other pollutants.

Green hydrogen is produced via electrolysis – an electrical current passing through water – with wind, solar or hydro-electric power providing the electricity.

Europe in particular is anxious to get a handle on the new and still costly fuel, having missed the boat on solar and battery technology, which is dominated by China.

Experts predict green hydrogen using renewable energy will soon plunge in cost and become cheaper than natural gas in many areas.

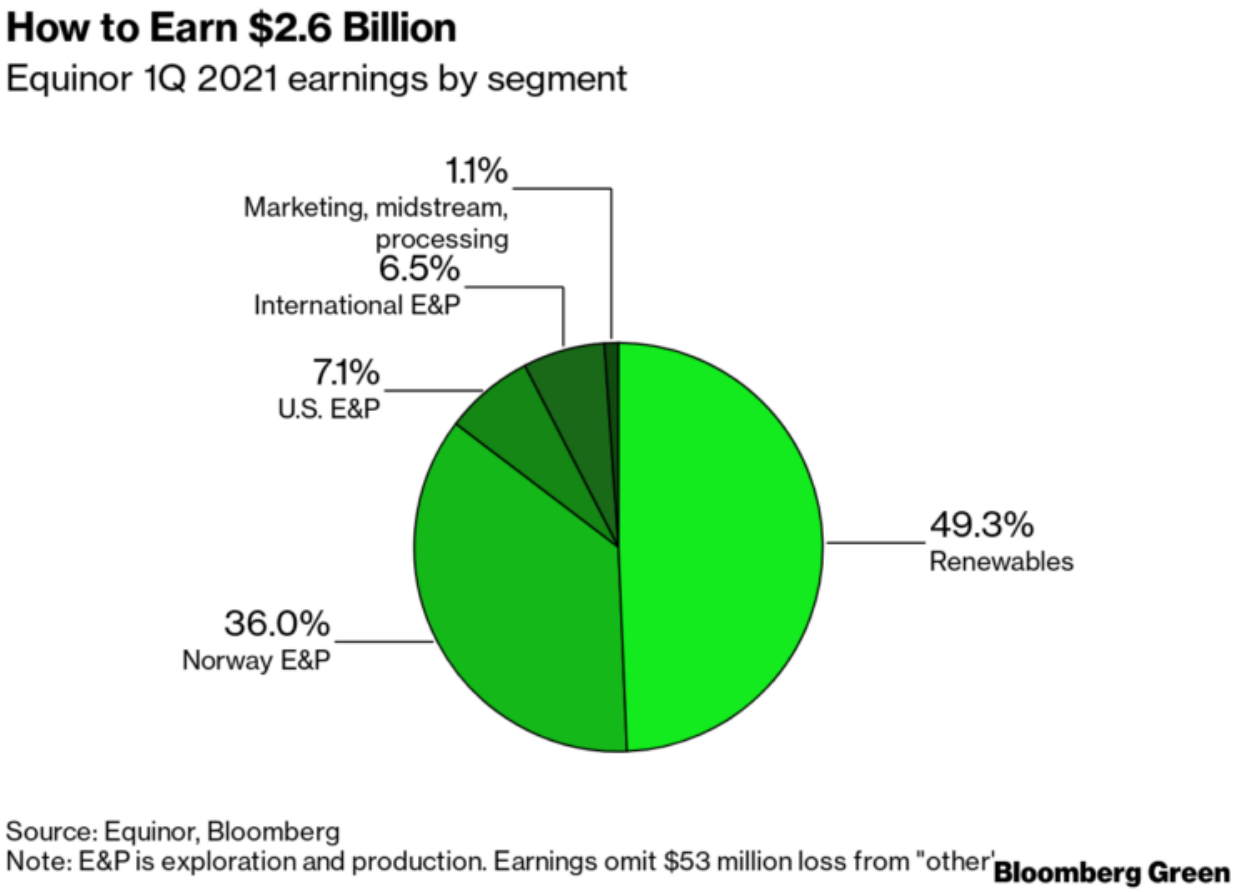
US engine maker Cummins announced Monday it would spend 50 million euros to build one of the world’s biggest electrolyser plants for the production of green hydrogen in Spain.

The plant, which will be built in the central region of Castilla-La Mancha, is expected to open in 2023.

“Spain offers a strong and dynamic local environment for hydrogen production, and we are excited to invest,” said Cummins chairman Tom Linebarger.

Spain is set to receive 140 billion euros – half in direct payments, half in loans – from the 750 billion-euro recovery plan adopted by EU leaders last year as the economy reeled under virus lockdown restrictions. (AFP)

How an Oil Company Becomes a Renewables Company



Last week a raft of oil majors released their first-quarter results, with companies like Royal Dutch Shell Plc showing a return to pre-pandemic profit levels. At the same time, some of the majors increased their energy transition commitments: as my Bloomberg Intelligence colleagues Salih Yilmaz and Will Hares noted on Twitter, Spanish firm Repsol SA devoted 40% of its capital expenditure to low-carbon projects, and France's Total SE stated plans to increase its renewable energy capacity five-fold over the next four years.

There are energy-transition commitments, though, and then there are energy-transition results. And on the latter side,

one company shines: Norway's state-owned oil producer, Equinor ASA. It posted more than $2.6 billion of earnings in the first quarter of 2021, 49% of which was from renewable energy. Last quarter, Equinor earned more from renewables than it did from oil and gas exploration and production.

But Equinor's results are more than evidence of a successful renewable-energy strategy. They're also a sign of the challenge ahead for other oil majors with similar ambitions.

Equinor's capital gains in renewables came from "farm downs," i.e. the selling of assets at various stages of development to new owners. (Another term for farm down is "asset rotation," which I discussed last week.) Equinor divested a 50% interest in two U.S. offshore wind projects and a 10% interest in two U.K. offshore wind farms. While asset rotation is slowing down in the power utility sector, it seems to be working fine for Equinor.
More interesting than the farming down itself is who Equinor is farming down to: two other European oil majors! BP Plc is buying into the U.S. projects, and Italy's Eni SpA is buying into the U.K. projects—or in other words, BP and Eni are paying Equinor for the privilege of taking on the earlier stages of developing offshore wind.

Therein lies the challenge for Big Oil's energy transition plans. Equinor's way to benefit from renewable-energy assets is, essentially, to put in the early work of developing them—and then reap the cash benefits of selling them to others.

Importantly, early wind development is more time-dependent and expertise-dependent than it is capital-dependent. Equinor's U.S. wind assets are the result of its success in the country's 2018 offshore-lease auction, when it won stakes with a bid of $135 million. In its latest earnings statement, the company says BP paid $1.2 billion for those same assets, netting the Norwegian company $1 billion on the deal.

Equinor is a special creature in a few ways. First, one of the reasons it could be an early developer of U.S. offshore wind is that it has decades of experience developing and operating offshore oil and gas assets. Other oil majors (in particular BP) can claim the same expertise, but Equinor seems particularly adept at it.

Second, the company is two-thirds owned by the Kingdom of Norway, with Norway's Government Pension Fund Global, also known as Norges Bank, owning another 3.59% of the company via Folketrygdfondet, which is authorized to invest 85% of its funds in Norwegian companies. Not only is the government a particularly patient and committed shareholder, it also has a hand in its portfolio companies' strategies. The Folketrygdfondet "has an interest in an orderly transition in line with the Paris Agreement" and expects that its portfolio companies "integrate climate change considerations into policies and strategy."

So to recap: Norway reinvests its state-oil company's revenues back into said oil company, while also helping drive said oil company's energy transition strategy. As Equinor's first-quarter results show, all of this effort and coordination has made it possible for an oil company to get half its revenues from renewable energy, at least for now. Other oil majors reaching for that same brass ring will have their work cut out for them, certainly—and may continue to resort to buying assets from each other in their quest to get there.

Nathaniel Bullard is BloombergNEF's Chief Content Officer.

Getting to zero deforestation in the Amazon by 2030

Amazon deforestation in Brazil reached a 12-year high in 2020, and over 95 per cent of it is illegal. Governments and markets must radically revalue the rainforest’s natural services and stimulate a green economy to avoid a nightmare scenario.

The Amazon Basin is fast approaching an irreversible tipping point. That should concern everyone, because what happens in the Amazon has planetary implications.

Spanning eight South American countries and French Guiana, the Amazon contains over 60 per cent of the world’s tropical forests, 20 per cent of its fresh water, and about 10 per cent of biodiversity.

As a result of land speculation and insatiable global demand for meat, soy, gold, and other commodities, roughly 20 per cent of the world’s largest tropical forest has already been

razed.

A further 5 per cent rise in deforestation levels could trigger catastrophic dieback, essentially dooming the 2015 Paris climate agreement.

Some fear this process may already have started. The current prognosis is not good: Amazon deforestation in Brazil reached a 12-year high in 2020, and over 95 per cent of it is illegal.

Unless governments and markets radically revalue the rainforest's natural services, this nightmare scenario may be unavoidable.

Dieback in the Amazon Basin could release the equivalent of a decade's worth of global greenhouse-gas emissions. The forest would also lose its ability to absorb billions of tons of carbon dioxide, disrupting hydrological cycles, evapotranspiration, and ocean currents.

The agro-industrial sector could collapse, and the loss of biodiversity could be staggering. Hydroelectric facilities would be shuttered, declining water tables would make cities unlivable, and fisheries would become unviable.

Preventing this outcome requires achieving zero deforestation in the Amazon by 2030. And that, in turn, requires a clearheaded scientific assessment and science-based targets.

The Science Panel for the Amazon, a coalition of about 200 leading scientists from the region, should become permanent. And, given the extraordinary wealth potential of preserving the forest's biodiversity, the best way to protect this resource is by stimulating the emergence of a green economy.

For starters, this will require a crackdown on illegal deforestation and the networks that sustain it. Brazil's environmental enforcement agency, Ibama, handed out 20 per

cent fewer fines in 2020 than in 2019, owing to funding cuts and reduced sanctions – and less than 3 per cent of fines are paid.

Reinforcing Ibama, a federal agency, is essential, as is bolstering state-level institutions on the frontlines of environmental crime, such as police, firefighters, and land registration offices.

Illegal deforestation occurs in several ways, but typically involves unlawful land invasions, followed by forest clearance for commercial agriculture and ranching.

Another encroachment, wildcat mining, mostly for gold, undermines local ecosystems and human health, while wildlife trafficking, fueled by unrelenting global demand for rare birds, reptiles, and mammals, also affects forest health.

Currently, two-thirds of global supply chains have no policies on illegal deforestation. Massive investment in high-resolution remote sensing and artificial intelligence-based alert systems is essential, as is tracking illegally extracted commodities in global supply chains and strengthening investigation and prosecution.

One of the most important priorities in the Amazon is developing a transparent and accountable system that allows property titles and land demarcations to be registered and monitored properly over time.

Given the considerable fraud and corruption in most Amazonian countries' land registries, creating a digitised, accessible, and up-to-date ledger is critical to enforcing existing laws and stimulating legal markets.

Developing an online dispute-resolution process to address outstanding legacy litigation related to competing land claims is no less vital. And establishing a blockchain verification system for land registries to demonstrate a clear

chain of ownership and custody, while difficult, would greatly improve the prospects for a green economy.

Another priority is accelerating reforestation and land regeneration. In Brazil, home to 60 per cent of the Amazon, the state of Pará is an obvious location for such efforts. In Colombia, Peru, and Ecuador, which together contain roughly 23 per cent of the Amazon, the states of Amazonas, Loreto, and Pastaza, respectively, stand out.

The key is to build a predictable pipeline of reforestation, biodiversity conservation, and sustainable forest management projects that can scale rapidly.

The Reducing Emissions from Deforestation and Forest Degradation initiative could accelerate funding for such efforts. International financing from the Amazon Fund, US President Joe Biden's administration, and tools such as green bonds would help, while local financing also could play a significant role.

So, too, could initiatives such as the Global Commons Alliance and 1t.org, along with investor activism, including from sovereign wealth and pension funds. In 2019, some 230 global investors, managing a total of more than $16 trillion in assets, called on companies to meet their deforestation commitments or risk adverse economic consequences.

Most important are innovations to bolster the green economy and support the communities that are the custodians of the Amazon Basin. Such initiatives could be accelerated by a Brazilian equivalent to the US government's Defense Advanced Research Projects Agency to ramp up research and development, as well as related regulatory frameworks to enable an inclusive bioeconomy in the Amazon.

This approach would include applied research to collect and map Amazon biodiversity – with scientists studying fruits, nuts, plant extracts, and fibers, and using drones to sample

biodiversity in hard-to-reach areas – along with digital platforms to secure biological assets for the public good.

To ensure that indigenous and local populations are included and benefit, clear and enforceable data-sharing rules and safeguards to promote local value creation and retention must accompany these efforts. In addition, establishing low- and high-tech innovation hubs in selected countries can stimulate local innovation, harness traditional knowledge, and ensure local ownership.

Advancing the green economy and achieving zero deforestation in the Amazon will depend on the combined efforts of governments, the private sector, and civil society. In Brazil, several groups – including the Concert for the Amazon and the Brazilian Coalition on Climate, Forests, and Agriculture – are playing a pivotal role in shaping the agenda and connecting stakeholders. And with the country's federal government missing in action on this issue, local governments also are stepping up.

Concerted international and regional efforts – such as the Leticia Pact – combined with national and subnational interventions could create a brighter future for the Amazon. The health of the planet depends on it.

Robert Muggah, Juan Carlos Castilla-Rubio, and Julia Sekula contributed to this commentary.

Ilona Szabó, Co-Founder and President of the Igarapé Institute, is an affiliate scholar at Princeton University's Brazil LAB and a public policy fellow at Columbia University

Copyright: Project Syndicate, 2021.

Inevitable fragments of a carbonneutral society: Natural gas coupled with CCUS, renewables, and hydrogen

As global society keeps pursuing a zero-carbon energy system, hydrogen’s role is becoming more notable. Updates and progress around the topic are now being broadcasted at an increasing pace, extending to areas that promise a significant role for hydrogen. Just a couple of years ago, everyone had agreed that hydrogen would gain a meaningful share by around 2050. However, these days, due to sanctioned projects and the advancement of the related technologies with a set of adopted strategies, it is believed that the hydrogen era will

materialise much earlier.

Hydrogen is not the only piece of the puzzle to achieve carbon neutrality, but it is the one that promises a feasible pathway towards net zero-emission through complementing other routes such as electrification and natural gas coupled with CCUS (carbon capture, utilisation and storage). The supremacy of hydrogen is based on the possibility that it can be employed to decarbonise the so-called hard-to-abate sectors or in sectors in which other decarbonisation pathways, such as electrification, are challenged. These sectors include but are not limited to steel, iron and cement, as well as heavy long-haul vehicles, aviation, and maritime and railways transportation. The GECF Hydrogen Scenario encompasses some of these recent developments in its latest update, which was published in February 2021. The Scenario has taken into consideration the latest updates and strategies adopted by countries and groups and assessed their impacts.

Currently, several countries have officially published their hydrogen strategies or hydrogen roadmaps. In some of the roadmaps and strategies such as the EU Hydrogen Strategy, the main priority has been attached to renewable hydrogen. While in some others, such as for Japan, Russia, and South Korea, blue hydrogen is envisaged to take a meaningful role. In certain strategies, definite and clear targets are set, like for the EU Hydrogen Strategy that considers a minimum of 40 GW installed renewable hydrogen electrolyser or 10mn tonnes (mt) of renewable hydrogen by 2030. Within the EU Hydrogen Strategy, another 40 GW is also defined as a target to install in the neighbouring countries and import to the EU. According to the latest results from the updated GECF Hydrogen Scenario which assumes a practical penetration of hydrogen into the future of the energy system, the demand for hydrogen by 2050 will increase by more than four times. However, the carbon saving through this hydrogen penetration is forecasted to be less than six (6) $GtCO_2$ – far below the amount needed to

achieve the Paris Agreement goals.

This result emphasises that, firstly, the hydrogen production supply chain needs to advance in all parts, and the cost should be reduced to gain more share in the future of the energy system. Secondly, the result highlights that hydrogen could not be the only solution in the carbon neutrality pathway, and other clean and decarbonised options, such as the application of natural gas coupled with CCUS has to be seriously taken into consideration by all stakeholders. Henceforth, let’s take a look at some results and forecasts from the Reference Case Scenario (RCS) of the latest GECF Global Gas Outlook 2050 (GGO 2050), as it will enable a clear view of the potential needs to fully decarbonise the hard-to-abate energy sectors when hydrogen is hypothetically assumed to take a sole role. According to the RCS results, the total EU transport demand in so-called hard-to-abate sectors will be reduced from 217mn tonnes of oil equivalent (mtoe); in 2019 and pre-Covid-19 pandemic situation, to around 150 mtoe by 2050. This reduction is primarily due to the energy efficiency enhancement of the fleets. In order to produce 150 mtoe of energy, around 52mt of hydrogen is needed, requiring more than 500 GW of electrolyser. This should be added to the demand from the iron, steel, and cement industry (other assumed hard-to-abate sectors.) The fossil fuel demand (coal, natural gas and oil products) from these sectors in the EU is forecasted to stand at 24 mtoe by 2050. To meet this level of demand only with green hydrogen, around 70 GW of the electrolyser must be installed. Based on the forecasted demand levels, the EU will need around 570 GW of electrolyser capacity to decarbonise the aforementioned hard-to-abate sectors in case that the green hydrogen is assumed to be the only solution. Based on technical circumstances and the policy, in the EU Hydrogen Strategy, the target was set to 2 x 40 GW renewable hydrogen by 2030. Therefore, the needed electrolyser capacity for 2050 seems to be challenging but feasible in the EU. However, we still need to bear in mind some other salient points. The

first point is that these results are based on assuming a successful effort in enhancing energy efficiency, and the level is subject to uncertainty. The second is that this is the volume needed only to decarbonise the referenced hard-to-abate sectors. Several other consuming sectors are supposed to be decarbonised through other pathways such as electrification.

They also create a massive volume of renewable electricity demand. A big question mark here is to gauge if there is a sufficient potential of renewable energies within the EU to accommodate all renewable electricity demand in the sectors and meet the electricity demand of electrolysers to produce green hydrogen. By looking into this subject from a global perspective, it can be observed that much more hydrogen is needed to decarbonise even these so-called hard-to-abate sectors. According to the latest modelling results published in GGO 2050, the global energy demand from hard-to-abate subsectors within transportation will stand at around 1800 mtoe per annum by 2050. In a hypothetical assumption, to provide this amount of energy only through green hydrogen production, more than 6,000 GW of electrolyser will be needed. This level is around five times more than the total current wind and solar installed capacity.

With similar calculations again on the imaginary only-green hydrogen assumption, 1,500 GW of electrolyser should be installed for the decarbonisation of iron, steel, and cement sectors. While numerous sectors are still not included in these calculations, other measures are assumed for the purpose of decarbonisation as well. In conclusion, the undeniable fact is that that there is no sole solution for carbon neutrality. Indeed, a combination of measures needs to be applied to achieve a net-zero emission. Apart from the energy conservation and energy efficiency enhancement that results in a reduction in final energy demand, clean energy supply should be diversely sourced from all clean available potentials.

Renewables, natural gas, and CCUS will take greater roles in their original form, and all of them should contribute to the hydrogen production. In closing, renewables, natural gas, CCUS, and hydrogen are inevitable parts of a fully decarbonised energy system.