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SECURING ENERGY

THE STREET VIEW

SEPTEMBER 2022

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Ewen Cameron Watt, Editor-In-Chief, Macro Forum, Actis, London

September 19, 2022 | 4 min read

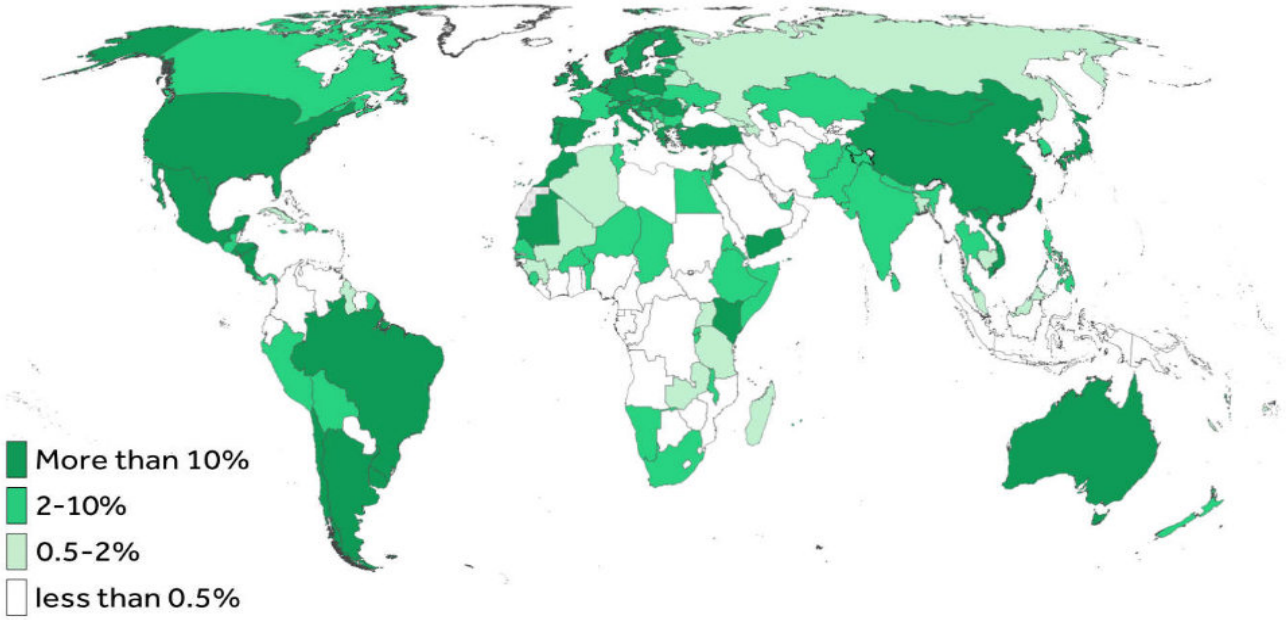
Russia's invasion of Ukraine has brought energy security back into world focus to a degree last seen during OPEC embargoes in the 1970s. Soaring prices of natural gas and electricity have elevated inflation risk as was the case nearly 50 years back. Securing energy supply on a stable price basis is once again a global geopolitical issue. The previous narrative of energy transition has been supplanted by a singular drive to secure any supply for now whilst planning for a more robust future.

In the accompanying pieces from colleagues and trusted advisors we have tried to give a sense of how Actis as a major investor in power generation and distribution is tackling energy security. We recognise that an unpleasant version of chaos events in Europe have impacted the entire world. For some observers it seems that energy transition has been dealt a crushing blow by the fallout from the Ukrainian tragedy as governments scurry to restart coal generation and turn their backs on just transitions.

We see this as nonsense. A simple moment to consider the relative costs of renewables relative to fossil fuel at today's elevated prices dismisses the claims that transition is in trouble. Prior to the beginnings of constrained Russian gas supplies to Europe in the autumn of 2021 most analysts reckoned that 80% of global solar and wind capacity was a cheaper source of supply than fossil fuel. Today that figure must be higher. The economic incentive to pursue energy diversification has risen not fallen (Exhibit 1 & Exhibit 2).

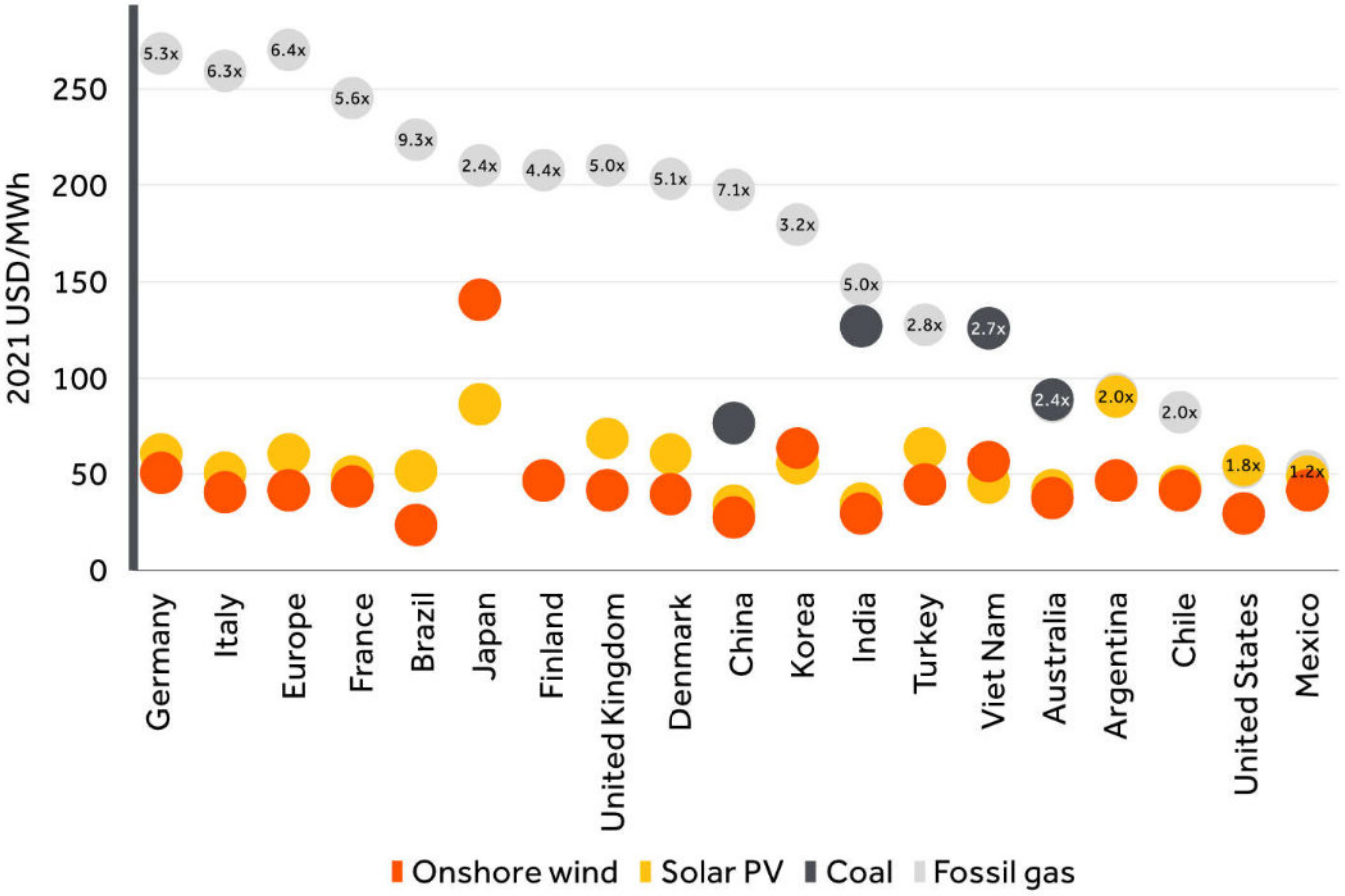
EXHIBIT 1: WIND AND SOLAR SHARE OF ELECTRICITY GENERATION

2021 data used where available, else 2020



Source: Ember's Global Electricity Review 2022
(https://ember-climate.org/insights/research/global-electricity-review-2022/)

EXHIBIT 2: FUEL-ONLY GENERATION COSTS FOR COAL AND FOSSIL GAS FOR 2022 RELATIVE TO THE LCOE OF NEW SOLAR PV, ONSHORE AND OFFSHORE WIND POWER PROJECTS COMMISSIONED IN 2021, BY COUNTRY



Sources: © IRENA (2022), Renewable Power Generation Costs in 2021, International Renewable Energy Agency, Abu Dhabi
https://irena.org/publications/2022/Jul/Renewable-Power-Generation-Costs-in-2021

> “THE ECONOMIC INCENTIVE TO PURSUE ENERGY DIVERSIFICATION HAS RISEN NOT FALLEN.”

NOT THAT IT IS ALL PLAIN SAILING

Governments battling inflation will be more reluctant to reduce the implicit post tax subsidy of sub optimal carbon clean up costs because it will inflate prices further. This subsidy, estimated by the IMF to be more than 3% of global GDP is one of the greatest barriers to full scale energy transition.

Supply chains for the critical components of renewables infrastructure are wide open to politically led disruption. Over 80% of global PV cell production is controlled by China who hold a cost advantage of anything between 10 and 35% over other global producers (in part because their own power costs are lower). Similar dynamics are beginning to emerge in wind turbines, rare earths and other critical materials.

We continue to believe that despite sharp price rises gas has a role to play as a transition fuel, particularly for countries with available domestic supply. We also believe that effective purchasing policies which seek to diversify supply play a role-as the article from Alberto Estefan and Maria Cox demonstrates how this has previously worked in parts of South America.

Staying with the theme of how we can invest to offset existing supply chain disruption Lucyna Stanczak-Wuczynska, an Actis senior advisor draws on her long experience of financing infrastructure in Central and Eastern Europe to outline the policy responses to Russian supply disruption. And Archer Kilpatrick from our Energy team writes about the exciting new investments we are making in the region.

Elsewhere in the world Julian Kim in Seoul investigates how South Korea – a major energy importer – is successfully combatting energy security through investment in diversification of supply.

Actis has a long-term commitment to responsible investing. So a must-read article comes from Marina Johnson of our Sustainability team. Marina outlines our Transition Tool and walks us through a first-hand example of how we have employed it to underpin a major new investment in Bangladesh.

Perspective and expert input form a key part of our decision making. So we are thrilled that Ben Backwell, Chief Executive of the Global Wind Energy Council, has written about the actions his organisation are taking to accelerate renewable energy generation. He touches on supply chains, government support, grid access, procurement policies and investment focus. His wise words are well worth a read.

Last and not least (he is my boss) our own Mikael Karlsson as Actis CIO reviews the whole topic of investing in energy transition and how this dovetails with energy security. Mikael draws on decades of experience in financing and constructing generation and distribution businesses in making the clear case that transition provides great investment opportunity.

The coming Northern Hemisphere winter will be a period of great stress in terms of energy supply. Blackouts may well return -I'm old enough to remember sitting public exams in the UK by candlelight, my weak excuse for average grades. It remains critical that policy makers, investors, industrialists, bankers and others resist short termism and plan for a better and more secure future. At Actis we are wholly focused on this ambition.

AUTHORS:

Ewen Cameron Watt

Editor-in-Chief, Macro Forum, Actis, London

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ENERGY SECURITY IN NUMBERS

September 21, 2022 | 1 min read

90%

drop in solar energy since **2010**

70%

drop in wind energy prices since **2010**

$230

for a **230**-watt solar panel **10** years ago

$140

for a **550**-watts solar panel today

SOURCE: ACTIS

87%

Henry Hub price rise from **4.9** USD/MMBtu in Jan 2022 to **9.1** USD/MMBtu in Aug 2022

SOURCE: BLOOMBERGNEF (AUG 2022)

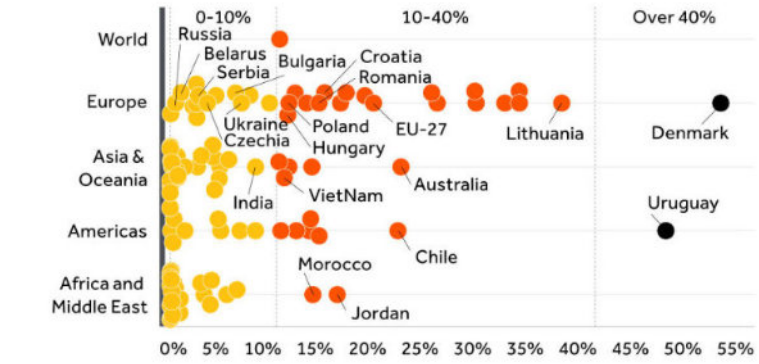
40%+

share of electricity generation from wind and solar in Denmark and Uruguay compared to **19%** in EU-27 (2021)

SOURCE: EMBER

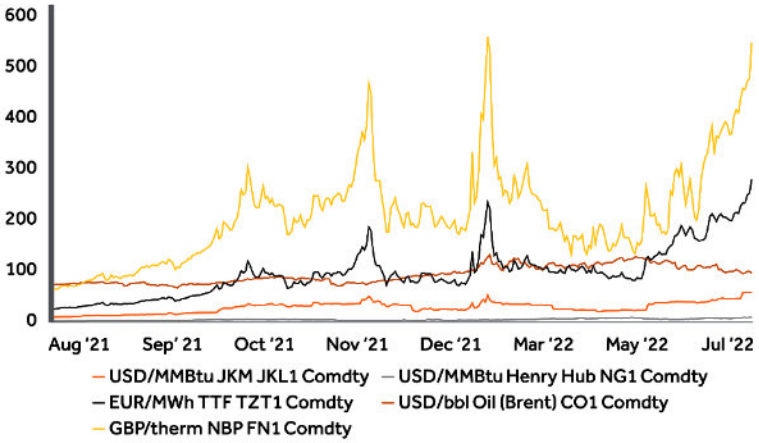
EXHIBIT 1: WIND AND SOLAR HAVE TAKEN OFF ACROSS THE WORLD

Wind and solar as a percentage share of electricity generation in 2021 (else 2020)



Source: Ember, Global Electricity Review 2022
https://ember-climate.org/insights/research/global-electricity-review-2022/

EXHIBIT 2: SURGE IN NATURAL GAS SINCE THE UKRAINE CONFLICT



Source: BloombergNEF citing ICE, NYMEX data via Bloomberg Terminal

183%

price increase in Natural Gas year-to-date, raising European gas prices to record highs

SOURCE: BLOOMBERGNEF (AUG 2022)

80%+

of global solar panel manufacturing today is from China

SOURCE: IEA

12%

increase in renewable power generation necessary annually between **2021** and **2030** to meet the Net Zero level

SOURCE: IEA, GLOBAL ENERGY REVIEW 2021

30%

share of renewables in the world electricity generation mix in 2021, rising from **18.5%** in 2000

SOURCE: IEA, GLOBAL ENERGY REVIEW 2021

40%

of total imports of natural gas to the EU came from Russia in **2020**

SOURCE: IMF NATURAL GAS IN EUROPE (JUL 2022)

2013

Since **2013** Actis has mobilised **$15bn** in renewable energy

SOURCE: ACTIS

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SECURING A CLEANER FUTURE

Mikael Karlsson, Partner, Chief Investment Officer, Actis, Luxembourg

September 19, 2022 | 5 min read

The crisis in Ukraine has rung alarm bells around the world about the need for greater energy security. Countries in Europe are witnessing what can happen when they become over reliant on one dominant supplier of fossil fuel to meet energy needs. A further rise in inflation, a potential reduction in living standards, as well as recession, are all now a firm possibility if the supply of gas from Russia is cut off, or severely restricted.

WHAT IS ENERGY SECURITY?

Energy security is achieved through a balanced energy portfolio, diversity of energy sources (e.g. renewable power, nuclear, hydro and fossil fuels) and diversity of origin of energy sources from home versus imported energy from a diversified group of countries and regions. Energy security is also a function of the redundancy in the system including energy storage to mitigate interruptions of energy supply and the ability to manage demand to offset supply interruptions.

The current situation demonstrates clearly the importance of energy diversification. Solar and wind power for example are both far less susceptible to supply interruptions from overseas than are oil and gas.

However, the increased energy security that low carbon energy offers is simply accelerating an existing trend towards the renewable sector that was already apparent. Even before the crisis, there was a growing sense of momentum towards renewables driven by climate change and lowest costs of power. Bloomberg New Energy Finance estimated last year that getting to Net Zero carbon emissions by 2050 would need up to $173 trillion in investments in the energy transition. Achieving an acceptable level of energy security will add to the investment needs. Mobilising private capital will be vital when it comes to filling that gap.

$173tn

Needed to reach Net Zero carbon emissions by 2050

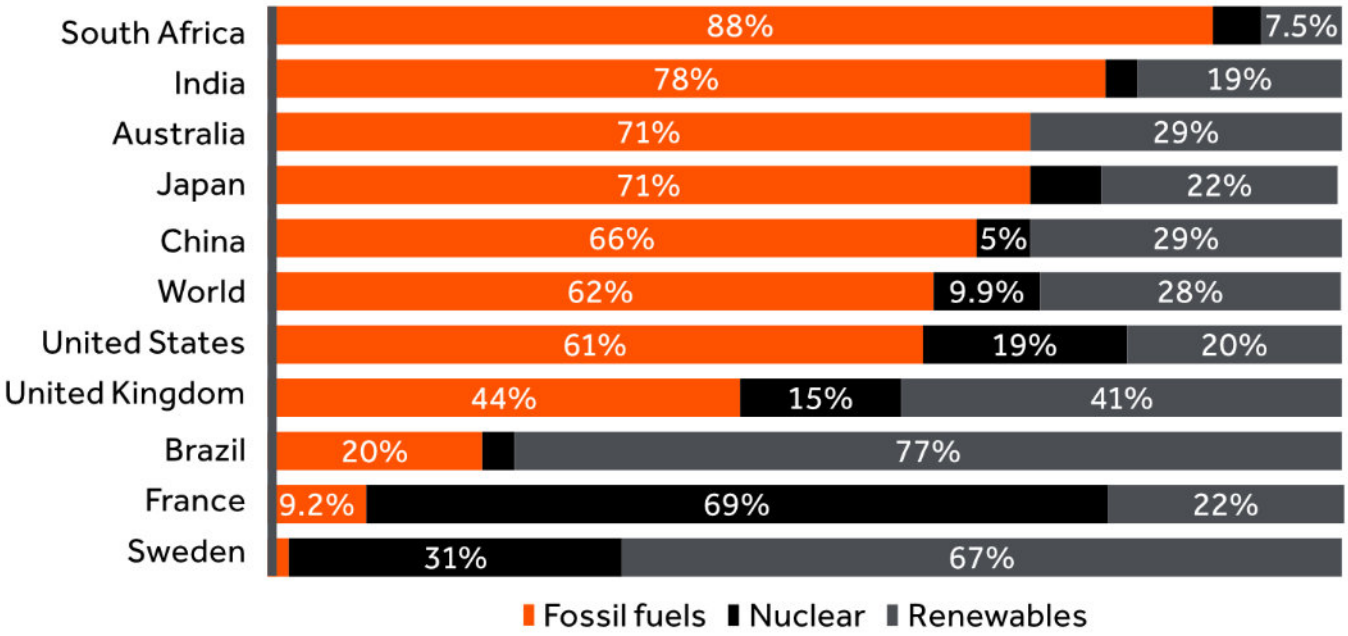
One of the most significant factors which is supporting the renewable sector's growth has been that costs continue to fall. At Actis, we have witnessed this first hand. We invested in our first pure renewable energy platform in 2010 in Central America. At the time, wind power was just becoming competitive compared with alternative sources of power in the region. Since then, prices have continued to drop: solar energy has fallen around 90%, with wind down around 70%. Even before the Ukraine crisis began, renewables were by far the most cost competitive source of electricity. The greater reliability of supply which the war has highlighted has simply added an extra dimension to the sector's attractiveness to investors.

The case for investing in the energy transition through cleaner energy is therefore even more compelling than before. It also brings with it a whole new range of parallel investment opportunities in renewable-supportive infrastructure such as battery storage, smart meters or hydrogen. But the war will bring challenges too from an investment perspective, beyond the effects of the conflict on the people in Ukraine itself, or on households and businesses in other parts of Europe.

There is a risk for example that politicians will take their eyes off the ball when it comes to driving the zero-carbon agenda; that they will become more focused on meeting the short-term energy needs of their own countries rather than on the long-term need to mitigate climate change. This is already happening in Europe with the delay in closing down nuclear power plants in Germany and the increase in coal fired electricity generation to mitigate shortages of gas supply and the big increase in gas costs to the consumers. We expect an acceleration of the investment in renewables and energy storage in Europe over the next decade driven by renewables being the lowest costs of energy while at the same time mitigating both climate change and energy security. The most important technical developments to address climate change and energy security will be in the areas of energy storage and demand management to mitigate the intermittency of wind and solar.

The war is also highlighting the importance of ensuring that gas retains its attractiveness to investors. While also a fossil fuel, gas is a vital, lower carbon source of energy than other fuels such as coal or oil. It will therefore play an important role in smoothing the way for the world to fully embrace zero-carbon sources of energy in the future (Exhibit 1). However, the crisis has demonstrated the need to secure other sources of gas to substitute for Russia's supplies. This will require investment in new infrastructure: yet the closer we get to 2050, the more likely this infrastructure is to become a stranded asset towards the end of its life. Regulators will therefore need to ensure investors feel comfortable making significant commitments in this area in the next few years.

EXHIBIT 1: PER CAPITA ELECTRICITY FROM FOSSIL FUELS, NUCLEAR AND RENEWABLES, 2021



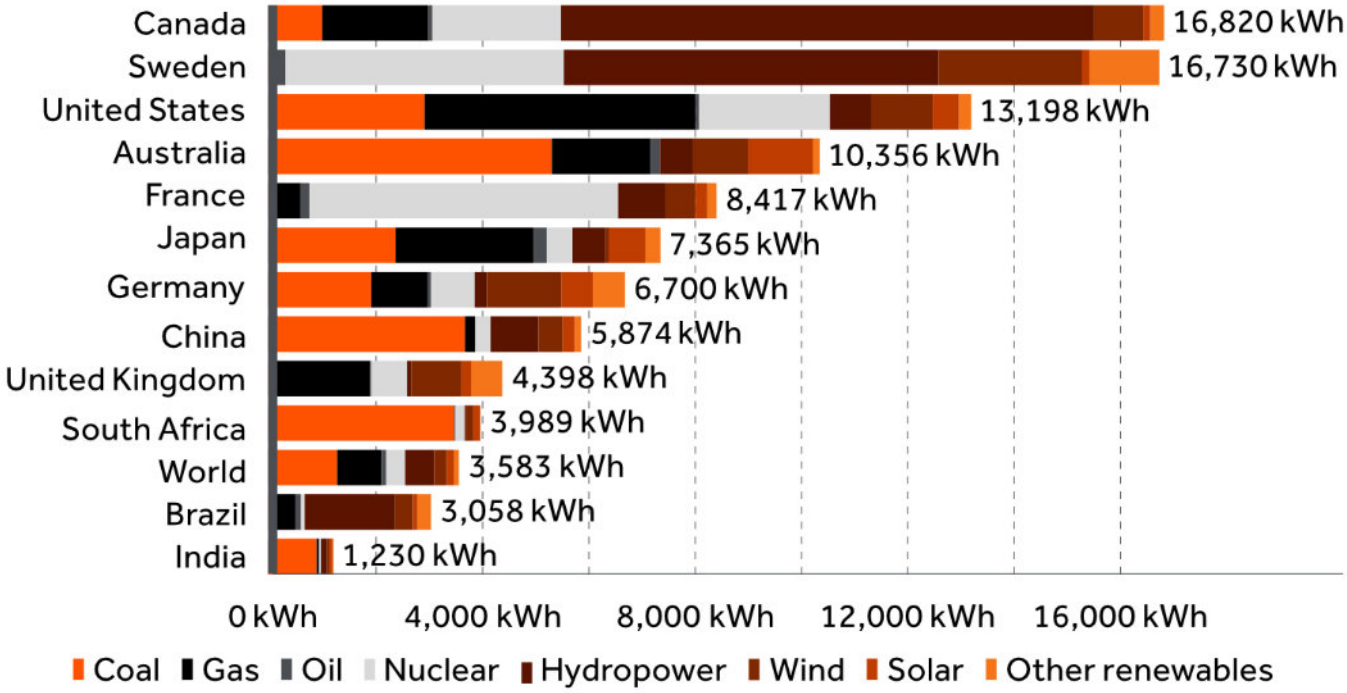
Source: Our World in Data based on BP Statistical Review of World Energy & Ember Global Electricity Review (https://ourworldindata.org/electricity-mix)

“THE WAR IS ALSO HIGHLIGHTING THE IMPORTANCE OF ENSURING THAT GAS RETAINS ITS ATTRACTIVENESS TO INVESTORS.”

And there are other regulatory issues to be addressed too. How, for example, is the intermittency of renewables to be overcome? Can battery or back-up thermal power be made more attractive for investors to ensure renewables still meet countries' energy needs when the sun isn't shining, or the wind isn't blowing?

Provided the right policy decisions are made, all these can be resolved. Meanwhile, at Actis, we continue to invest in the energy transition and in energy security assets. We have created more than 20 renewable energy platforms, all focused on delivering reliable, affordable clean energy to our customers. Our current fund, which has around $6bn in capital, is already investing in renewable platforms focusing on Brazil and the United States, and Central and Eastern Europe, on the Middle East and Africa, on India, and on South-East Asia. This reflects widening geographic opportunities driven by increased focused on energy security. As a result, our investment profile is increasingly regionally diversified. This widening range of investment destinations reduces the macro economic risks of the portfolio. We are also currently benefiting from a strong appetite from others to acquire assets from us: the exit environment is compelling, given the vital role renewables will play in the years to come (Exhibit 2).

EXHIBIT 2: PER CAPITA ELECTRICITY CONSUMPTION BY SOURCE, 2021



Source: Our World in Data based on BP Statistical Review of World Energy & Ember Global Electricity Review (https://ourworldindata.org/electricity-mix)

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“AS A RESULT, OUR INVESTMENT PROFILE IS INCREASINGLY REGIONALLY DIVERSIFIED.”

The war in Ukraine has therefore given an added impetus to the existing trend towards investing in renewable energy in support of the transition. Energy security has only accelerated a need for change that was already evident. It will create more compelling investment opportunities for the world's investors, ensure there is less dependence on sometimes unreliable sources of fossil fuels, as well as helping the world meet its climate goals.

Mikael Karlsson is Actis' Chief Investment Officer

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TRANSITIONING EUROPE'S ENERGY

Lucyna Stanczak-Wuczynska, Senior Adviser To Actis

September 19, 2022 | 6 min read

Countries in Central and Eastern Europe (CEE) and South-Eastern Europe (SEE) probably understand better than most the impact of the war in Ukraine. Many have close relationships with the government in Kiev, while Poland, Slovakia, Hungary, Moldova and Romania all share borders with the country, so are acutely aware of the scale and impact of the war. The need to strengthen energy security and become less dependent on Russian fossil fuel supplies is therefore uppermost in the minds of politicians and businesses in the region.

The focus on energy security which the war has caused has also given added impetus to the European Union's Green Deal agenda, as well as the broader European energy transition. The EU Commission's 'Fit for 55' legal package, unveiled in July last year, sets itself a binding target of reaching climate neutrality by 2050. As a first step, and to emphasize the importance of picking up the pace of cutting greenhouse gases, it has committed to cutting emissions by at least 55% by 2030 and increasing the share of renewables in the energy mix to 40% by the same year. The package also introduces the revision of the EU's emissions trading scheme and its carbon border tax mechanism, promoting energy savings and other measures.

For the CEE and SEE EU member states these targets are ambitious, especially when in some countries – such as Poland, the Czech Republic, Slovakia or Bulgaria – there is still a large dependency on fossil fuels for energy generation, district heating and transport. The regions are still dealing with the legacy of energy intensive industries, often obsolete energy assets and underinvested energy grids, which are unable to accommodate digital and smart energy distribution.

Meanwhile countries in the western Balkans – where fossil fuel dependency is even greater and the share of renewable energy only half that in the CEE and SEE regions – are determined to join the European decarbonisation agenda by introducing their own renewable energy targets, promising to phase out coal usage and introduce internal energy trading mechanisms. In that context, it is critical that the energy integration, both inside the CEE and SEE regions and with the rest of Europe, is strengthened, particularly when it comes to grid connectivity, with the transmission infrastructure reflecting both the geopolitical environment and technological changes.

15%

Targeted gas reduction this winter in Europe

The escalation of the war in Ukraine, followed by the cutting of gas supplies from Russia to Europe and the subsequent soaring of electricity and gas prices which are causing a cost of living crisis, has brought a further acceleration of the European decarbonisation agenda. The European Commission announced the new REPowerEU plan in May this year, while two months later member states took a joint decision to reduce the use of gas by 15% during the winter. The REPowerEU agenda not only elevates the targets for European renewable energy generation capacities (to 45% by 2030), it also pushes for stronger energy savings, greater transport

electrification, more solar energy in buildings, renewables-based district heating, clean industries and green hydrogen. Planned carbon pricing reforms and the Carbon Adjustment Border Mechanism (which puts a carbon price on imports of certain goods from outside the EU) will only strengthen the competitiveness of the bloc's renewable energy and decarbonisation sector.

€800bn

Temporary recovery package to help repair the economic and social damage caused by Covid-19

€17.5bn

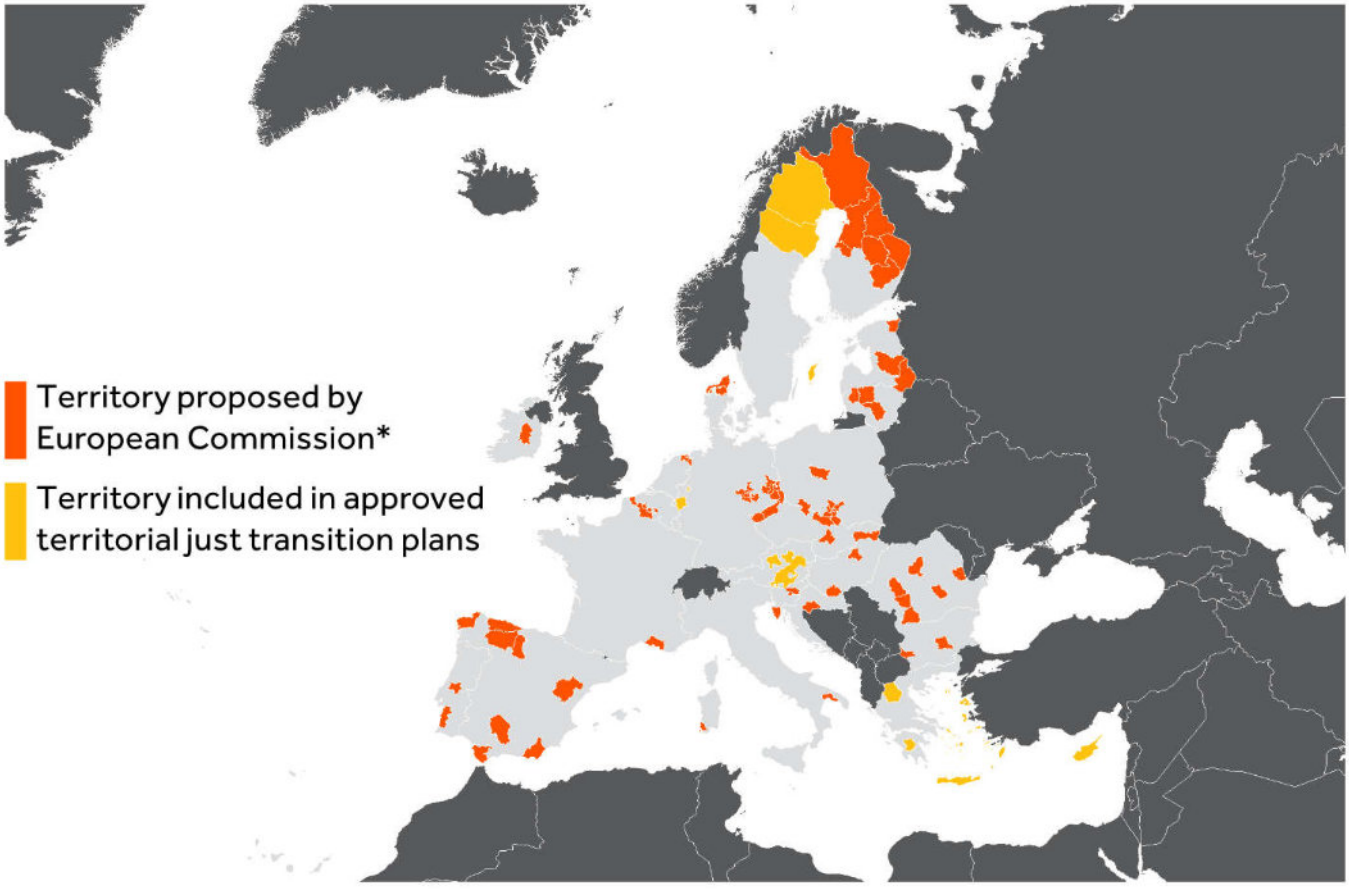
The Just Transition Fund

For countries in the CEE and SEE regions, the war is creating huge challenges. Being heavily dependent on fossil fuels from Russia (by up to 100% in some cases), the war risks making the ability to meet the EU's goals without causing damage to the regions' businesses and consumers a painful experience. In addition, affordability is becoming a pressing issue: not only are gas prices soaring, putting pressure on businesses and households, but countries in this part of Europe also have some of the lowest incomes of any on the continent. A need for a transition support towards these ambitious goals is therefore important.

For investors, the situation is made complicated by the different financial landscape, as well as regulatory models, faced by countries that are in the EU, and those that are outside. EU countries – and in particular Central and Eastern Europe member states – will have access to funds through loans and grants from NextGenerationEU, the €800bn temporary recovery package to help repair the economic and social damage caused by Covid-19, as well as from the EU Modernisation Fund, which is dedicated to

supporting 10 lower-income member states. Then there is the €17.5bn Just Transition Fund to address the social and economic impact of the transition to climate neutrality. The Just Transition fund will prove hugely beneficial to countries such as Poland, the Czech Republic, Slovakia, Romania and Greece, which are suffering from the social costs of the energy transition. Meanwhile the investment environment is also becoming very encouraging. CEE and SEE countries are reforming their support models, REPowerEU works on improved permitting for renewable energy installations, while the EU taxonomy adds tighter requirements on financial institutions and large corporates to look for renewable energy sources, push for energy savings, and disclose relevant policies (Exhibit 1).

EXHIBIT 1: ELIGIBLE JUST FUND TRANSITION (2021-2027) TERRITORIES



Source: OpenLayers, EuroGraphics, REGIOgis via the © European Commission (https://ec.europa.eu/regional_policy/en/funding/jtf/just-transition-platform/)
* Additional territories have been proposed by some Member States and may be accepted as part of territorial Just Transition plans.

The success of the energy transition in Europe will only be possible when private funds support the available EU money. Financial institutions in Europe have made a fundamental shift towards decarbonisation over the last few years. The majority of European banks and institutional investors developed their own net zero commitments, undertook to grow their green asset ratios, and focus on green financing. The assessment of risks associated with the environment and climate change is better understood, through the stress testing performed by the European Central Bank (ECB) and other European regulations. To comply with the EU taxonomy and climate-related disclosure requirements (under Europe's Non-Financial Reporting Directive (NFRD) and its Sustainable Finance Disclosure Regulation (SFDR)) banks are increasing their focus on green investments and financing, with a growing variety of instruments including green mortgages, green savings loans, as well as green and sustainability linked bonds, all of which serve to improve their green assets ratios and better meet the EU Capital Requirements Directive's Pillar 3 obligations. European banks are also strongly represented in the western Balkans and Eastern Europe, so the best standards should spill over beyond the EU's borders.

Taken together, providing more renewable energy across both the CEE and SEE regions represents a huge investment opportunity for the private sector. To meet the expected targets, the region should double its renewable energy sources. However in some of the SEE countries, the challenge will be greater. Many countries are starting from a low base when it comes to renewable energy capacity. There will therefore be a significant need to invest not just in renewable power, but in energy storage, smart grids, digitalisation, green hydrogen and other technologies. Governments will need to build infrastructure that is suitable for renewables transmission. Many lack the capital and the experience to make the changes themselves.

While the availability of EU funding and grants is a key component, there is a growing demand for commercial leverage and capital in the CEE and SEE regions. The area is less developed in dealing with other market

instruments. Contracts For Differences (CFDs) exist in only a few countries in the regions and are in their infancy (notably in places including Romania and Serbia). There is also little experience with commercial PPAs in comparison to some Western European countries, while there is a growing complexity in energy management thanks to the increasing role of energy storage, grid integration, future CO_2 storage and management, selection of the right technology mix and digital services.

All of this requires strong experience and skills when managing renewable portfolios, with the need also to be aware of the social aspects, affordability and the wellbeing of local communities. Smart money and experienced investors with significant operational skill such as Actis – which has the sector experience and knowhow in structuring deals, energy management and technology – can play a significant role in helping the region overcome its challenges. Indeed, harnessing private capital will be vital, since the scale of the challenge across the continent can appear daunting.

More private capital will therefore be key to the regions' futures. Harnessing the sector's funds and expertise will be critical if Europe is to meet its clean power and energy security needs. The requirement for more renewable power throughout the CEE and SEE regions was evident even before the war began. The crisis has therefore only added a growing urgency to the need for a speedier energy transition.

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EUROPEAN ENERGY TRILEMMA

Archer Kilpartick, Energy Infrastructure, Actis, London

September 19, 2022 | 6 min read

The crisis in Ukraine has added a new complication to Central and Eastern Europe's existing energy trilemma, one that is shared by many other countries. Their issue is how to enhance energy security, protect the interest of consumers, and meet sustainability goals, all at the same time. Historically, these three policy objectives were in conflict. The abundance of cheap domestic and imported hydrocarbons, coupled with a transmission grid designed with fossil fuels in mind, meant customers' bills were kept low. The need for energy security was therefore often an afterthought. Meanwhile the relatively low capacity of renewables – with the exception of offshore wind – meant making progress towards the region's environmental goals required market interventions. Indeed in order to achieve the environmental sustainability objective of the trilemma, fiscal resources needed to be spent on subsidising renewables – which in turn fed back to consumers through higher costs.

In order to reduce their dependence on coal and other dirtier fossil fuels, much of Europe, has prioritised gas generation. In Germany this was given added weight by the policy stance of Ostpolitik, which sought to build trade ties with Russia and other former countries in the USSR, leading to an exceptionally high reliance on Russian gas.

Yet even before the crisis, the balance between the three policy objectives was shifting. With the dramatic fall in the costs of renewables, the relationship between consumer affordability and environmental sustainability had altered, meaning they were no longer in conflict. Now, the geopolitical developments of the past year have brought further changes.

The war in Ukraine has increased the importance in Central and Eastern Europe of the other arm of the trilemma: energy security. A previous overreliance on natural oil and gas supply from Russia, coupled with the surge in the price of fossil fuels, has brought the problems caused by the lassitude of governments to enable a greater share of renewables in the generation mix into stark relief. While Europe is scrambling to build new Liquified Natural Gas terminals, open up new routes to the Caucuses and improve gas transmission corridors, an electricity system based on a natural gas backbone looks a shakier proposition than it did just one year ago. Indeed, ironically, the hunt for greater diversity of energy supply is pushing some governments to reopen some of their most polluting coal-fired power stations, in clear violation of climate-based investment principles.

“THE WAR IN UKRAINE HAS INCREASED THE IMPORTANCE IN CENTRAL AND EASTERN EUROPE OF THE OTHER ARM OF THE TRILEMMA:ENERGY SECURITY.”

NOT EVERY COUNTRY IN EUROPE FACES THE SAME LANDSCAPE

The Baltic countries for example have generally been more dependent on Russian gas than countries further afield, such as Spain and France, which are less reliant upon it. Across Central and Eastern Europe, the picture is also troubling. The EU's internal gas transmission mechanism is not perfect, meaning supply problems will be distributed unevenly. Bulgaria, which has been heavily dependent on Russian gas, had its supplies cut in April, and is likely to be severely impacted. Even Romania, which has its own production capabilities, is likely to be significantly affected, as are countries such as the Czech Republic. It is arguably in countries like these that governments' past failures to diversify sources of fuel supply and underprovide for sufficient energy security has most significantly enhanced the already strong case for renewables.

Across the whole of Europe, governments are accelerating their rollout of Contracts For Difference (CFDs), market price stabilisation tools which are intended to reduce the costs of capital to finance new generation projects. Meanwhile, with consumers facing rapidly rising costs of energy and the continent's electricity market being remarkably short-term in nature – very few firms buy power more than one year ahead – more and more commercial and industrial consumers are looking to contract with renewable energy generators directly, disintermediating utilities.

The fact that there is now a greater imperative for energy security, and that the price of renewables has fallen enough to make them an attractive investment proposition without subsidy, represents a huge opportunity for banks and investors. Many countries are planning to double or treble their renewable investment by 2030. Indeed the targets are even greater across much of central, eastern and southern Europe, where the levels of coal generation are particularly high.

In 2021 we developed a proprietary Transition Tool to support decision-making in the investment process on alignment with the climate transition The tool, which was developed in collaboration with consultants SYSTEMIQ is used to systematically evaluate Actis' investments and consider how they align to a Net Zero economy.

The tool enables Actis to direct capital to assets that enable and accelerate the low-carbon transition and can be aligned to a net-zero economy. The tool identifies assets as "green" (Paris/NZ-aligned), misaligned (where we will not invest) or somewhere in between which is "olive" (has a role in the transition). Actis will only invest in "olive" assets if there is a clear path to decarbonisation and/or it can be shown that there is no viable alternative. The tool also helps Actis identify what can be done during our ownership to decarbonise olive assets to become "smart olive" and helps to design pathways to transition assets to Net Zero. The Tool is used on every deal and is presented during Investment Committee to ensure a systematic and robust assessment of climate transition risk.

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“THE BUSINESS WILL USE ACTIS’ TRANSITION TOOL TO HELP SELECT INVESTMENTS THAT WILL HAVE THE BIGGEST IMPACT ON THEIR COUNTRIES’ MOVES TOWARDS NET ZERO.”

Actis has recently launched **Rezolv Energy**, an independent clean energy power producer to build a new era of sustainable power in Central and South-Eastern Europe. It aims to build a multi-gigawatt portfolio of wind, solar and energy storage which will help companies and countries across the region meet their energy needs in response to the energy security challenges and the need to embrace climate policies. The business will use Actis' Transition Tool to help select investments that will have the biggest impact on their countries' moves towards net zero.

Looking to the future, both private institutions and governments are likely to focus on diversity of supply to increase energy security and accelerate their moves towards maximising the role of renewables in the generation mix. Governments in the region are showing a significant appetite to make changes to grids and power infrastructure in order to equip them to be ready for a greater share of renewable energy. Europe's electrification and decarbonisation programmes are also aimed at making fossil fuels less attractive, through carbon pricing and altering regulations around permits.

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Gas – although maybe not as much from Russia – will continue to play a role as an enabler of the transition thanks to its lower carbon intensity, however dispatch rates will be uncertain, so governments may need to follow the UK's example and introduce capacity auctions. New nuclear power may need the same, or a CFD structure similar to that seen with the UK's Hinkley Point project.

When it comes to renewables, generators are likely to have options to contract through government-backed CFD tenders, contract with long-term Power Purchase Agreements with commercial offtakers, or sell directly to the market. Battery storage will become increasingly important as operators seek to manage inter-hour intermittency. In addition, the green hydrogen market may well develop at pace, offering the market the opportunity to decarbonise hard-to-abate sectors and manage seasonal renewable intermittency.

"GAS – ALTHOUGH MAYBE NOT AS MUCH FROM RUSSIA – WILL CONTINUE TO PLAY A ROLE AS AN ENABLER OF THE TRANSITION THANKS TO ITS LOWER CARBON INTENSITY."

The crisis in Ukraine has highlighted much of Central and Eastern Europe's energy dependency on Russia. But it has also placed an added impetus on the region's need to accelerate the pace of renewable infrastructure development. Countries including the Czech Republic, Bulgaria and Romania are likely therefore to need to accelerate their commitment to renewable energy. The war has proved the need for a new emphasis on clean power, one which can help the continent in reaching its own goals of greater energy security.

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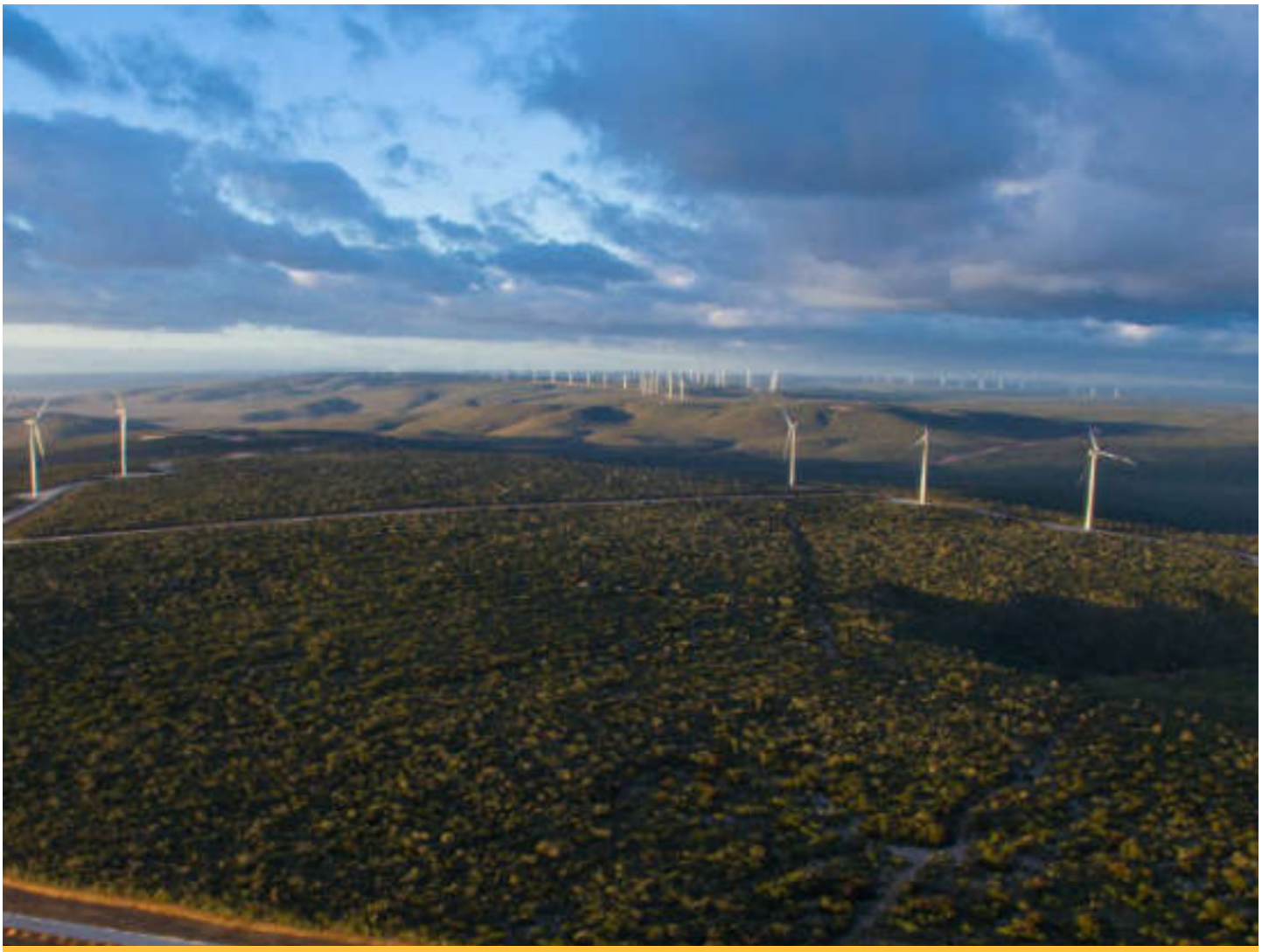

ENERGY SECURITY – LESSONS FROM LATIN AMERICA

Alberto Estefan, Partner, Energy Infrastructure, Actis, Mexico City
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September 19, 2022 | 4 min read

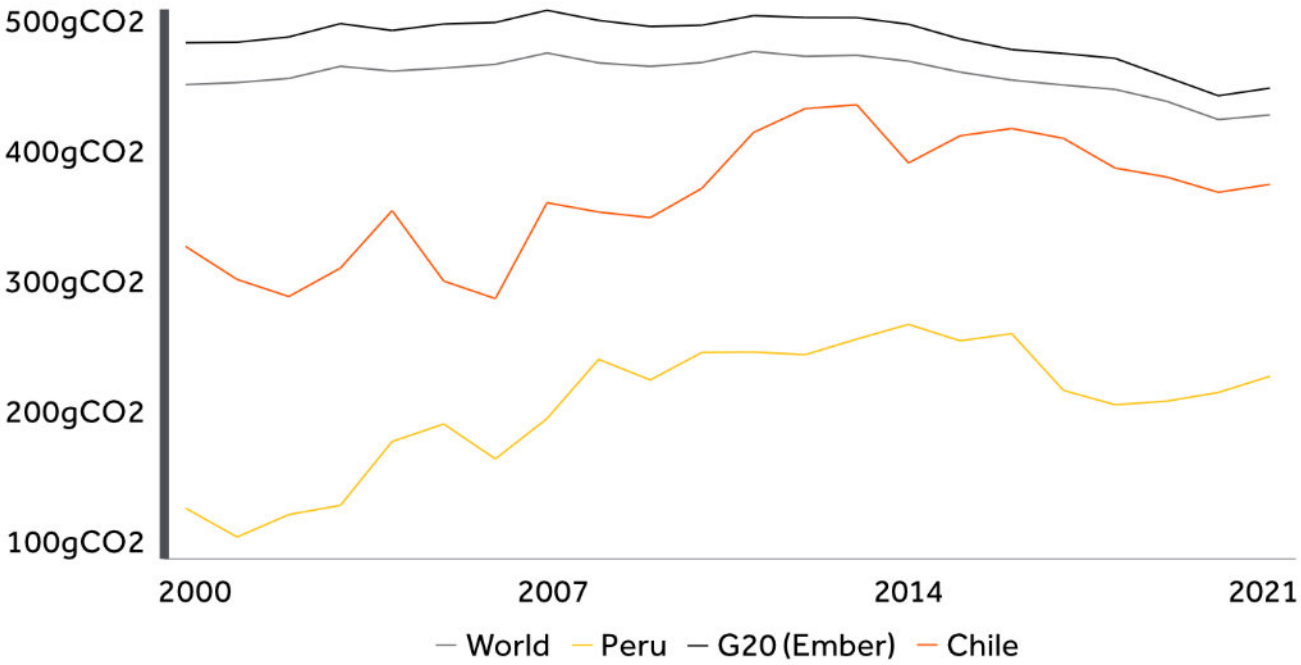
After years in which the public debate about energy policy focused mostly on decarbonisation, the crisis in Ukraine has forced stakeholders worldwide to revisit the energy trilemma. Although governments in the short-term are putting considerations to the fore to keep the lights on, energy security has taken a more prominent role in country's long-term plans as the world observes European economic disruption and energy hardship as Russia cuts off gas supply. While Latin America may be far from the war, some countries have previously gone through energy security crises of their own, thanks to issues as varied as unreliable neighbours and unpredictable weather. The experiences of Chile and Peru – global pioneers when it comes to liberalising their power sectors – offer some important pointers about the way ahead for other parts of the world.

Both countries have successfully built resilient power systems, in the case of Peru, as well as high penetration levels of carbon-free generation (Exhibit 1). This is in sharp contrast to much of Europe, which is still overdependent on Russian gas. Indeed, South America was an early mover in liberalising its power sector.

"THE EXPERIENCES OF CHILE AND PERU – GLOBAL PIONEERS WHEN IT COMES TO LIBERALISING THEIR POWER SECTORS – OFFER SOME IMPORTANT POINTERS ABOUT THE WAY AHEAD FOR OTHER PARTS OF THE WORLD."

EXHIBIT 1: CARBON INTENSITY OF ELECTRICITY, 2000 TO 2021

Carbon intensity measures the amount of greenhouse gases emitted per unit of electricity produced. Here it is measured in grams of CO_2 per kilowatt-hour of electricity.



Source: Ember Climate (from various sources including the European Environment Agency and EIA) and Ember's Global Electricity Review
https://ourworldindata.org/grapher/carbon-intensity-electricity?tab=chart&country=CHL~PER~G20+%28Ember%29~OWID_WRL

Chile was the first to pursue comprehensive market reforms beginning in 1978, adopting elements that traced their ideological foundations to Milton Friedman and Friedrich Hayek at the University of Chicago. By the 1990s, the liberalised power sector model was common across Latin America, driven by the poor performance of state-owned enterprises and the burden they placed on the region's fiscal position.

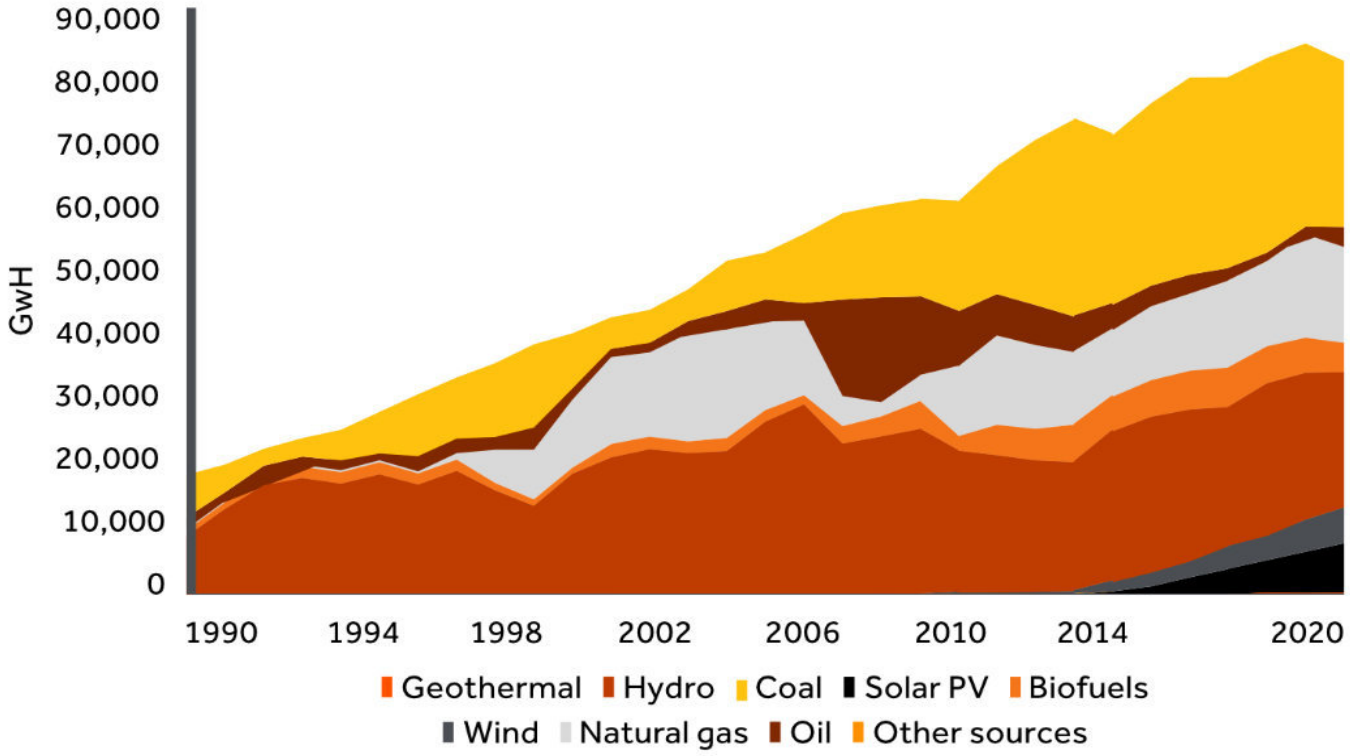
Chile's transition to becoming self-dependent yet clean stemmed from efforts to diversify sources of power generation and primary energy supply which were driven by forces outside its control. In the past, Chile sourced most of its natural gas from Argentina. So cheap was the supply from across the border thought to be that the country began to increasingly rely on it for power generation over its hydro power plants, which before the gas from Argentina arrived covered 80% of the country's energy needs.

However, Argentina cut off supplies to Chile in 2004 to prioritise its own domestic energy needs, forcing Chile to act quickly. It built two regasification terminals to supply the country, reducing its cross-border dependency. Although the country was forced to turn to coal to fill the gap caused by the withdrawal of supply from Argentina (Exhibit 2), it also successfully introduced a series of incentives and regulations to foster more sustainable energy production. As part of its decarbonisation goals, generation companies signed agreements with the government to retire over 1,000MW of coal-fired generation within the next 5 years and close the remaining plants by 2040. In fact, this timeline has been accelerated, and it is expected that half of the coal generation fleet will be retired by 2025.

On the back of energy requirements from distribution companies, the country tendered high price Power Purchase Agreements (PPAs) for renewables. Thanks to its competitive bidding framework, it was able to boost competition in supply auctions and improve system operations, while regulating capacity to ensure adequate generation. As a result of these efforts, Chile has seen a meaningful increase in renewables penetration, while achieving decreasing costs. The first vintage of renewables auctions in 2013 saw PPAs priced in average at $129/MWh. In 2021, prices in the renewables auction averaged as low as $24/MWh, before raising to $37/MWh in the latest round in 2022 on the back of inflationary pressures across the supply chain. In any case, as lower priced power increases its share of the generation cost to distribution companies, end users expect to see declines in their electricity bills going forward.

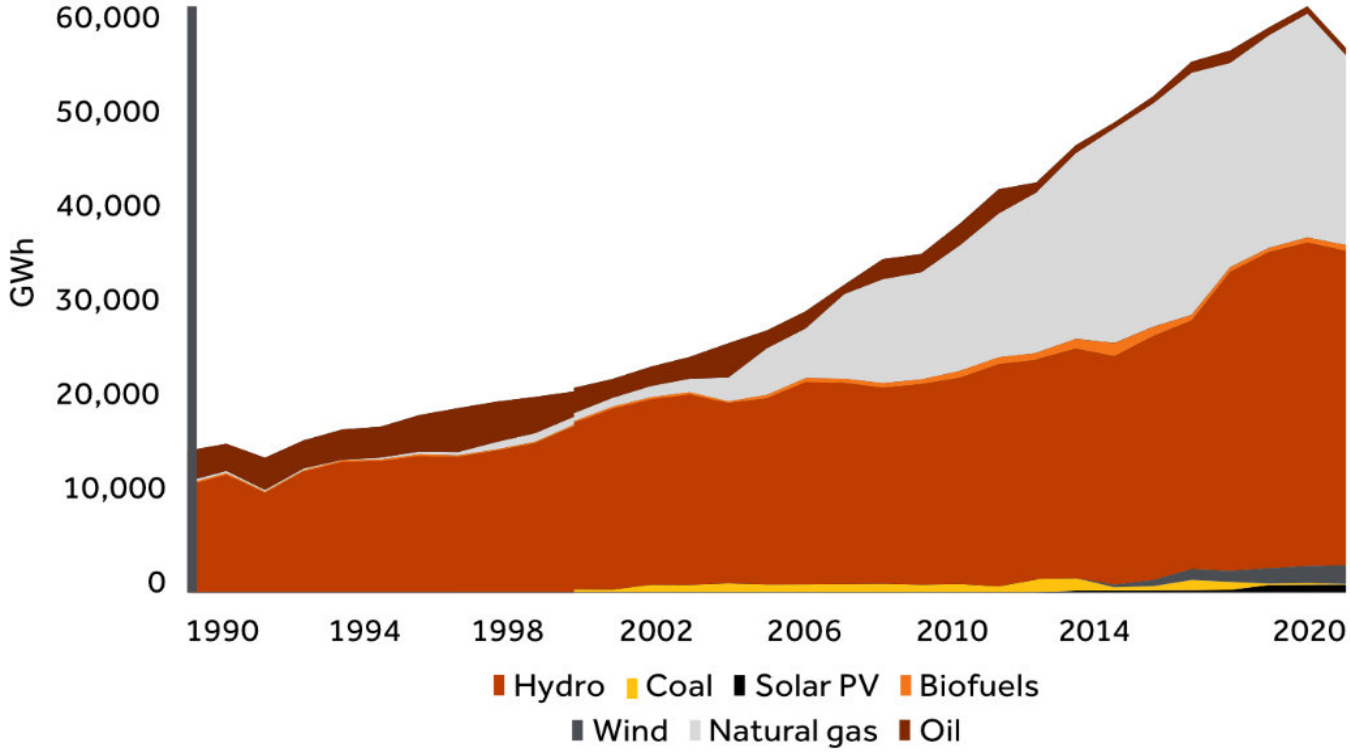
$129 /MWh	$24 /MWh	$37 /MWh
2013 average PPAs price	2021 average renewables auction price	2022 average price

EXHIBIT 2: ELECTRICITY GENERATION BY SOURCE, CHILE 1990-2020



Source: IEA, Electricity Information. All Rights Reserved (https://www.iea.org/countries/chile)

EXHIBIT 3: ELECTRICITY GENERATION BY SOURCE, PERU 1990-2020



Source: IEA, Electricity Information. All Rights Reserved (https://www.iea.org/countries/peru)

Peru faced different issues. Its supply constraints did not come from geopolitical problems, but from changing climate patterns. Until 2004, hydroelectricity generation met 80% of the country's requirements with the balance mostly from fuel oil and diesel. However, a series of droughts exposed the system's weakness and galvanized the country to invest in Camisea, a natural gas project which created the necessary infrastructure to supply energy in a secure way. Hand in hand with that went the buildout of natural gas fired generation plants. Today, the generation matrix is split 50/50 between hydro generation and natural gas fired generation, with a nascent renewables' environment (Exhibits 2 and 3). This combination of locally sourced natural gas and hydro + renewables results in energy wholesale prices that hover in the $20-30/MWh area for 2022 – some of the lowest in the world.

The lesson for others when it comes to Chile and Peru is of the dangers that can arise when you are overdependent on a single, or dominant, source of energy. To combat the problems they faced, both nations refocused domestic political priorities on energy security, diversifying energy production and ensuring security of supply, demonstrating the important role governments can play in driving change. Competitive bidding was vital for both markets, establishing public auctions for contracting new generation capacity and therefore responsibly transitioning each of the countries' matrices to a secure and sustainable mix. The region also accepted natural gas as a transition fuel, a viable, affordable, and reliable option to accelerate the decarbonisation process. Meanwhile the competition engendered by the processes helped keep costs relatively low.

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“ON VIRTUALLY EVERY TYPE OF REFORM MEASURE, LATIN AMERICA AND THE CARIBBEAN HAS BEEN A PIONEER ”

ACCORDING TO A 2019 WORLD BANK REPORT ENTITLED ‘RETHINKING POWER SECTOR REFORM IN THE DEVELOPING WORLD’

Peru and Chile faced vastly different problems, and have vastly different energy generation mixes. Yet both in their own way found a balance between energy supply, access, and the transition. Countries in Europe could well learn lessons from their experiences.

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MEASURING TRANSITION – THE ACTIS TOOL

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The global need to reduce our dependence on the most polluting fossil fuels is becoming increasingly evident. The dual priorities of net zero and energy security dictate an ever greater requirement to shift away from coal and oil. Whilst much emphasis has rightly been placed on the role of renewables to address this as part of a greener economy, gas is increasingly seen as a vital transition fuel for many countries to help them meet their climate goals.

80%

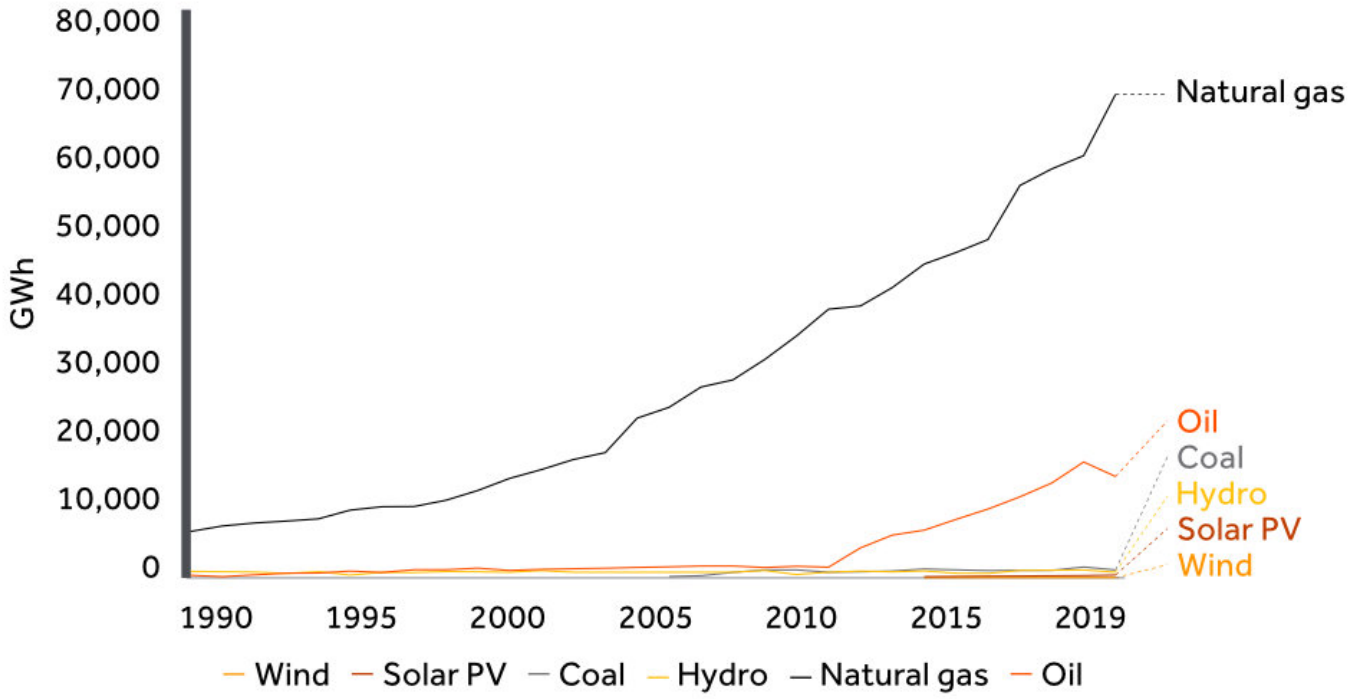
of the world's new coal generating capacity is expected in Southeast Asia

This is particularly relevant in coal-dependent regions of the world, such as Southeast Asia (SEA) where 80% of the world's new coal generating capacity is expected. For many countries in this region, it is not feasible to roll out renewables at the pace required to meet demand and reduce carbon emissions quickly, whilst maintaining grid stability. As a less carbon intensive source of energy to coal, gas can therefore play a significant role.

We recently announced the launch of Bridgin Power, a power generation platform that will pursue gas-fired assets and focus on delivering the energy transition across SEA. Nimbus, its first transaction was the acquisition of a 220MW operational gas-fired power project in Barishal, southern Bangladesh, which uses reserves from a local gas field just 7km from the site. An expansion plan for another co-located 220MW is also planned.

The acquisition highlights the important role that gas can play in the transition While Southeast Asia is expected to shift to renewables in the long term, and huge investment flows are anticipated to help the region increase its generation from renewable sources, the immediate baseload demand can only be fulfilled by thermal energy (Exhibit 1). As a far cleaner alternative to coal – which often has to be imported – harnessing a country's indigenous gas reserves therefore provides an obvious short and medium-term solution to supporting its energy strategy, while contributing to climate goals. Natural gas is 50% cleaner than coal on a CO_2 basis, but more than 1,000 times cleaner on an air quality and pollution basis, so there are also considerable environmental and health benefits. Domestic production also provides immediate relief from global energy insecurity which many countries are likely to continue facing over the coming years.

EXHIBIT 1: ELECTRICITY GENERATION BY SOURCE, BANGLADESH 1990-2019



Source: IEA, Electricity Information. https://www.iea.org/countries/Bangladesh

Natural Gas

50%

Cleaner than coal

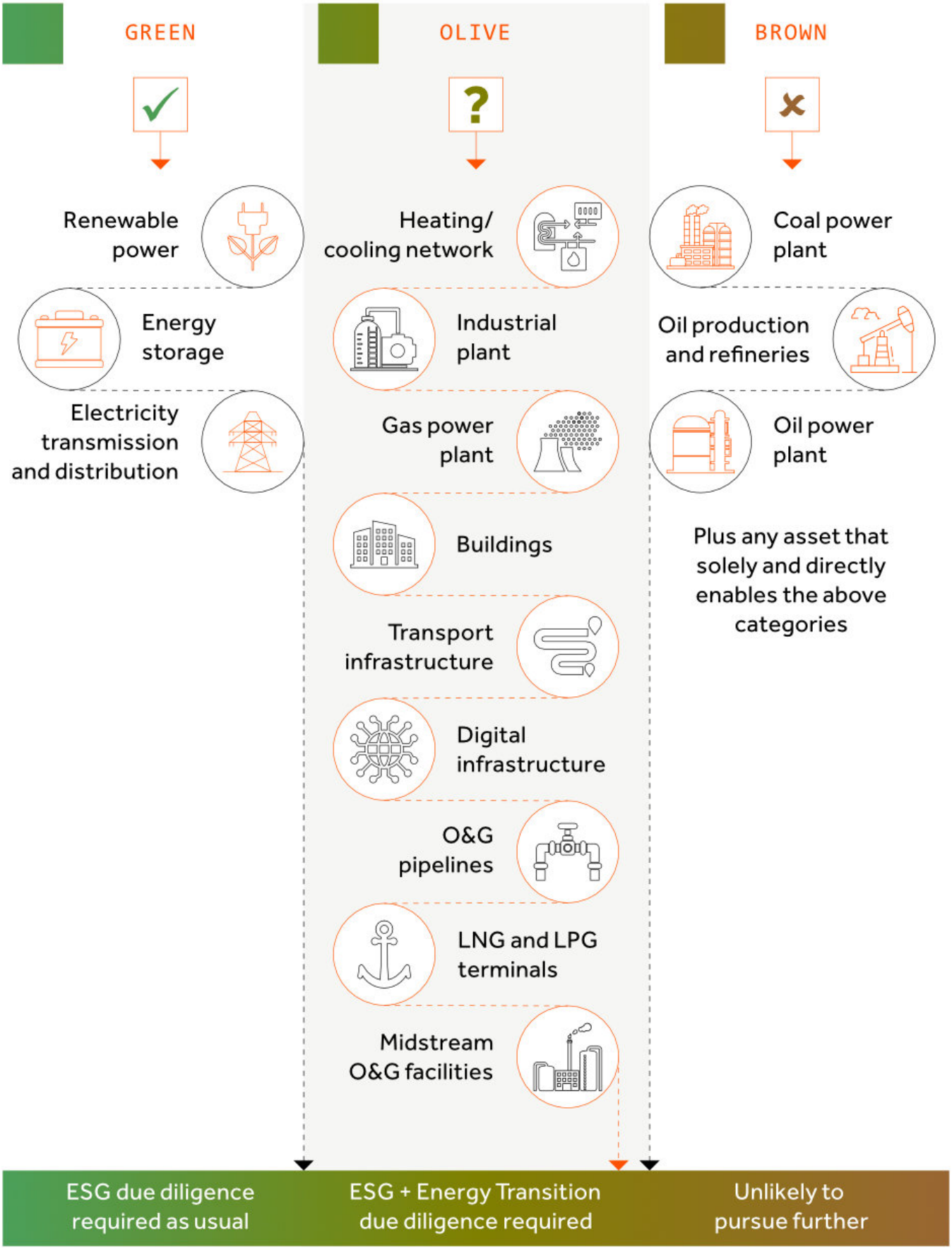
1000X

Cleaner on air quality and pollution

As in other markets where energy poverty is high and access and affordability are low, investing in enabling power technologies such as gas plants therefore supports the transition away from fossil fuels as well as delivers socioeconomic benefits. The recent inclusion of gas in the European Union's green taxonomy supports this position of gas having a pivotal role as a sustainable fuel source in the energy transition.

How do we ensure such investments have positive outcomes? We have developed an in-house Transition Tool with consultants SYSTEMIQ, that is run as part of our due diligence process (Exhibit 2). It assesses climate transition risk by analysing the role of an individual asset in the local market in relation to national climate transition and decarbonisation plans. It identifies assets as "green" (Paris/net zero aligned), "misaligned" (where Actis will not invest) or somewhere in between which we call "Olive".

EXHIBIT 2: TRANSITION TOOL OUTCOME FOR NIMBUS



Source: Actis

> “THE ACTIS TRANSITION TOOL ASSESSES CLIMATE TRANSITION RISK BY ANALYSING THE ROLE OF AN INDIVIDUAL ASSET IN THE LOCAL MARKET IN RELATION TO NATIONAL CLIMATE TRANSITION AND DECARBONISATION PLANS.”

Bridgin Power uses the Transition Tool to inform future investments into such ‘Olive’ assets where the asset plays a clear role in a transition and decarbonisation pathway, and where there is no viable alternative. The tool also helps Actis identify what can be done during the hold period to future proof and decarbonise such Olive assets to become “Smart Olive” – that is measures to protect us from stranded asset risk, and make operations more efficient and resilient.

Analysing the Nimbus asset through the prism of our Transition Tool enabled us to demonstrate that Bangladesh’s renewable options are limited and that no lower carbon solutions could be implemented. Wind resources are relatively low, there is insufficient suitable land for solar development, and much of the country is susceptible to flooding or other natural disasters.

In this instance, investing in gas is delivering immediate economic benefits in terms of energy production, helping the country meet its baseload need. Bangladesh has set a target of generating 4.1 GW of electricity from renewable energy sources by 2030. The investment therefore supports the switch away from coal, as a more carbon intensive fuel source, and the plant has the flexibility to operate at mid-merit or peaking power ahead of greater renewables generation in the future.

Investments such as Nimbus highlight the important role that responsible investment into gas can play in supporting countries in their transition to a lower carbon economy.

Marina Johnson is a member of Actis' sustainability team

"IN THIS INSTANCE, INVESTING IN GAS IS DELIVERING IMMEDIATE ECONOMIC BENEFITS IN TERMS OF ENERGY PRODUCTION, HELPING THE COUNTRY MEET ITS BASELOAD NEED."

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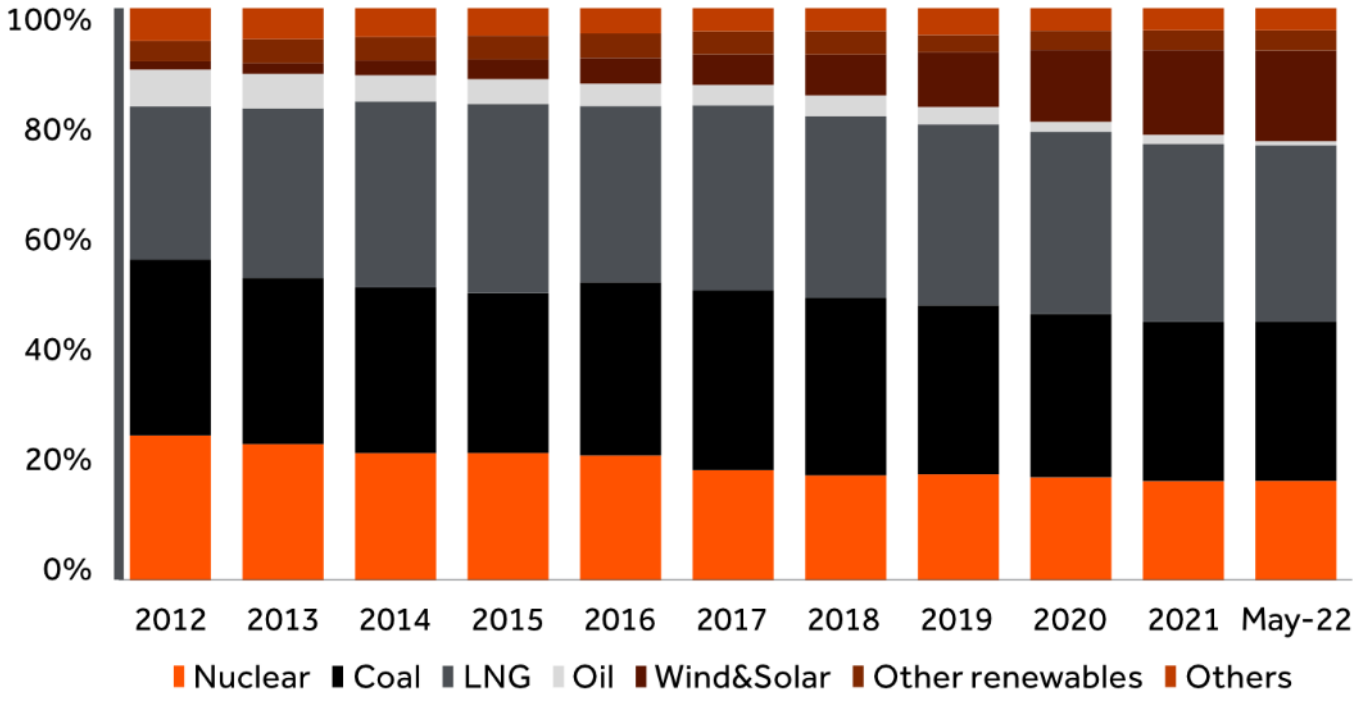
SECURING KOREA'S ENERGY

Julian Kim, Principal, Real Estate, Actis, Seoul

September 19, 2022 | 4 min read

The Korean government has long been committed to reducing greenhouse gas emissions across the country's industries. However, making deep reductions has proved challenging in the past: the economy is built around manufacturing-based exports which account for a significant share of the country's emissions. That means Korea still relies heavily on fossil fuel, most notably Liquified Natural Gas (LNG) and coal, as sources of power. Nuclear too makes up a significant portion of the power supply; indeed, nuclear looks set to increase in prominence over the next few years (Exhibit 1).

EXHIBIT 1: INSTALLED CAPACITY PER PRODUCTION TYPE



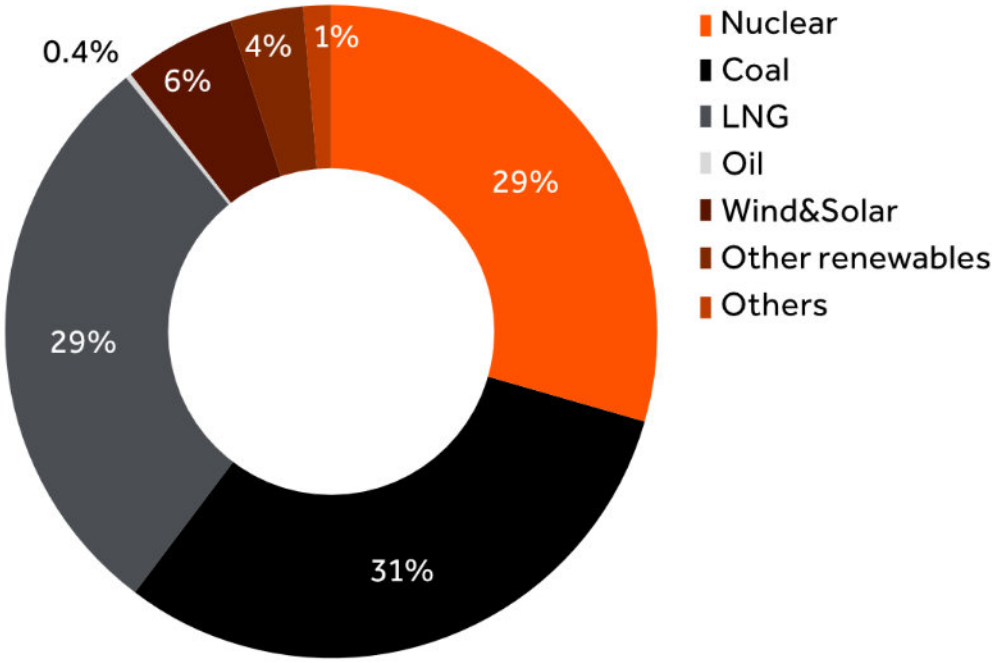
Source: Korea Power Exchange (KPX)

RENEWABLES HAVE YET TO BECOME COST EFFECTIVE

Renewable energy sources which include not just solar and wind, but hydrogen, biomass and others too, now make up around 16% of total capacity but account for just 5.6% of generation (Exhibit 2). The country aces the same challenges when it comes to the sector as others: addressing renewables' intermittent nature, the need to invest in better battery storage, and reshaping existing – or establishing new – grid systems to support the different power infrastructure that renewables require. Meanwhile the recent sharp increase in raw material prices – including for some that are vital for electric vehicle batteries – is an added concern. Until many of these issues are resolved, the country is likely to continue to rely on LNG and nuclear fuels to meet its needs.

These have become important over the years not least because of Seoul's relationship with Pyongyang. Since Korea is not able to pipe its gas across a land border, its energy strategy has developed over the decades to rely on imported fuels such as LNG. The turbulent relationship with the North therefore has a limited impact on the country's energy strategy.

EXHIBIT 2: POWER GENERATION PER PRODUCTION TYPE (YTD MAY 2022)



Source: Korea Electric Power Corp (KEPCO)

In spite of the energy challenges Korea faces, the recently elected conservative People Power Party administration led by President Yoon Suk-yeol seems determined not to go back to traditional energy sources like coal. But while it is continuing to foster the growth of the renewables sector, it also recognizes that the country cannot transition into clean power in the short term: it needs to have an energy bridge that can meet the country's growing energy demand while giving time for renewables to catch up. That means bolstering the role of nuclear in the energy mix, which had been de-emphasized by the previous administration.

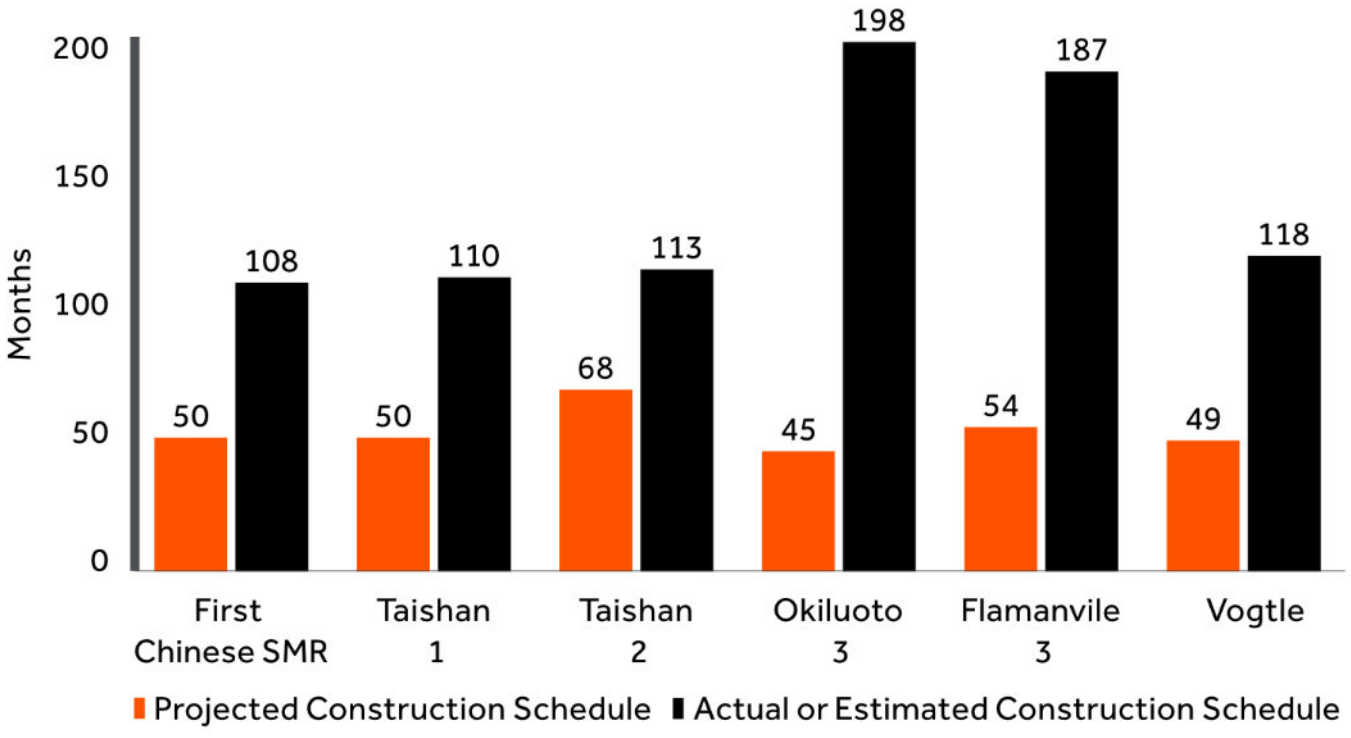
Its recently-announced new energy policy highlights the challenges the country faces, as well as the steps it plans to take to overcome them.

> “NURTURING BOTH NUCLEAR AND RENEWABLES WILL BE VITAL IF KOREA IS TO OVERCOME ITS ENERGY CHALLENGES, WHILE MEETING ITS OWN CLIMATE GOALS.”

To that end, it called for a strengthening of the nuclear economic ecosystem, creating and growing a new energy market, and transitioning towards a green economy by establishing scientific initiatives in order to achieve carbon neutrality. It aims to boost the share of nuclear in the country’s power mix to 30% by 2030, from 27.1% last year, while lowering the country’s dependence on fossil fuel imports to under 70% by 2030, compared with more than 80% in 2021. When it comes to renewables, the country wants to establish a new distribution plan based on a more sustainable energy mix, strengthen next generation renewable technology, and improve the competitiveness of core turbine parts that rely heavily on imports. It also aims to provide incentives for low carbon solar production and encourage the commercialisation of building-integrated photovoltaics.

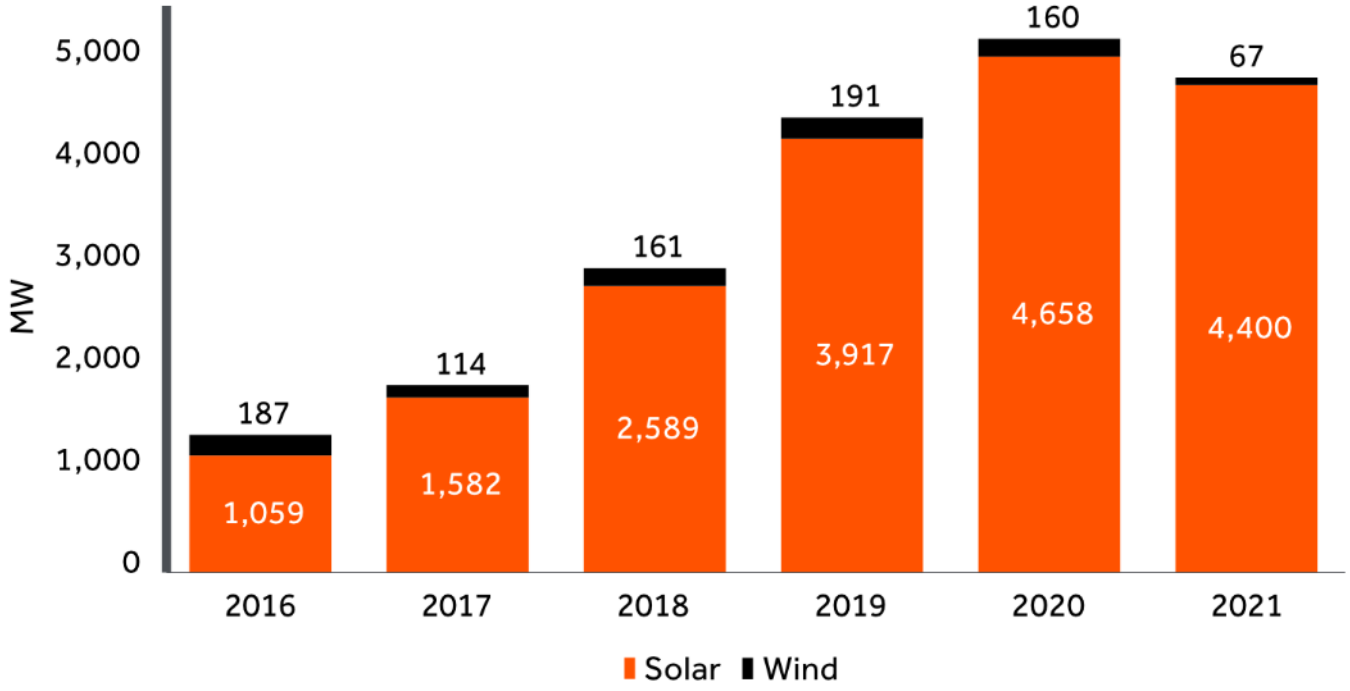
While growing back the reliance on the nuclear, importance of the renewables, especially wind and solar will continue to grow driven by the nationwide commitment to GHG reduction and the prolonged development process (from permitting to commissioning) for nuclear power plants (Exhibits 3 and 4). The new regime has kept the Nationally Determined Contributions (NDC) target by 2030 unchanged. The NDC target was set in 2015 and later was tightened in December 2021 meaning that growing reliance on the renewables is essential to achieve the target, especially given that the development of nuclear power plants as well as extension of the operating life still take a significant amount of time.

EXHIBIT 3: CONSTRUCTION SCHEDULE OF NUCLEAR POWER PLANTS



Sources: World Nuclear News and the IAEA Power Reactor Information System (PRIS)

EXHIBIT 4: SOLAR AND WIND GENERATION CAPACITY (ANNUAL GROWTH)

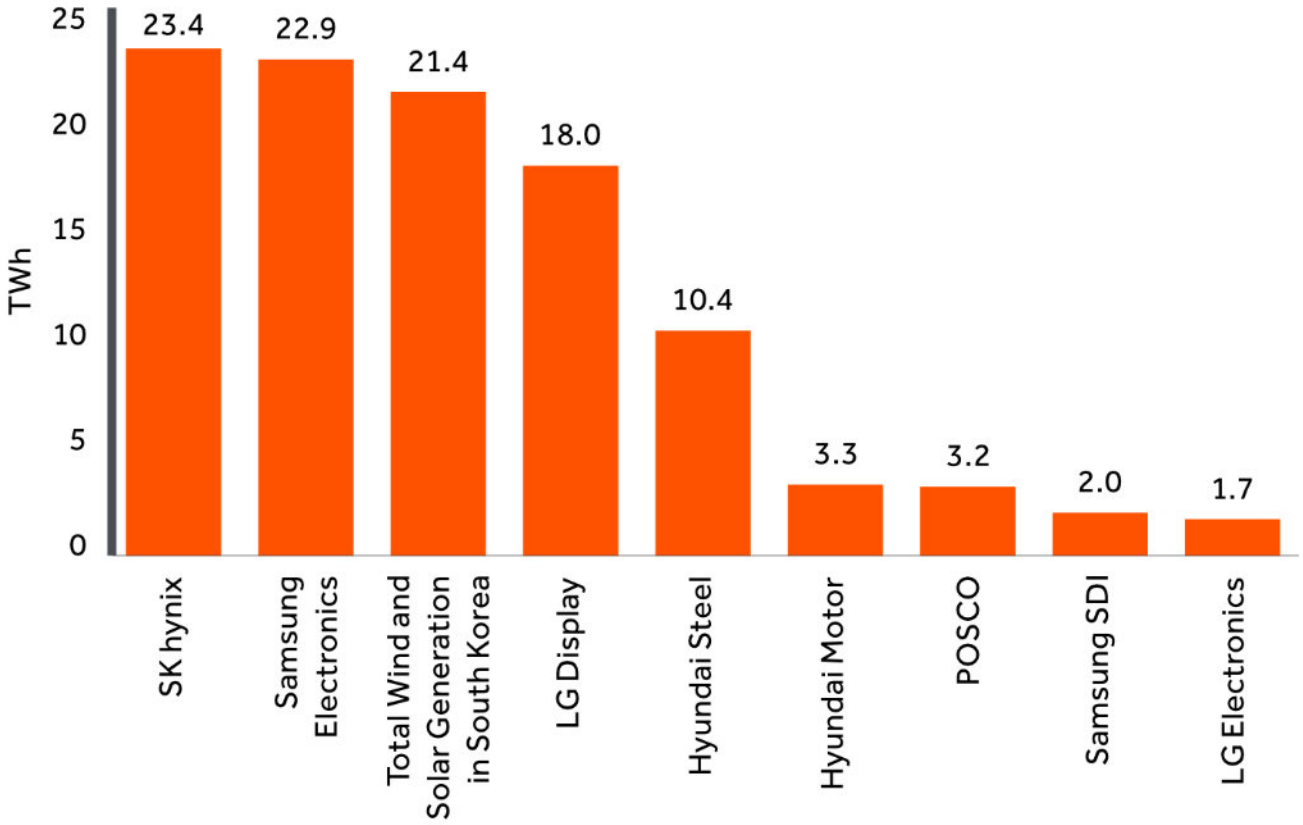


Source: Korea Energy Agency

KOREA'S POWERFUL MANUFACTURING SECTOR HAS GIVEN ITS BACKING TO THESE PLANS

Korea's powerful manufacturing sector has given its backing to these plans. The country's major corporates have continued to pledge the importance of renewable energy generation in their own power mix (Exhibit 5). Yet there is still some way to go to achieve the country's goals. The share of power generated by renewables is still far too low within the manufacturing sector. That puts added pressure on President Yoon's new administration to ensure the country sticks to the path it has set out. The country faces a set of challenges it has not faced for decades. Nurturing both nuclear and renewables will be vital if Korea is to overcome its energy challenges, while meeting its own climate goals.

EXHIBIT 5: POWER USAGE OF MAJOR DOMESTIC EXPORT COMPANIES



Source: EMBER - https://ember-climate.org/insights/research/south-koreas-lack-of-wind-and-solar-hinders-exporters/

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