

The Road to Smart Olive: The Energy Perspective

The Street View

Actis Macro Forum

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Welcome



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Delivering Smart Olive

Ewen Cameron Watt

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Welcome to our latest Street View, the publication where we draw on the insights of our staff and key commercial partners around the world. This edition is all about 'transition' – energy transition to be precise.

'Smart Olive' is Actis' own terminology to categorise assets which can be adapted to have a role in a net-zero world. We consider that 'green' assets have a clear role in a global net-zero economy. Brown assets (such as coal and oil) do not. But bridging the two needs a pragmatic pathway: the bridge is 'Smart Olive' in our taxonomy. 'Smart Olive' assets can be future proofed, decarbonised, protected from stranded asset risk, and made more efficient. and more resilient. Actis believes 'Smart Olive' assets are key to accelerate the Energy Transition.

In this edition of The Street View, we make the case that 'Smart Olive' is a viable path for emerging economies in the face of real world energy access crises in a number of our markets.

With sustainable investment in our DNA, and as a major player in the provision of power generation and distribution in emerging economies, every day we confront energy transition opportunities and challenges. This edition is as much about how the transition is delivered, as to why it is essential.

We do not believe full decarbonisation is feasible or fair without a transitional period where gas plays an important role. This may run counter to perceived wisdom-read the articles from GE Renewable Energy and Damilola Ogunbiyi, Co-chair of UN-Energy. Our preferred and recommended path is what we dub 'Smart Olive', where we mix pure green investments with those capable of full transition over time. We are very conscious of the need for a 'Just Transition'-one where poorer countries do not have to adapt overnight to the priorities of postindustrial nation states.

This view may be controversial. I recommend reading the articles kindly written for us by Anne McEntee and Martin O'Neill of GE Renewable Energy, Damilola's input and the views of our partners from Africa (Jennifer Boca of Lekela Power and Libby Hirshon of BioTherm Energy plus our own Lisa Pinsley). I'd direct you towards the pieces from Katherine Stodulka and Mark Meldrum of SYSTEMIQ in Asia and José Arruda Jr. in our São Paulo office before accepting conventional wisdom which holds there is no future for gas in a carbon-zero world. We don't believe this argument has legitimacy without a transition period. To believe otherwise is to believe that countries will put global issues in front of national priorities. And, in any case, technology provides a wide range of opportunity to apply gas with a diminishing pollutant output.

Central to the energy transition are the needs of the private and public sector investments needed to deliver net zero. Our Senior Partner Torbjorn Caesar and Shami Nissan, Head of Sustainability explore this topic and the ability of Actis to marry investor expectations and social imperatives. A few individual prejudices to end this introduction. Post pandemic public sector budgets and fiscal head space for long term investment are severely limited. This makes effective regulation and government support even more important. The penalties of getting this wrong are seen in the hydro deficit of Brazil, which combines the largest rainforest in the world with a severe hydro crisis.

Commitment is essential on all levels. Read the interview between Roger Fisk former Communications Strategist in the Obama Presidency for a behind the scenes look at global conferences such as the forthcoming COP26 meeting in Glasgow. Roger notes how the real work goes on away from the stage managed photo shoot opportunity. This is a global conference reality.

Without the involvement of Asia in general and China and India in particular, global net zero is unachievable. These are the main geographic sources of emissions. Happily, despite differences of opinion in most subjects, delivering a cleaner future for citizens is a priority of Presidents Xi and Biden.

Lastly, incentives matter. Archer Kilpatrick from our London office points to progress on carbon pricing. Personally I strongly agree with the IMF that charging emitters a price that encourages clean up remains the most successful route to net zero, far outmuscling investor boycotts.

A final word-this edition has been led by Shami Nissan and James Magor from our Sustainable Investing team. If, as I hope you read this edition, you are inspired by the detail and messages, they deserve the praise.



Road to Smart Olive

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Supporting the Energy Transition moving the world away from carbonintensive energy production towards a zero-carbon future – is at the heart of many of Actis' investments. Whether it is investing in renewables, or converting more carbon-intensive power plants to use of greener fuels, sustainability sits at the heart of our investment philosophy. But how do we ensure that our investments deliver a positive impact while also making the long-term, stable returns that investors need? Our Senior Partner, Torbjorn Caesar and Head of Sustainability, Shami Nissan discuss how Actis' strategy is evolving, and the tools we use to help make our investment decisions.



and for the sustainability of the planet? Shami Nissan: The Energy Transition is mission critical for our

planet's future. The landmark 6th Assessment Report from the UN's Intergovernmental Panel on Climate Change (IPCC) provides the strongest scientific evidence yet of how global warming is impacting the planet and sets out implications of various warming scenarios. The world is likely to temporarily reach 1.5°C of warming within 20 years even in a best-case scenario of deep cuts in greenhouse gas emissions. This will lead

to further "unprecedented" extreme weather events, such as floods and heatwaves, which are expected to become more frequent and intense. Although warming could still be capped, the report indicates some changes that have been set in motion are "irreversible", including sea level rise. Poverty and inequality naturally follow given limited financial headroom for necessary capital expenditures and limited social security nets

A zero carbon future necessitates a whole economy transition. Within that, the energy sector, currently responsible for 40% of carbon emissions¹, is key. A successful Energy Transition is therefore vital in ensuring the climatic stability of the planet, and in turn paving the way for stable societies and prosperous economies - both of which are important to securing investment outcomes. This is our home ground and we feel this allows for meaningful initiatives on our part.

Torbjorn Caesar: The long-term sustainability of the planet is incredibly important to investors, and will become even more so. After all, they are human beings themselves, they worry about the future of the planet like everyone else. And don't forget the people behind many of our large institutional investors, such as teachers, police officers and civil servants, worry about this too, and want their money used in a long-term, sustainable way.

It is also a fantastic investment opportunity. Energy demand will double over the next 20 years, so there will need to be investment not only to ensure that current and future demand can be met sustainably. Much of this electricity demand is thanks to the economic growth coming from the parts of the planet where 80% of the population lives, such as Asia, Africa and Latin America. That is where we have our unique footprint. If you can forgive the mixed and non sustainable metaphor we are on the ground and at the coal face.

Thinking about supporting the Energy Transition is also important when it comes to investing in other global themes. Digitalisation-which is driven by longterm trends towards increased use of data - will also continue to offer huge opportunities for investors, but they need

to make sure the extra energy supply needed to manage all this data is carried out in a sustainable way.

Ewen Cameron Watt: So with that in mind, how does Actis decide which investments are appropriate to meet the needs of the Energy Transition, and which to avoid?

Shami Nissan: We have developed a transition tool to inform and aid the investment decision-making

process. The tool helps us assess whether each investment we make is aligned to a net zero future which we would deem as being Green, or net-zero-misaligned -which we would deem Brown. But between Green and Brown-between, say, renewables and coal-there are other investments/assets which we call Olive. That doesn't mean we cannot invest in Olive, but we need to ask key questions around the transition risk of that business, to understand whether it is vulnerable to dilution of value in the future. And then we need to consider what we can do during the time of our ownership to repurpose it, to move Olive assets closer to the Green end of the scale. For example, a data centre that is powered via the grid in a heavily coaldependent country could perhaps be switched to using renewable energy. That would be an example of how an Olive asset could become Green.

Torbjorn Caesar: Thanks to our presence on the ground, we can see the deal flow of opportunities where capital can be invested to drive the Energy Transition, and we can pick and choose where we see the best risk-return. The countries where we have a significant presence and a unique competence set are precisely those where the most investment is needed, because electricity is in short supply, yet there is less capital chasing those opportunities than in developed markets. But as Shami said, investors also need to consider not just how the potential asset looks today, but how it will look tomorrow. You need to have a view about what this company, in this sector, in this country will look like for the next 20 or 30 years. Our long-term transition tool is crucial to get visibility on how an asset will be viewed when we come to sell it. This is not something you can just put in a spreadsheet, you need to make a judgement about the future, and that is why the tool is so important.

https://www.iea.org/data-and-statistics/charts/global-energy-related-co2-emissions-bysector



This is the equivalent of removing almost

T M cars from the road for one year



In the last 12 months

employed across Energy platforms





40 m customers served by our businesses

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most debated topics within the Energy Transition is the role of gas. On the one hand it is less polluting than oil and coal, but it is still a fossil fuel. Does investing in gas meet the demands of the Energy Transition and what is Actis' view about investing in the sector?

Ewen Cameron Watt: One of the



Torbjorn Caesar: Gas is an important transition fuel. There are many periods when the sun

doesn't shine or the wind doesn't blow, and as there isn't yet enough battery capacity to store renewable energy, there is still a need for fuels like gas. So it's perhaps useful to think of gas as something that enables renewables to happen, it provides the capacity to build out a renewable base. But as we said earlier, as investors we always have to think about what the investment will look like in the future. And the issue is that, in a decade or so from now, there will be many financial institutions who will not invest in gas. So thinking ahead we need to be careful, but until then gas is a big opportunity and serves a huge global need in supporting the transition.

Shami Nissan: We should also remember that in many of our markets there is not the opportunity to shift to renewables overnight. That is not a viable option as the infrastructure isn't there. When considering the role of gas, it is important to apply a country-specific lens and to invest in assets and solutions which enable renewables to scale in time. In this context, gas has a critical role to play in accelerating the Energy Transition, in particular when substituting more carbon intensive alternatives (e.g. coal, heavy fuel oil), when harnessing indigenous reserves and in recognition of the fact that power generation is correlated to GDP growth in many of our markets and therefore this approach enables economic progress.

We have previously invested in converting a heavy fuel oil operation to gas: that is an example of transitioning '*in action*' and in terms of decarbonisation, has important real-world impacts. Clearly, a net zero future requires trillions to be invested into

new renewables infrastructure however in isolation which will not suffice to secure a net zero future – we must continue to invest to decarbonise and transition all sectors, including gas, and the so-called hard to abate sectors. For example, gas may stay in the energy mix in 2050 but it's role will likely transition away from baseload to providing peaking capacity. We also look at upstream emissions and initiatives like the Responsibly Sourced Gas certification scheme will further help to reduce emissions from gas value chain.

Finally, as Torbjorn alluded to, the role of gas in providing stability to the grid in many emerging countries is absolutely critical for the power system as a whole and is indeed a means of stabilizing the infrastructure to support the rapid scale up of renewables.

Ewen Cameron Watt: Once the decisions about where to invest have been made, how does Actis monitor its investments, to ensure they are still meeting the requirements of the **Energy Transition?**

Shami Nissan: We have always had Environmental, Social and Governance (ESG) kev performance indicators, but in addition to that we apply our impact measurement framework to assess how our investments contribute to the United Nations' Sustainable Development Goal (SDG) number 7, which is about clean, affordable energy. We also look at other social aspects, such as job creation, job quality, female representation, how widely value/ benefits are shared across communities and remote areas: to keep our social licence to operate but also to change people's lives for the better. It's about enabling them to boost their own economic prospects through initiatives such as upskilling and vocational training, helping them get better jobs with higher salaries and other measures which transform livelihoods. We are actively working to ensure that the transition away from fossil fuels in our markets is a Just Transition with the substantial benefits of a green economy shared across society.

Ensuring a Just Transition

At Actis, we are proud to play a part in financing the energy transition, and through increased availability of electricity contributing to economic growth and social progress at a macrolevel. At a more localised level, our values-drive-value approach ensures we focus on our licence to operate-our businesses deliver tangible, measurable benefits to local communities so that the value we create is shared with our stakeholders. This includes local job creation, training/upskilling programs to improve employability and boost income-generating activity, providing access to electricity, safeguarding ecological systems and addressing key developmental needs. In this way, the energy transition in which we invest is an inclusive and equitable one. This is the Just Transition.



Ensure access to affordable. reliable. Sustainable and modern energy for all



Ewen Cameron Watt: That all sounds very positive when it comes to the impact on the lives of the people and of the communities Actis invests in. But how do investors react to this way of thinking? Are they not still simply focused on yield?



Torbjorn Caesar: The ideas both of making a positive contribution and of making the right financial

return are converging. And the speed that they are coming together is remarkable. Five years ago, there was a perception that there was no connection. Now people understand that focusing on values also drives financial value.

Investors are also realising that their returns elsewhere are low, so they need to move capital into alternative assets. seeking long-term, stable transactions with a good yield. One challenge however has been that in the past many investors were perhaps too focused on simply spreading their capital across different parts of the world rather than thinking globally. That can be a limitation, because the issues we face are relevant to the whole planet: if we want to cut carbon emissions, we need to do it everywhere, not just in one region. We at Actis are right in the middle of where capital flows and opportunity come together, whether it is for energy that promotes the transition, or for the digital infrastructure needed to support the economies in the arowina countries of the world.



Shami Nissan: The last few years have seen a sea change in this agenda: on sustainability, on

climate and on impact. We are at a tipping point on this topic, it is here to stay. These are fundamentals that drive value and stability and are needed to create a prosperous society. This is all now hard-wired into business and civil society and, increasingly, the investment community. And investors are now prepared to move forward at a much faster pace than they were in the past.



Torbjorn Caesar: You are right about civil society: public opinion also matters here. People see the

impact of climate change all around the world, and also on their daily lives. That means governments have to move guickly to address the issues.

Shami Nissan: And the impact of climate change influences next-generation talent too. It changes the contract people seek with their employers. Younger people want something very different to previous generations when they make decisions about which jobs they want to have and for which companies they want to work. So, integrating sustainability is vital to companies if they are to attract the best employees in the future.

Ewen Cameron Watt: What does this all mean for Actis? Does it change the places or countries you might invest in, and the investor partners you might work with?

Torbjorn Caesar: We are lucky at Actis to be in the right place at the right time. When it comes to big trends such as the Energy Transition and digitalisation - with all the infrastructure and logistics behind it - we are experts in the markets where 80% of the population of the world lives. So, we have a fantastic opportunity. We aren't just experts in emerging markets, we are global thematic investors in areas such digitalisation, sustainable energy and infrastructure. And the emerging markets themselves present probably the biggest opportunities in these areas. So, the opportunity we have is massive

Shami Nissan: The sun shines brightest and the winds blow strongest in our markets. So, when it comes to the Energy Transition, it makes sense if you are a global investor to work with us to achieve the returns you need. It also makes sense if you want to have outsized sustainability outcomes, because the places we work in are where the world's needs are greatest.

Torbjorn Caesar: I take the view that we have three distinct competitive advantages. First, our footprint-17 offices, 300 people, 600 board members, 120,000 employees in our portfolio companies – gives us a huge base on the ground where we are investing. Second, our operational capabilities mean we act like industrialists who are working in the investment space, which means we understand the complexities of infrastructure investing. Third, our belief that values drive value is in our DNA. This is

Key IPCC Findings

Global warming:

0.95 to 1.2C, since late 1800s. Surface temperature has risen faster since 1970 than in any other 50-year period over at least the past 2,000 years

Global warming under very low emissions scenario:

temperature rise of 1.5°C by 2040 and 1.6°C by 2060

Global warming under very high emissions scenario:

carbon emissions triple, warming could reach 1.9°C by 2040, 3°C by 2060 and 5.7°C by 2100

Sea levels under very low emissions scenario:

rise of about 0.35m by 2050 and 0.5m by 2100, compared with 1900 sea levels under very high emissions scenario: rise of about 1m by 2100

Sea levels in case of complete ice sheet melt:

rise of about 65m

Arctic:

likely to be 'practically sea ice free' in September at least once before 2050

who we are, it sits at the heart of everything we do, it isn't just a case of us jumping on a trend. That makes us different, and different is good.

Shami Nissan: l'd also point to our track record. We aren't a firm that talks about what are planning to do, we have been doing investing to generate both compelling returns and sustainability outcomes since our inception. Actis was founded with this investment mindset, and hence we have decades behind us of integrating sustainability fully into our processes. It's something we have had from day one, it isn't something we have just dialled-up or bolted on

James Magor

Sustainability Director, Actis, London



The Methane Problem

Background

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Methane is an extremely potent greenhouse gas (GHG) with 84 times the global warming potential (GWP) of an equivalent amount of carbon over a 20-year time frame. In 2019, the oil and gas industry contributed approximately 82 million tons of methane to global emissions, roughly equal to the all the emissions from the entire global road transport fleet.

The vast majority of methane (the primary component of natural gas) is destroyed during combustion in highly efficient gas power generation turbines; however, the natural gas supply chain causes potentially significant methane emissions.

Methane emissions can be 'fugitive' (e.g. due to a faulty seal or leaking valve) or deliberate and carried out for safety reasons.

There remains a high degree of uncertainty in estimates of methane emissions from oil and gas operations globally.

Natural gas has a lower lifecycle GHG emissions intensity than coal when used for power generation. IEA analysis shows that, on average, coal-to-gas switching still reduces GHG emissions by 50% when producing electricity.

Methane abatement

The IEA estimates that around 40% of total methane emissions could be avoided with measures that would have no net cost (at 2019 natural gas prices).

Options to reduce vented and fugitive emissions include:

 Regular, proactive maintenance of valves, controllers and pumps (which emit methane in the regular course of operation) or replacing them with loweremitting versions.

- Installation of devices, such as vapour recovery units, to capture gas and pair it to an end use that is less harmful than direct release of vented emissions to the atmosphere.
- Inspection of a facility at regular intervals, using drones or metering tools to scan equipment for leaks.

Gas procurement and certified gas

While satellites provide a way to identify large leaks and help endusers avoid the worst offending regions, they are not going to provide all the answers. Most notably, existing satellites do not provide measurements over equatorial regions, northern areas or for offshore operations.

The intensity of methane emissions varies widely across countries that produce oil and gas. Based on annual data for 2020, the IEA estimate that the emissions intensity among the worst performing countries is more than 100 times higher than among the better ones (refer to Exhibit 1).

National and regional regulation can and will play a crucial part in reducing methane emissions in the energy sector in the longer term. In addition, we're seeing the emergence of certification systems, developed by organisations like <u>MiQ</u> and <u>Project</u> <u>Canary's TrustWell</u>TM, that will enable oil and gas producers to be assessed according to a universal standard, in which operators can be awarded 'Responsibly Sourced Gas' status.

While these certification schemes are relatively nascent it is hoped that, in regions where certified gas is available, sustainability-conscious end users will seek to demonstrate methane abatement in their supply chain by procuring certified Responsibly Sourced Gas.





Source: IEA (2021) <u>https://www.iea.org/data-and-statistics/charts/total-methane-emissions-and-</u> methane-intensity-of-production-in-selected-oil-and-gas-producers-in-2020



Watch Actis' 50 Sustainability Climate Leaders video.

The project is the response from the International Business Community which demonstrates the desire, the leadership, and the will to take effective action in the fight against Climate Change.

Sprng Energy, India

Guest View: We Must Act Now: Innovation via Renewables, Gas and Grids

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Actis invests across the energy sector in renewable power generation, high growth distribution businesses and also high efficiency gas generation projects. We work with many of the leading technology companies across these investments and in this article we have asked two General Electric ("GE") leaders to give their view on the role of gas powered generation as a catalyst for large scale deployment of renewables. GE is uniquely positioned in that they design and manufacture wind turbines, gas turbines, transformers, inverters and many other key components for the generation of electricity.

Anne McEntee

CEO, Digital Services, GE Renewable Energy



Martin O'Neill

Vice President, GE Gas Power





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We Must Act Now: Innovation via Renewables, Gas, and Grids is Key to Accelerating the Energy Transition.

The global challenge of climate change has never been more urgent or real. While the world races to meet carbon reduction goals, approximately 800 million people worldwide remain without access to reliable and affordable electricity today, while demand for electricity is set to grow by 50% or more in the next two decades according to the International Energy Agency (IEA). Put simply, access to energy is a human right and GE believes we must decarbonise power generation and ensure the sustainability, reliability and affordability of electricity for all – through a decade of action. We believe that accelerated and strategic deployment of renewables and gas power along with modernising the grid can help change the global trajectory of climate change, enabling substantive reductions in emissions quickly while continuing to accelerate technologies for low or near zero-carbon power generation. While the challenge is daunting, the opportunity afforded to us to make real changes to our power generation supply is equally apparent.

Gas must be part of the solution both short and longer term and has been the technology that has driven the highest amount of carbon intensity reductions over the last two decades

Decarbonising power generation is a foremost priority as the power sector currently produces about 40% of global carbon emissions¹, the largest of any sector. Changes we make now, not decades from now, are critical for our planet – especially as our collective carbon budget is declining every day, month, and year. Additionally, as other sectors – such as transportation, heating, and heavy industry – look to increasing electrification as part of their own efforts to reduce carbon emissions, power generation must be rapidly decarbonised to ensure a net positive effect for our climate.

Our approach within power generation is clear: first, we must continue to grow renewables while strengthening our infrastructure to achieve a cleaner energy future – faster. Renewables are the fastest growing source of new power generation capacity and technology. We can and must grow renewable energy fast and affordably, looking to expand new opportunities in wind, solar, hydro and nuclear energy to produce as much carbon-free electricity as possible. Secondly, we see additional benefits when growing renewables alongside energyefficient natural gas power, which can be deployed both quickly and at scale. Gas power is a force multiplier for renewables. providing the lowest carbon-emitting dispatchable support for the inevitable extended periods when renewables alone are not able to meet demand. By allowing us to support periods of days without renewable resources - common during season shifts or severe weather events-gas power will enable deeper, more rapid, renewables penetration and sustain grid reliability, while second order problems such as grid resilience, inertia and decongestion are addressed. Gasfired power plants have high availability and provide dependable capacity for minutes. hours, days or weeks at a time precisely when required. To keep electricity supply and demand in balance, renewable energy is complemented by dispatchable backup power such as natural gas power plants, complemented with other energy storage media such as batteries. Balancing can also be achieved through broader regional connectivity of the grid and better management of the demand side, again facilitated by an increasingly complex grid.

Despite massive growth in the deployment of wind and solar capacity in recent years, increases are not occurring at the pace or scale needed to decarbonise the electricity generation sector and meet the goals of the Paris Agreement. Gas must be part of the solution both short and longerterm and has been the technology that has driven the highest amount of carbon intensity reductions over the last two decades as renewable capacity additions have been accelerating. According to the IEA, coal-to-gas switching is the quick win for emissions reductions, for example, the U.S. power sector has cut its carbon emissions by 33% since the peak in 2007, mainly by replacing coal with gas generation and building out renewable capacity. There is potential in today's power sector to immediately reduce up to 1.2 Gt/yr of carbon emissions by running existing gas-fired plants harder and reducing coal use commensurately. There is additional opportunity to reduce coal emissions by retiring existing coal-fired capacity and replacing it with renewable energy and new, high efficiency combined cycle gas capacity. If replaced fully by gas

- 1 https://www.iea.org/data-and-statistics/charts/global-energy-related-co2-emissions-by-sector
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power, this would almost immediately bring down global power sector emissions by 10% and total energy-related carbon emissions by 4%.

Decarbonising power generation is a foremost priority as the power sector currently produces about 40% of global emissions

Gas-fired power can also serve as a low to zero-carbon destination technology for tomorrow through innovations including hydrogen fuels and carbon capture. Full decarbonisation of gas-fired power generation is on the horizon and GE and our customers are delivering pilot projects to demonstrate the importance of these cutting-edge innovations to the fight against climate change. The development of programs and supportive policy for hydrogen fuels, CCUS technologies, and methane abatement pilot projects are the subject of GE position papers available here, and will ensure solutions to combatting climate change are developed rapidly and in a way that is optimum for a specific region or country.

Modernising the grid is crucial to ensuring resiliency and enabling more renewable energy Haliade-X offshore wind turbine, a prototype unit currently running over 13 MW located in the Netherlands

Technology innovation in renewable energy, efficient gas-fired power, and grid will help drive the energy transition and combat climate change

To help facilitate such growth, GE is working with our customers to deliver the carbon-free future that countries and consumers demand, with a focus on four key areas:

- Building, servicing, and maintaining a global fleet of renewable energy assets: GE Renewable Energy manufactures and installs leading edge equipment for new onshore and offshore wind farms, services and re-powers the global wind energy fleet, deploys advanced solar and storage assets, and builds new and upgrades existing hydropower plants.
- Reducing the cost of renewable energy: Already, electricity costs from new renewable energy capacity are less expensive in many markets than electricity costs from new conventional, fossil fuel-based power plants-without subsidies. We want to make it even more cost-effective so everyone everywhere can afford cleaner energy. GE Renewable Energy is introducing new onshore and offshore wind turbines that capture more energy from the same amount of wind, driving down costs even further. GE's Haliade-X turbine, the world's most powerful off-shore wind turbine built today, can generate 67 gigawatt hours annually - enough to provide the equivalent electricity needed to power 16,000 European homes for a yearwhile also withstanding harsh offshore conditions.
- Making renewable energy function as reliably as traditional power generation sources: Everyone agrees renewable energy must be integrated into the grid, but few fully appreciate that the grid was not designed to accommodate generating assets that operate the way wind and solar systems do. Battery energy storage can be a key solution for the future, but

it is not the only answer. Our hydropumped storage technology creates long duration storage, far longer and larger than batteries, giving system operators the flexibility to address the variability of wind and solar by providing reactive power support and overcoming imbalances in supply and demand to complement the role we describe for gas power. GE Renewable Energy is also increasing 'system capacity factors,' in part through hybridisation of solar, wind and batteries so that power from wind and solar farms can be used in a more dispatchable manner.

Ensuring grid resiliency and efficiency while maintaining grid reliability even as more renewable energy come online: the grid is being pushed beyond its capacity in many countries around the world. The 600,000 miles of transmission lines in the United States, for example, are increasingly vulnerable to weather and myriad other impacts, causing power outages that cost billions of dollars each year. And it is hampering essential progress toward a cleaner energy future. Our Grid Solutions team helps our customers accelerate the energy transition by providing them with both the hardware and the cutting-edge digital tools to deliver affordable, reliable and accessible electricity.

According to the IEA, coal-togas switching is the quick win for emissions reductions

Modernising the grid is crucial to ensuring resiliency and enabling more renewable energy. We believe this requires both physical upgrades to support the increasing share of renewable energy and increase efficiency and resilience, as well as digital improvements to increase overall capacity, reliability, and security. Technology innovation in renewable energy, efficient gas-fired power, and grid will help drive the energy transition and combat climate change. When combined with action and proper policy frameworks. combatting climate change is possible. GE is committed to working with countries, companies, and communities at every stage of the energy transition using these three critical technologies to reduce carbon emissions and secure our collective future. Differences in available resources and technological capacity will mean not every community will move at the same speed – but we all must work together, beginning immediately, to confront this urgent global threat. Power generation represents a significant opportunity to utilise technologies we have today -while pursuing innovations and breakthroughs vigorously-to take aggressive climate action together. No company, country, or community can do this alone; we must win together.



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Emissions Trading Schemes and Carbon Pricing

Over the past year carbon pricing has become an increasingly relevant topic of international policy debate. China launched their mechanism in July 2021, the EU is in the process of 'super-charging' their 15-year-old Emissions Trading Scheme (ETS) and the UK, host of this year's COP26, launched their own standalone scheme in May. These moves are prompting policy makers globally to re-consider whether such schemes should take more prominent roles in their own climate agendas. IMF studies argue convincingly that the greatest incentive for energy transition is a function of charging for carbon at a rate that encourages innovation. We agree.

How do emissions trading schemes work and why do they matter?

ETS mechanisms seek to overcome market failures by pricing negative externalities (costs to society as a whole, not borne by individual agents) which would otherwise be ignored by the market. The intention behind this is to create a financial incentive for economic activities to shift away from carbon intensive activities to more efficient alternatives which do not need to pay such a high carbon price. Over time the total supply of allowances to emit can be reduced thus driving the targeted outcome.

How "fit for 55" is changing things

Policy amendments under negotiation between the European Commission and EU member states introduce two key changes which could have profound global consequences:

1. they expand the scope of the scheme to include new sectors such as transport; and

2. they introduce a Carbon Border Adjustment Mechanism (CBAM) which means that imports into the EU would be subject to the same emissions requirements as goods produced within it.

Given the EU's significant economic clout, if these adjustments do become law, then there will be profound consequences not just for EU states but for their trading partners too. The adjustments could also have inequality effects, with some regions and countries being much less able to decarbonise than others. As such it is critical that the adjustments are accompanied by wealth transfers to mitigate such a risk.

For now, China's scheme is less ambitious, covering only the electricity sector (just as earlier phases of the EU's mechanism did) and commensurately carbon was recently trading on the Chinese

Exhibit 1: How a simple cap and trade ETS works

Company A and B are both given a cap of 100 tons of carbon Company A emits only 80 tons, whilst Company B emits 120

exchange at 13% of prices being seen currently in Europe, as reported in the FT. However, if Beijing chooses to strengthen their mechanism the global impact of carbon pricing will be even greater.

Relevance for Actis sectors should carbon pricing be adopted / expanded

At the time of writing few of Actis' markets have adopted ETS mechanisms; however, should the political momentum behind ETS mechanisms continue and our markets adopt such mechanisms, it is likely that our sectors will be positively impacted. For instance, the advantage that our renewables investments have over thermal will accelerate, our hotels would be more incentivised to decarbonise and the competitive position of our data and logistics centre investments will be strengthened.





Source: BloombergNEF

Exhibit 2: Conceptual merit order of an electricity market



Source: Actis



Guest View: Sustainable Energy for All

Damilola Ogunbiyi

CEO and Special Representative of the UN Secretary-General for SEforAll, and Co-Chair of UN-Energy



Lucy Heintz

Partner, Energy Infrastructure, Actis, London



Transitioning to a net zero carbon future in a way that is fair and just for everyone in the world was always going to be a challenge, even before the pandemic struck. That challenge is particularly acute in parts of Africa, where high levels of energy poverty still exist and many places depend on fossil fuel generation to meet the demand for electricity.

So how can the transition be brought back on track, and what is the role not only of governments, but of international bodies like the G7? And what policies are required to make change happen? Lucy Heintz, Partner and Fund Head at Actis talked to Damilola Ogunbiyi, CEO and Special Representative of the UN Secretary-General for Sustainable Energy for All (SEforALL), and Co-Chair of UN-Energy, about how to address the challenges, and the role that investors can play.

Lucy Heintz: Overall, how do you feel about the energy transition in 2021? Are you optimistic?

Damilola Ogunbiyi: Globally, almost 760 million people lack access to electricity, and 570 million of these people live in Africa. In addition 2.6 billion people lack access to clean cooking solutions. This lack of access to electricity and unreliable supply forces people to rely on fossil fuel powered generators, which typically produce the power equivalent of up to 1,000 coal-fired power stations. It is simply unacceptable . that this is the state of energy access in 2021. And it's clear that the energy transition, which is a pathway to net zero emissions by 2050, is nearly impossible while energy poverty still exists.

Renewable energy solutions can support our global net zero ambition, but we also need inclusive planning approaches and policy measures that support these technologies in order to provide electricity and associated energy services to meet human needs and contribute to sustainable development. Sustainable Development Goal (SDG) 7 – affordable and clean energy for all – is truly the golden thread that will unlock all of the other United Nations Sustainable Development Goals, and put us on the pathway to net zero by 2050.

But we are far behind. In order to deliver SDG7 by 2030, it is critical that we push governments, businesses, and the global development community to make ambitious, action-oriented, and transformative commitments to sustainable energy systems.

7 AFFORDABLE AND CLEAN ENERGY

Sustainable Development Goal (SDG) 7 – affordable and clean energy for all – is truly the golden thread that will unlock all of the other United Nations Sustainable Development Goals, and put us on the pathway to net zero by 2050







Lucy Heintz: How do you see the role of G7 and policymakers in creating a framework for a Just Transition that works for everyone?

Damilola Ogunbiyi: Even before the pandemic, the world was struggling to eradicate poverty and inequality. And energy poverty further exacerbates this as access to energy is essential for providing healthcare, empowering women, and growing economies. At the same time, the energy sector is responsible for the majority of global carbon emissions. The pandemic has thrown us even farther off track in our work towards achieving the Sustainable Development Goals. Understandably, and with full support from global multilateral bodies, fiscal headspace has been drawn down to protect populations today. The pandemic recovery efforts offer us an opportunity to change course and make bold commitments to recover better and leave no one behind, effecting a Just Transition to clean and sustainable energy while also providing energy access to the 760 million people globally currently living without electricity, and the 2.6 billion without access to clean cooking solutions. More than ever, though, given the fiscal resources spent in the last 18 months, this requires capital and effective investment frameworks.

The clean energy offer has to include ensuring we don't leave anyone behind, and that the access to energy also supports development

The G7 can and must play a significant role in making this happen, building consensus around key issues to be addressed and highlighting a fundamental reality: that modern energy access is about more than just enough electricity to power a few lights. It's about development, jobs, opportunity, and equality. Energy access will not be useful unless it can be used by everyone to improve health, well-being and prosperity.

It is great to see the G7 committing to lead a technology-driven transition to net zero to build back better and make the future greener and more equitable. Commitments to increase efficiency and accelerate renewables and other zeroemissions energy solutions, phasing out new direct government support for carbon-intensive fossil fuel energy as soon as possible, to clean cooking fuels and technologies, and policy action to ensure a Just Transition for affected workers and sectors so that no one is left behind will result in a just, resilient and more healthy world for all.

Lucy Heintz: How do you see the role of gas in emerging markets vis a vis transition and economic development?

Damilola Ogunbiyi: It is critical that the energy transition is equitable and inclusive. The role of natural gas in the energy transition is a sensitive topic, but an important one to consider. Here's an example: historically, Africa as a whole is responsible for less than 3% of cumulative global carbon emissions. Sub-Saharan Africa is responsible for a mere 0.55%. If all of Sub-Saharan Africa tripled its electricity consumption overnight using only natural gas, the additional carbon emissions would still be just 1.2% of global emissions. One thing that has become clear is that the energy transition will look different for individual countries. Rather than merely locking out certain fuels, the focus should be on enabling solutions where renewables are the best option. This will be essential to make the energy transition at scale.

Lucy Heintz: A growing percentage of global capital has made net zero commitments. What do you think that will mean in practice - short term and long term?

Damilola Oqunbiyi: More than 130 countries, in addition to companies, cities, and institutions have set or are considering a target of reducing emissions to net zero by 2050. This is a critical goal for us in order to keep global warming to no more than 1.5 °C and ensure long-term planetary sustainability. This, along with the Nationally Determined Contributions (country-level plans for emissions reductions and climate adaptation) required by the Paris Agreement, still leaves us much more work to do in order to meet our goals. We need bolder ambition, in the short term as well as the long term, in order to make this happen.

The top 3 greenhouse gas emittors contribute 16 times the emissions of the bottom 100 countries

Making these commitments is just the first step. What needs to follow are concrete actions, the policy support, availability of sufficient financing, as well as the political will to stay the course and achieve the target. And all of this needs to be backed by an understanding of the specific issues of the country or region, a clear plan and roadmap backed by data, science, and an assessment of the challenges and risks involved



Lucy Heintz: What could we do to improve clarity around net zero? What do you think the "fair share" concept that is emerging will mean in future?

Damilola Oqunbiyi: We are often made to think net zero is a simple pathway to stop using fossil fuels, and that developing countries are the ones who need to action this.

An inordinately high percentage of global emissions come from just a few countries. The top 3 greenhouse gas emittors contribute 16 times the emissions of the bottom 100 countries. So, while commitments to net zero are needed and welcome, a lot more needs to be done and these commitments need to be backed by the right policies, funding, and support in order to be actioned.

When we talk about commitments to net zero we need to understand that we have to allow for different realities and pathways to net zero. African countries are committed to a net zero future, especially given their vulnerability to the effects of climate change, but they need support and financing. The clean energy offer has to include ensuring we don't leave anyone behind, and that the access to energy also supports development.

Africa as a whole is responsible for less than 3% of cumulative global carbon emissions. Sub-Saharan Africa is responsible for a mere 0.55%. If all of Sub-Saharan Africa tripled its electricity consumption overnight using only natural gas, the additional carbon emissions would still bejust 1.2% of global emissions



Damilola Oqunbiyi: The energy transition is a challenge without historical precedence and this can make financing appear risky to investors. But with such a great need and everything to lose if we don't achieve our goals, we need investors to step up and support sustainable development.

It is estimated that by 2030 we would need an investment of at least US\$ 45 billion annually to achieve universal energy access. This volume of finance requires a deep understanding of the current financing landscape-whattype of projects currently receive finance, as well as an assessment of the gaps in terms of energy access deficits and the countries that need it most urgently. Fair and consistent regulation is essential to attracting these flows.

USS45

annually-

the estimated amount needed to achieve universal energy access

One of SEforALL's core pieces of work on energy finance offers sustainable energy stakeholders a reality check on where financial commitments for sustainable energy stand and how they can be enhanced to ensure the world achieves SDG7. Building a strong foundation for a range of stakeholders, including policy makers, the finance sector, industry and civil society will help increase deployment of appropriate finance for energy access globally. Investors like Actis and its partners can be a part of the solution in ensuring that adequate and timely capital is directed to local and innovative energy access solutions and helping shape the regulatory and investment landscapes.

Guest View: Cutting Through the COP Cacophony

Roger Fisk

Communications and Marketing Strategist and former aide to President Obama



John Thompson

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As COP26 approaches, Actis' John Thompson caught up with communications strategist to former President Barack Obama, Roger Fisk, to get his first-hand experience as part of the US Presidential delegation.

The world's media in all its guises broadcast, print, social, local, global -will be focused on Glasgow this autumn as 30,000 delegates turn up to the biggest annual event focused on climate change, COP26. Every year, the UN's Climate Change Conference (COP. or Conference of the Parties) brings together world leaders, nongovernmental organisations and businesses to accelerate action towards the goals of the Paris Agreement and the **UN Framework Convention on Climate** Change.

With so many attendees, including some of the most influential people on the planet, we explore why delegates are there and how they ensure their words are heard and translated into actions. Roger Fisk is a global communications and marketing strategist. He was a key architect in the back-to-back electoral victories of President Barack Obama in 2008 and 2012. Following President Obama's first campaign he served as Cabinet Liaison for the 2009 inauguration then became a political appointee in the Obama Administration where he helped lead trade and Diplomatic missions all over the world. In 2012 Fisk joined President Obama's re-election team, leading teams as a White House Lead Advance. Prior to working on the Obama campaigns, Roger Fisk was Senior Aide to Senator John Kerry. Here is what he had to say about heading into the Geopolitical cauldron of COP26.

John Thompson: For those that haven't attended COP before, can you describe the scene-how do these events run?

Roger Fisk: It's a real combination. In some respects, it's like a carnival - a bit like Burning Man festival. The first one lattended was in Copenhagen and on the way there, we saw protesters dressed as polar bears and bands and celebrities on stages - I think members of Pearl Jam were there. It's interesting and colourful. Yet it also has a trade show component, so you'll have booths and stands for businesses that, say, retrofit water filtration plants. And then there is obviously the political element that brings together world leaders. There is so much going on at these events and so many people there that you really have to prepare well in advance and be highly strategic if you want to be heard.



John Thompson: So how do world leaders and their aides prepare for COP events?

Roger Fisk: First off. it's worth making the point that, even though it's an incredibly crowded space, if you claim to have any interest in making a difference to climate change, you probably have to be there. It's like a massive family wedding-you're unlikely to be noticed if you're there, but you'll get talked about if you're not there.

We have to consider how the event is reported to the rest of the world. Let's take the BBC as an example. It may have a five-minute slot to cover COP and because you have these visually interesting street carnival aspects and colourful protests, these will probably consume up to two minutes, then you might have a snippet of the opening ceremony and then you might have 30 seconds of, say, President Macron addressing the media and then another 30 seconds of Chancellor Merkel. There's not much room for anything else because most of the oxygen from these events actually gets consumed by what's going on outside.

So the real value from attending an event like this - especially given that attendance is really just the threshold of involvement required to signal your interest to constituents who care about this - is in the before and after COP. Preparation has to start many months in advance to ensure messaging is clear, concise and impactful. COP is fundamentally a diplomatic exercise, but leaders also use it for internal political purposes, as a way of sending messages to their populations. The new US administration will likely be looking to make it clear that it is re-engaging with the world.



John Thompson: Given the noise and distraction around COP, what should investors care about?

Roger Fisk: One of the pillars of COP this year is about mobilising capital. When it comes to cutting through and making news, size definitely matters. Never underestimate the power of a coalition of similar businesses or ones



that share their values to commit to large-scale funding of a particular area. If you as a business have, say, \$250 million, that's just a drop in the ocean, but if you leverage that and have several parties come together to commit \$50 billion over five years, or \$1 trillion over 15 years, that will cut through. Big banner figures and goals are the central currency when it comes to making news at COP. Trying to wave one's hands and saying "Hey, we are doing the right thing, too" gets lost.

John Thompson: COP is one of those events where the public sector, multi-laterals and of course the private sector are all thrust together-how do these powerful people interact effectively?



Roger Fisk: Whatever you do, you have to be hyper-intentional. You can't just go there with good intentions; you need to really focus on who you want to communicate to, for example is it ratifying and enhancing relations with current investors or soliciting new ones, and work on distilling your message. You also need to be genuine - you can't go to COP to reinvent yourself. Use the event to summarise the previous year and to chart the course for the next 12 months.

John Thompson: Within this political and corporate interface how do words translate into action? How can they ensure things actually get done?

Roger Fisk: COP is essentially a co-operation between the government and the private sector and the event itself should be an accelerator of an existing conversation or the beginning of a new conversation that is then picked up the following year.

It is critically important to begin working many months before COP to establish the groundwork of a proposal or partnership on that agency level, so when your executive finds himself or herself in conversation with a country's deputy prime minister there is a reference point already in place around that proposal or partnership. He or she can talk about how the company's investment will create x number of jobs over x number of years, and that uses the staff-to-staff conversations already in place as a vehicle for the minister or Deputy Secretary to get involved and puts it on the agenda of a decisionmaker. Broad good intentions won't win the day; you really need a foundation for conversations to move forward and use that brief conversation with a government official to accelerate something already in place.

John Thompson: And what about after the event? How do leaders make the most of their discussions and work?

Roger Fisk: Anyone really interested in the summit takes part in COP working groups, which meet I think quarterly. That's really where the work happens and relationships get built. That also helps with your political engagement-it gives you a foundation on which to build the conversation.

COP is a lot about aspirational statements. you package up what you've learned and what you intend to do. It could be the time to trumpet, for example, becoming a signatory to a broad set of principles and use this to declare your values and intent. You should also use this time to be alert for new opportunities and capitalise on them while the discussions are still fresh. The days immediately after the event are a window to frame what you want to accomplish and lay out goals for the next COP

It really needs to be a year-round effort. What I mean is if you really buy into the COP model, start working on the next one. You should get better each time you're involved as you learn. You may want to have someone focused on preparation and groundwork year-round who ensures there is someone on working groups and planning activities over the full 12 months.

It's the before and after that really drives results. There has to be an element of repetition to inculcate what you want to achieve through the entire organisational culture, whether that be in government or the private sector. For world leaders of sufficient profile, this is a massive opportunity to use mass media to persuade other nations towards a course of action, as well as to speak to domestic audiences about both challenges and opportunities. The leader needs to be very clear about the target of their address. They could pick two key sentences and work back from there to accelerate, ratify and amplify the policies and actions required to meet the leader's strategic priorities.

A Day in the Life of a World Leader's Delegation at COP

Morning

Land at the airport, where mass media is gathered to cover the arrival of world leaders

Meet leader of host country for protocol visit; over a cup of tea or coffee at their official residence.

Head to hotel, where bilateral meetings have been set up and a series of working groups are in session. Attend part or all of the workshops, talk about the importance of relationships and offer symbolic blessing to discussions

Afternoon

Turn attention to domestic audience, following briefing with trade and climate staff, emphasising job creation to come from energy transition and addressing concerns in target areas/constituencies about the move away from coal and oil

Head over to COP, passing street protests and attend executive plenary

Attend bilateral meetings and make statements about mutually beneficial agreements to be signed and jobs to be created

Evening

If the President wants to send a message of connection with the people in the host country, maybe do what is called an OTR which is an off-the-record visit to an iconic local establishment like a family-run bakery or the city's oldest bar.

Energy Transition in Africa

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Nowhere is the Energy Transition vs Energy Access dilemma more acute than Africa. A continent with significant prospects for rapid economic growth but significant parts of it are hugely dependent on fossil fuels, not just for energy but for jobs too. Energy poverty remains high and so what is the experience of companies actually working there? How open do they find communities, governments and other stakeholders to the transition? Lisa Pinsley, Head of Africa for the Energy Infrastructure team at Actis was joined by Jennifer Boca and Libby Hirshon, the heads of Environmental, Social and Governance at two of its portfolio companies, to discuss the situation.





Energy Transition mean on the Jennifer Boca: In Africa as a whole,

around 570 million people still have no access to electricity. However, we've seen progress in access rates across the continent-for example in Kenya where lam from, access rate is at almost 85%, compared to around 20% seven or eight years ago - thanks to both investment in

grid-connected power and the huge rise in deployment of off-grid systems. Unlike industrialised countries faced with the challenge of phasing out coal, the dilemma for many African nations is how we balance the exploitation of new fossil fuel discoveries with the expansion of readily available renewable resources.

Libby Hirshon: In my view, one of the most important aspects is the current level of fossil fuel consumption globally and the associated effects of climate change, which disproportionately impact the poorest and those with the least access to social infrastructure. But at the same time, in many parts of Africa there's a significant reliance on extractive industries and the fossil fuel economy for jobs and livelihoods. So the Energy Transition has to take into account this particular vulnerability in communities across the whole of the continent.

Lisa Pinsley: The Energy Transition, while a global movement, is quite unique in Africa. There's a huge increase in demand expected over the next 20 years because Africa is starting from such a low level of energy access and per capita power consumption compared to the rest of the world. But there is also the human aspect: the potential impact in Africa of a new wind farm on the community, the region and indeed the country and its economy can be significant, and the developer of each new plant must carefully engage on all levels. And there is limited fiscal capacity to support initiatives particularly in the wake of COVID-19

James Magor: With all this huge demand, where will the additional supply come from?



Libby Hirshon: The African

continent has an abundant supply of renewable energy in the form of solar, wind, hydro, and geothermal energy. According to this year's IRENA report on this topic, Africa's potential to generate renewable energy from existing technologies is 1,000 times greater than its projected demand for electricity in 2040!

Lisa Pinsley: A majority of new capacity will come from renewables. That said, I do believe there's still a role for new gas-fired generation in Africa in the years up to 2030

as we shift from heavy fuel oil and diesel, and from coal-fired generation. There will still be a critical need for baseload power and intermittency balancing in the transition to renewables. And while a concerted global response means we can achieve net-zero by 2050, there is a need for gas in the short to medium term across the continent. Financing will increasingly become an issue for gas projects, which could delay the transition itself, in addition to slowing poverty alleviation efforts based upon increasing access to power.

Jennifer Boca: Since Lekela was set up six years ago, we have been able to develop a gigawatt of renewables across Africa. In Senegal, we've just completed the construction of the first utility scale wind farm in West Africa. This project is hugely exciting for us because it provides a 15% increase in electricity generation capacity for the country, providing power to over two million people. This is the kind of impactful project that is already happening on the ground. We've also seen the delivery of significant renewable projects in Kenya and in Egypt, so the deployment is already happening.

James Magor: We hear a lot about the Just Transition. What does that mean in Africa?

Libby Hirshon: There needs to be a real focus on the benefits that this transition can bring to people in Africa. It is important to recognise that shifting away from a reliance on fossil fuels can negatively impact the most vulnerable. There also needs to be a focus on capacity building in skills associated with green energy and on transitioning skills from fossil fuel industries into renewables. These considerations need to be carefully planned for and built into any overarching strategies for the transition.

Jennifer Boca: Developing the human capital to build and operate these new renewable power plants is going to be integral to how we achieve the Just Transition. This can help mitigate some of the potential adverse impacts on people and livelihoods. It's important we have a sharp focus on developing capacity for industry professionals and for the communities in which we work through offering training, research, innovation and prototyping of ideas in social impact so we can ensure it really is a Just Transformation that doesn't leave anyone behind.





James Magor: Aside from ensuring the transition is just and equitable, what do you see as the main challenges that need to be overcome in Africa?

Lisa Pinsley: Often where the renewable resources are strongest, the national grids have not been built out to reach those points. So getting the energy that's produced in remote locations with excellent resources to where the demand centres are requires significant grid buildouts.

In general, financing renewables in Africa isn't a challenge: plenty of private and public sector equity and debt are available for renewables generation. However, financing for grid build out is constrained by the fact that in Africa transmission is still mostly government-owned and hence requires public sector financing. Sadly the pandemic has used up much of the available fiscal headroom to finance these projects.

Jennifer Boca: I think one of the biggest issues we find is making sure we have a social licence to

operate for new renewables projects. We spend a lot of time building trust with communities during development. We also know land acquisition can be a real showstopper for solar and hydro projects in rural Africa if not undertaken in the right way. Another challenge is high unemployment. We work with local leadership and other stakeholders to manage expectations and ensure we explain how projects work, how many jobs we are creating and ensuring that the communities also directly benefit from the project.

Libby Hirshon: One of the challenges | think is political stability. There are significant opportunities for investment directly into renewable energy development, but also, and perhaps even more significantly, indirectly into the supply chain. Expectations of investors in new energy projects are so high - and the risks associated with those expectations are equally as high - that it becomes a very risky context in which to operate. The second is environmental considerations. Africa is rich in biodiversity, but this richness is being rapidly depleted. A number of renewable energy projects, by their nature, are built within biodiversityrich environments, providing important ecosystem services and a source of

livelihood for local communities. If we want a Just Transition we need to look at the whole picture - the environment, society, biodiversity, the economy - all at the same time and take them into equal consideration.



James Magor: Could you give me a reason to be cheerful about the transition in Africa?

Jennifer Boca: The economics of renewables - they are substantially cheaper than a couple of years

ago. So I feel very positive that we can actually deploy even more. Transforming the energy system would cost less than not doing so, and hopefully this realisation will get key decision makers moving in the right direction.

Libby Hirshon: The opportunity to put sustainability at the heart of the transition in Africa. In the transition to renewable energy, we have the opportunity incorporate wider sustainability thinking from the beginning, ensuring our approach is equitable. inclusive and creates social value locally. We have the opportunity to develop something that is truly transformational.



Source: Sustainable Energy for All, "It has to be both" Instagram, 2 June 2021

Energy Transition in Asia

Katherine Stodulka

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The world's centre of gravity is irreversibly shifting to Asia, creating new investment opportunities and the power to define the global economic & energy outlook for the next two decades. Accelerating the transition of Asian economies to net zero (especially scaling renewables and other low carbon, resilient infrastructure) is the single, most important lever to meet global climate targets and drive sustainable growth.

Five years on from the Paris Climate Agreement and almost two years into the COVID-19 pandemic, the benefits of reaching "net zero" emissions by midcentury are well understood for people, planet and the economy.

Smart capital is moving away from fossil fuels towards companies whose business models are based on clean electricity. The oil & gas value chain – which used to make up around 15% of the market cap across major indices ten years ago – is now less than 4%.

But there are still major barriers which lockin traditional models of capital allocation and prevent trillions of dollars from flowing out of the old, carbon-intensive economy and into assets aligned with a net zero transition.

This lock-in is particularly high in Asia – which accounts for over half of the world's carbon emissions. Without change in Asia the world will fail the climate change test.

Asia's growth and growing climate risk

Home to over 50% of the global population and 17 of the world's 33 megacities. Asia is also the last real coal stronghold. Over 80% of the 500 GW of global coal capacity is located in Asia and the region accounts for almost the entire (94%) global pipeline of new coal power plants.

No region in the world is more climateexposed than Asia. Temperatures are rising twice as fast as the global average; climate-related weather events like torrential rain and typhoons are set to increase in both frequency and intensity.

While this paints a stark picture, it also represents the biggest investment opportunity of our time, especially given the growth profile of the region. By 2030, 3.5 billion Asians will be middle class. By 2040, Asia will represent 50% of global GDP. By 2050, the urbanisation rate will be nearly 65%, up from 50% today.

This growth corresponds to a massive increase in energy demand (e.g. Southeast Asia saw an 80% increase in electricity needs since 2000 linked to massive population growth, urbanisation and industrialisation). This hike in Asia's demand for energy over the past two decades was met by doubling the use of fossil fuels.

That is no longer an economically viable course of action for Asia. As Asia is arguably the most climate-exposed region in the world, no region has a greater economic imperative to transition its highcarbon energy and industrial systems to net zero emissions by mid-century. And no region has more levers to pull to accelerate its decarbonisation journey.

Key levers for transition = major investment opportunities

The total amount of capital needed for climate-smart infrastructure in developing Asia is estimated to be at least \$1.7 trillion a year over the next decade. More than 60% of that needs to come from private sector investment into assets aligned with a net zero transition including clean transport, power, water, waste management, sanitation and digital infrastructure. As the single largest source of global temperature increase, rapidly decommissioning coal as a power source is the most urgent lever to accelerate the transition to net zero. Meanwhile, scaling clean energy in its place is the most obvious, economically viable and investable solution. The cost of renewables is now at grid parity in most of SEA, and renewables help to tackle tackle affordability, access and energy security issues. They can also be a huge

job driver, underpinning more than a third of all energy jobs and with the potential to employ millions of people, supporting COVID-19 recovery and long-term economic growth. Other than Vietnam, ASEAN countries have been relatively slow to adopt renewables. They could do more to increase competition and strengthen the enabling environment to drive down the price of renewables, including investing in grid infrastructure, revisiting local content requirements, providing certainty around tariffs and project approvals, and strengthening PPAs.

Transitioning out of coal would also tackle major social costs linked to air pollution while mitigating the huge stranded-asset risk of fossil fuels. Climate-aligned policies have already limited the pool of investors for coal assets dramatically; soon these assets will be un-financeable.

There are other obvious investment opportunities too. Real estate and digital infrastructure are key sectors for the net zero transition: the ADB sizes the investment opportunity for green buildings in Asia at \$17.8 trillion while the WEF predicts a \$500 billion digital infrastructure investment gap to 2040, clearly demonstrating the scale of the sustainable infrastructure opportunity if governments can get the enabling investment conditions right.

Asia can also be a leading producer of environmentally friendly, ethically sourced wind turbines, PV modules and batteries for the rest of the world. Solar PV capacity in Asia Pacific could triple to 1,500GW by 2030: China continues to drive deployment and Indonesia is set to be the region's fastest-growing market. Southeast Asian countries like Indonesia are also nickelrich, drawing in global suppliers of EV batteries and feeding the growing appetite for low carbon transport solutions.

The total amount of capital needed for climate-smart infrastructure in developing Asia is estimated to be at least \$1.7 trillion a year over the next decade Asian leaders – who have traditionally lagged on the sustainability agenda – are urgently playing catch up for fear of missing these kinds of investment opportunities

Asian opportunities, global leadership

Asian leaders – who have traditionally lagged on the sustainability agenda – are urgently playing catch up for fear of missing these kinds of investment opportunities. With Indonesia as the G20 President in 2022 and India hosting G20 in 2023, the world's political centre of gravity is shifting to Asia, which should help accelerate climate commitments to decarbonise the region.

Of course, one size doesn't fit all, especially in Asia's diverse and evolving power markets. Nevertheless, the mood music is changing and net zero is now the topic dujour. China has committed to peak carbon emissions by 2030 and carbon neutrality before 2060. Japan is targeting net zero by 2050. Indonesia's energy utility has committed to carbon neutrality by 2050. And India is the world's third largest renewable energy producer with 38% of total installed energy capacity in 2020 coming from renewable sources. It is also on track to become the global market leader in solar and storage by 2040.

This political leadership is driven by a growing understanding of Asia's exposure to physical and transition climate risk, coupled with the opportunity to attract high-quality capital into low carbon sectors and net zero assets. It will be enabled by a flourishing digital and innovation economy and should create a flywheel of enabling policies to rapidly scale renewables and support other low carbon industries.

In all of this China is key-the largest global emitter, the driver of Asian activity and at present in a deteriorating relationship with the US. Happily, though pollution is seen by China's leadership as a pressing issue on the quality of life of her citizens.

Exhibit 1: Annual carbon emissions, 2019

Carbon dioxide (carbon) emissions from the burning of fossil fuels for energy and cement production. Land use change is not included.



Source: Our World in Data based on the Global Carbon Project https://ourworldindata.org/co2-emissions

Pathway for an Asian net zero transition

Aligning Asian economies with a net zero transition is the single most important action needed to meet global climate targets under the Paris Agreement. And getting Asia to net zero first and foremost means changing the energy mix. The Energy Transitions Commission says that it is both economically and technologically feasible to decarbonise power systems by 2040 and get to a net zero economy by 2050. Its Making Mission Possible report explains that clean electrification will be the primary route to decarbonisation, complemented by hydrogen, sustainable biomass and fossil fuels (e.g. natural gas) combined with carbon capture.

To meet these ambitions, governments, investors, corporates and civil society need to work together to accelerate the deployment of zero-carbon solutions before 2030 to put mid-century targets within reach.

Key transition pathway milestones include:

- Power sector is net zero by 2040, mainly through increased use of renewable energy
- Large reductions in energy demand across all end-use sectors by 2030 coupled with electrification of end-use sectors
- Coal for power should be reduced by 80% from 2010 levels by 2030 (coal use for power generation should already have peaked in 2020)
- Coal for power should be phased out completely by 2040, meaning:
 - OECD Asian countries (e.g. Japan, South Korea) and countries in the North and Central Asia subregion need to phase out coal by 2031
 - Non-OECD Asia needs to reach a reduction of coal generation of over 60% compared to 2010 by 2030 and complete a global coal phase-out before 2040

Scaling renewable energy fast enough to meet these milestones will require clear frameworks to better support deployment. For example, Vietnam is expected to add 45GW of solar PV this decade supported by feed-in tariffs and other enabling regulation. Similarly, moratoriums on new coal like those in the Philippines can help send the right market signals. These policies will need to be coupled with commensurate support for a Just Transition, compensating workers and ensuring funding and capacity to retrain and reskill.

Ultimately, the global centre of gravity is shifting irreversibly to Asia. No other region will have such an impact in shaping COVID-19 recovery, economic stability, employment and equality and climate outcomes – especially over the next critical two decades.

That offers an unprecedented opportunity to transition the world's energy and economic systems to be more sustainable, resilient, inclusive and investable. Ignoring this opportunity would be catastrophic for climate, capital markets and communities. Capturing it could change the whole trajectory of global growth. A prize worth chasing.

Ostro Energy, India



Energy Transition in Latin America

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Over the past decade, Latin America has made good progress in leveraging its strong natural resources to drive the energy transition. Renewables are today the cheapest source of new electricity across most of the region and, after Europe, Latin America has the second cleanest power mix in the world, with 61% of the generation coming from zero-carbon sources such as hydro, wind, biomass, solar, nuclear, and geothermal plants. Brazil and Mexico, the two largest power markets in Latin America, will continue to shape the path towards decarbonisation in the region.

With new sources of electricity demand arising from air conditioning and electric vehicles in the next decades, energy capacity is expected to double by 2050 in Latin America. While wind and solar resources are expected to represent half of the capacity expansion (Exhibit 1), balancing the inherent intermittency of such resources with baseload energy will be crucial to enable reliable power supply and a sustainable energy transition in the region.

In Brazil, more than 75% of the country's installed capacity comes from renewable sources, which have also taken the lead in the country's energy expansion – 17 GW of wind generation were added to the grid in the past ten years, taking its overall share of the energy generation in Brazil from less than 1% in 2011 to 10% today. However,

the dominance of hydro in the power grid, nearly 60% of the energy output, has added hurdles to its continuing and sustainable expansion, as Brazil currently faces one of its worst hydrology crises – reservoirs are at circa 35% of capacity, just 2 percentage points above the level in 2001, when the country last implemented electricity rationing. The current crisis has put Brazil's energy system at risk, leading to soaring energy prices and demonstrating that hydro reservoirs can no longer provide reliable baseload energy capacity to support the growth of wind and solar sources.

Following the electricity rationing in 2001, the Brazilian government designed the Priority Thermoelectric Program to spur investments in thermal power plants, which resulted in 9.1 GW of gasfired installed capacity. Such additions, however, are no longer enough to stabilize the system. With Brazil's power demand expected to double over the next 20 years, a mix of gas-fired and renewable power generation emerges once again as the ideal solution for Brazil, as it supports a decrease of carbon emissions and ensures that supply is reliable even when renewable energy generation is low.

Natural gas is increasingly viewed as a fuel with a dual role in Latin America's energy transition; first displacing crude oil for power generation, and second providing baseload power to complement renewables growth. To ensure gas continuing feasibility as a transition fuel, it is going to be critical to redesign its processes and promote initiatives that proactively decarbonise its value chain. Using renewable energy to power gas production, installing methane leak detection technologies, and deploying CCUS (Carbon Capture, Utilisation, and Storage) or DAC (direct air capture) technologies are potential avenues to achieve this goal.

In Mexico, natural gas plants currently comprise over half of the country's generation capacity, due to abundant US shale gas imports that reduce the marginal cost of running existing gas plants. The increasing penetration of renewables, which currently account for a third of the generation, can be easily supported by the flexible nature of the existing natural gas generation at least for the next decade, before batteries become a costcompetitive alternative.

While Brazil and Mexico have big differences in their power grids today, the future composition of these markets tends to become more similar over time (Exhibit 2), as the region continues to balance further penetration of wind and solar sources with reliable gas-fired generation in the next decades.

Within this context, considerable investments are needed to fund the energy transition in Latin America (Exhibit 3). After solar and wind, natural gas is the third energy source with the most investments needed in the next 30 years, with a total of US\$100 billion expected to be invested in new gas plants, according to BloombergNEF. In Brazil, more than 20 GW of new gas capacity is expected to be contracted through energy auctions in the next ten years – and due to the recent crisis triggered by the low hydro reservoir levels, the government has accelerated its plans to contract circa 3GW in 2021 alone.



2025

2030

2035

2040

2045

Exhibit 1: Expansion of energy capacity in Latin America (GW)

1.035GW

20%

- Small-scale batteries
- Utility-scale batteries
- Small-scale PV
- Utility-scale PV
- Onshore wind
- Biomass
- Hydro
- Nuclear
- Oil
- Peaker gas
- Combined-cycle gas

Source: BoombergNEF

400

200

0

As energy demand doubles in the next few decades, wind, solar and gas will continue to play a significant role in the Latin American energy transition. In this scenario, it is clear there is an investment opportunity to implement our repeatable strategy of building leading renewables and gas power generation businesses in our core markets. Throughout this process, as the world transitions to net zero 2050 over the following decades, we will remain focused on further incorporating decarbonisation initiatives to the gas investment thesis, facilitating the reduction of emissions through the several stages of the gas production and energy generation processes.





Source: BloombergNEF





Source: BloombergNEF







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