

Exchanges at Goldman Sachs

How Companies Are Navigating the Energy Transition

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Allison Nathan: From geopolitical tensions, surging gas prices, and energy shortages, how are major companies dealing with the energy transition?

Giulia Chierchia: It's really a trilemma in terms of how do we deliver cleaner, reliable, and affordable energy? Now, that requires trillions of investments in terms of getting there because it's a fundamental rewiring of the entire energy system.

Allison Nathan: I'm Allison Nathan, and this is Exchanges at Goldman Sachs.

To help us break down the energy shift and big oil's push into a more sustainable future, Giulia Chierchia, executive

vice-president of strategy, sustainability, and ventures at BP, and Michele Della Vigna, head of natural resources research in EMEA for Goldman Sachs's research, join us now. Michele, Giulia, welcome to the program.

Giulia Chierchia: Thank you.

Michele Della Vigna: Thank you, Allison.

Allison Nathan: So Michele, let's start with you.

Russia's invasion of Ukraine is obviously forcing countries to make some really tough choices about how to fuel their economies. So how have these developments changed the landscape for energy investments over the last few months?

Michele Della Vigna: I think it's a complete turning point after seven years of structural underinvestment. Let me put a couple of numbers to it. If we take all of the investments in primary energy -- so not just oil and gas but also solar, wind, nuclear, bio energy -- we sum it all up, we used to spend about \$1.5 trillion per annum up until 2014. And since then, the investment has started to decline, reaching a trough of only \$1 trillion in the last couple of years. We believe that investments need to rise again, at

least to \$1.5 trillion, more likely to \$2 trillion if we also want to reach net zero carbon by 2050.

And finally, after this conflict, the world, the government, but also investors are starting to realize that this underinvestment in energy is unsustainable and hurtful to society, and we think it's really signaling this turning point from effectively a 10% negative decline in energy investment from the last seven years to what we believe should be a 15-20% per annum growth looking forward.

Allison Nathan: And Giulia, we are having this war in Ukraine. We are obviously facing inflationary pressures around the world. And there's a lot of pressures to decarbonize, as Michele just outlined. So walk us through the forces that integrated energy players like BP are contending with. How are you dealing with all of these challenges?

Giulia Chierchia: Yes. So I think it's fair to describe it as an exceptional confluence I would say of four challenges. The first one is, unfortunately, obviously the human tragedy and the war in Ukraine, with so many lives impacted and also with impacts in terms of global food

supply chains. The second one is very much around the energy crisis. Michele gave some numbers. We just published our stats review, and what we're seeing happens is this, on one side, demand rebounding post pandemic. So in 2021, we've seen primary energy consumption actually grow to be 1% higher than what it used to be in 2019. So on one side, we have energy demand growing. And the other side we have supply constraints. And Michele talked to the supply constraint driven by past investment, but of course Russia also plays a critical role.

In 2021, Russia produced 10.5 million barrels a day of oil and was the largest global exporter. The IEA estimates that approximately 3 million barrels a day of that production is actually offline today due to sanctions. You take gas, Russia was supplying in 2021 32% of European gas and 55% in Germany. And if you look at Nord stream 1 last week, volumes decreased by 60%. So that creates a fundamental pressure that brings into the equation security of supply.

The third key challenge is climate. So a lot of commitment, a lot of ambition, and yet if you look at 2021, emissions again have risen by 5.7% in our stats review, which

basically means a rebound from the 2020 dip, which was linked to lockdowns. And then the fourth one is the societal crisis in terms of increasing cost of living, inflation, and lower economic growth and, you know, potential implications in terms of recession.

So it creates an extremely uncertain environment to navigate both in terms of macroeconomic environment as well as energy with very different stances in different geographies. So Europe is seeing it as an opportunity to accelerate because the levers for the energy transition basically play into security of supply and independence from Russia. Other regions playing it very differently.

For us, it's just a restatement of our strategy and what we need to do, which is basically do the right thing. And “do the right thing” was really at the core of our decision to exit Russia. Continue to invest in our resilient hydrocarbons business to supply the oil and gas that the world so needs today and making that business resilient. And accelerating and continuing to invest in our transition growth engines to build the alternative and capture that growth.

Allison Nathan: And in many ways, you're really just

seeing your customer base change in terms of their urgency and need to diversify energy resources away from traditional hydrocarbons, again, given this push towards decarbonization and to focus on climate change mitigation. So how has that impacted your strategy?

Giulia Chierchia: Well, it's very much the prerogative of actually getting to net zero. If you think about it, it's really a trilemma in terms of how do we deliver cleaner, reliable, and affordable energy? Now, that requires, as Michele was saying, trillions of investments in terms of getting there because it's a fundamental rewiring of the entire energy system. And I don't know how it's going to play out in terms of pathway, but there's a few truths that we know will play out.

The first one is, in the energy demand mix, we'll see fossil fuels over time decreasing. So if you take Paris aligned narratives, we're talking about 25-50 million barrels a day in 2050 versus 100 today. So there still is oil in the system but less. Gas is more resilient. Electrification doubles to 2050 with renewables if we are to get to net zero, basically having to grow to approximately 600-750 gigawatts a year developed. That's three times, two to three times, what we

did in 2021.

And for hard to abate sectors, which are sectors where we can't electrify -- and that's one third of energy demand today -- we will need hydrogen, bio energy, and CCS to actually play a role. So as you can imagine, it creates huge opportunity for us, and that's really at the core of what we've done from a strategy standpoint in setting an ambition to net zero, in setting mid- to long-term, medium-term targets to get there, covering scope one, scope two, and scope three, and a 3 piece strategy with hydrocarbons, mobility and convenience, and low carbon.

And we're in action. So a week ago we announced the Asian Renewable Energy Hub, which has the potential to actually become one of the largest global hydrogen hubs. So we've acquired a 40% stake in it and operatorship. And you're talking about 26, up to 26 gigawatts of renewable capacity developed, 1.6 million tons of hydrogen produced, or equivalent to, 9 million tons of ammonia. This is big and is a clear indication of our willingness but also the acceleration in the system towards energy transition.

Allison Nathan: And Michele, if we think back, one of

the key hindrances of embedding more renewables into the system, as Giulia just laid out, we have to do in order to transition in the way that we desire, has just been the cost. The cost and returns environments of renewables. So is that changing? Are we moving more towards an environment in which renewables are offering better returns?

Michele Della Vigna: I think higher hydrocarbon prices are a driver of decarbonization because renewables become more attractive in an environment of higher electricity prices. Until a few months ago, we were looking at purchasing agreement of renewables, which kept going lower and lower and lower, really challenging the economics there. And there was this view that returns would only fall in renewables.

I think this energy crisis has mainly negative consequences, as Giulia highlighted. But if we want to look for the silver lining, it does make these low-carbon technologies more attractive. Certainly renewables with much better purchasing agreement looking forward but also technologies that looked incredibly marginal like green hydrogen until recently from an economic perspective are

actually in demand today in Europe because of the extremely high gas prices. And this is certainly an angle that we need to think about. And if there is one positive consequence from this energy crisis, it is, we believe, the acceleration of some of these low-carbon technologies.

Allison Nathan: But it's interesting you say that, Michele, because ultimately that's on a relative basis, right? So they look more attractive because hydrocarbon prices are higher, not necessarily because the costs are coming down for renewables. Or are they? Is that part of the equation here as well?

Michele Della Vigna: I think we have a long track record of some of these low-carbon technologies being deflationary. We've seen it over a decade for solar and wind, but they certainly are not deflationary today. They are suffering from the tightness in the global supply chain as so many other parts of the industrial sector. And we're seeing somewhere between a 10 and a 40% increasing pricing across solar, wind, and batteries. We believe it's temporary. We believe development in scale of these technologies will ultimately bring the costs lower, but there is no doubt that right now we are into an inflationary

phase.

Allison Nathan: And one area that you are focused on and have been for some time is actually hydrogen. The hydrogen investing landscape has been gaining momentum, but you see more momentum ahead. So if you can talk a little bit about the role that the hydrogen that Giulia mentioned might play in this transition.

Michele Della Vigna: Absolutely. You know, Giulia mentioned it as one of the key drivers of decarbonization, but also of low-carbon growth for the big oil companies as they become big energy companies. And there's no doubt that, when we look at our carbonomics cost curve, actually hydrogen is the key decarbonization technology for a lot of the harder to abate sectors, especially heavy transport and heavy industry. And that's why we've always estimated hydrogen would ultimately need to drive between 10-15% of global decarbonization, unlocking at least \$5 trillion of investment over the next three decades.

But I think the recent energy crisis has added extra urgency because, if Europe wants to substitute Russian gas, which is mainly consumed in winter, with renewables,

which are mostly produced in summer, the only way we can bridge this seasonality issue is through hydrogen. And that's why we believe a development in large scale of green hydrogen in Europe will be a great way to turbo charge the development of renewable power without suffering from seasonality problems. But I also pass it on to Giulia because clearly her company is one of the most active in this area.

Giulia Chierchia: Yeah, Michele, I totally agree. I think we see hydrogen playing a critical role with the same order of magnitude in terms of primary energy demand share. I think definitely towards hard-to-abate sectors, including, by the way, on the longer term, aviation and e-fuels. We see the same acceleration coming in, power in particular by Repower Europe, and that confluence of hydrogen being one of the critical drivers to actually reduce reliance on import of gas.

We also see, interestingly, an acceleration in terms of demand, right? Customers actually also from other regions and I think, you know, similarly prices might play a critical role in terms of being in the money or not, but actually asking already for green or blue hydrogen supply. I think

in terms of map, we see a world where we see local hydrogen production for local demand, but increasingly also an international hub play where you're basically going to look for where's my cheapest resource? And that could be Australia, the Middle East, countries in Africa such as Mauritania. And then obviously the challenge that we need to crack is how do we effectively transport it to the demand centers in Europe and Asia?

But, yes, we see it playing a critical role. And I think as you mentioned, Michele, it is complex, large-scale projects. It is difficult and dangerous to transport. It requires significant conversion capabilities and shipping capabilities if you actually want to move it. And gas customers are likely to transition to hydrogen. So for us, it is a perfect play in terms of our role in decarbonization.

One thing I would mention, Allison, to what you were saying is this is also why we see renewables playing a role but not only as renewables stand alone but also renewables integrated into hydrogen. So when we look at renewables as a critical piece of the equation, we're not only looking at renewables with its return but we're looking at renewables as part of integrated plays, be it into EV, be

it into trading power, or be it into hydrogen, which actually changes pretty fundamentally the economics.

Allison Nathan: Right. But, you know, as we talk towards these goals of moving towards net zero -- and BP has actually been quite specific about this. I think you've announced or put an update in February that basically said net zero across your operations and production and sales by 2050. And then, you know, an interim goal of 2030. But ultimately, if you look at some of the reports from the IEA and the IPCC, the efforts that BP and the broader industry and the broader world are making still seem to be falling short of keeping that global warming at an acceptable level. So I guess my question to you is BP doing enough? Is the industry more broadly doing enough? How would you respond to that?

Giulia Chierchia: Yeah, so I think what I would say, Allison, is we've built everything around scenarios. And if you look at scenarios indeed, the sources that we work with in terms of more authoritative scenarios are the IEA and the IPCC scenarios. Now, if you look at those April scenarios from the IPCC, which are the last scenarios, including the 1.5 degree scenarios, the 43% which is

referred to is a global average. Now, what we can't do is take that 43% and bridge it into a specific energy source for an industry.

If you look at the breakdown of that number, what you actually start seeing is primary energy consumption from oil is set to decline from 2019 to 2030 by 10%. Primary energy consumption from gas declines again 10% from 2019 to 2030. Primary energy consumption from coal declines by 75% from 2019 to 2030. So what we have done is we've actually looked at the scenarios at a pretty granular level, and we've extracted the elements which are relevant and pertinent to our asset base because we don't have coal generation assets in our portfolio.

And so on that basis, we've defined our aims, which indeed, as you described, are net zero across operations, production, and sales. And I think we're one of the only oil and gas players who has actually net zero aims across the entire supply chain or value chain. And we think they're aligned to Paris. They're based on, aligned to Paris scenarios. They get to net zero across all the dimensions, and they're based on a corridor of scenarios in terms of 2025 and 2030 interim targets.

Allison Nathan: But at the same time, as we've discussed in this conversation a few times, oil markets are tight. Global energy markets are very tight. Right now, natural gas prices are skyrocketing. Does it make sense to really stick to these targets? I mean, in other words, is BP doing the right thing but just too early given the current context?

Giulia Chierchia: That's a question we get pretty often, as you can imagine. But in the current context, if I look at it, our strategy is a strategy of diversification in the frame of an energy transition which will happen. We don't know at what pace that energy transition will happen, but it is happening. So it's a strategy of diversification on one side. And secondly, it's a strategy of growth to be exposed to those transition growth sectors and be to a place where we can capture them.

So our strategy is set to optimize that, and it's not changing, given the context that we're navigating today. It is a strategy of growth. We've set an ambition to actually grow EBITDA from 37 billion to approximately 41-48 by 2030. And, yes, high oil prices are actually making it

easier to transition, but we didn't develop the strategy assuming high oil prices, as you can imagine. We developed it across a range of scenarios.

And the strategy is very much built on two pillars. On one side, it's continuing to invest on the resilient hydrocarbons piece. And we're talking about 9-10 billion in 2025 in terms of investment, going to 8 billion in 2030. And we're talking about continuing provide the oil and gas the world needs even more than before today.

We have announced that we will be reducing our portfolio by 40% by 2030, but we've also announced that we aim to keep EBITDA flat by basically focusing on the best. So to your question, what we are doing is we're focusing on the highest margins, lower carbon, to make sure that the oil and gas we produce on the long-term basis can actually be resilient through the energy transition.

At the same time, we are investing in growth. And those transition growth engines, basically 6 billion in 2025 and that number grows through approximately 7-8 billion in 2030. And those are transition growth engines which are likely to grow whichever scenario we're in. We're talking

about bio energy, where, if anything, the limitation is going to be supply. We're talking about EV mobility, which is happening twice faster what we expected even in our net zero scenario a year ago. We're talking about convenience, which for us is related to EV mobility. We're talking about renewables, and I shared some of the numbers in terms of acceleration. And we're talking about hydrogen, which is a critical building block for hard-to-abate sectors. So the way I look at it is you're exposed to the short-term upside, and you continue to provide oil and gas to an energy system which today, let's face it, is very reliant on oil and gas. But you're positioning yourself to capture the growth that will inevitably come through the energy transition.

Allison Nathan: And Michele, you have been banging the drum for a long time about the underinvestment in hydrocarbons and how painful that could be in the near term as we are undergoing this transition. So do you see the industry responding? Do you think there are now opportunities given the current price environment, high price environment that we expect to be sustained? Or how do you see this impacting how much money goes into the core hydrocarbons?

Michele Della Vigna: I think the industry is starting to respond. We are starting to see it in short cycle development, which had the payback of 2-3 years. We're seeing it in US shale. We're seeing it in parts of the Middle East. I think where we're not seeing it yet in the scale we need is in the longer cycle, longer payback oil development and in natural gas. One argument we've always supported is that natural gas is a key green transition fuel. It's needed for the next 10-20 years as a minimum to move away as fast as possible from coal and from fuel oil that generate two times the CO₂ emission per unit of energy than natural gas.

And I think the problem that we've seen until now, especially in Europe, is that there's been a movement against all hydrocarbons without the distinction of where they sit in terms of the carbon intensity curve. And we believe we need to reevaluate natural gas as a transition fuel and really turbo charge the growth of liquefied natural gas as the key way to continue to support not only decarbonization in emerging markets where affordable LNG is key to move away faster from coal but also energy security in Europe and a more rapid move away from Russian gas, which would be impossible and unaffordable

unless we start to develop more LNG projects globally.

Allison Nathan: But there's such a stigma around investing in fossil fuels, but is that the way to do it without conflicting with ESG goals? Focusing on natural gas, which is a cleaner energy, or for companies out there that are focused on making sure we have sufficient hydrocarbons but don't want to conflict with ESG goals? What is the right way to do that?

Michele Della Vigna: Let me attempt an answer, and then I'm sure Giulia has a lot more to add. I believe as long as we need hydrocarbons from a consumption perspective and we think that is the case definitely for oil with growth until the middle if not the end of the decade and for gas growth probably until the end of the next decade, I think the key is to produce them with lower emissions, lower emissions. So I think it's important, first of all, to develop oil and gas with less flaring, less methane venting, and less emission across the supply chain.

And then to add lower carbon sources of energy like renewables and hydrogen and make sure that while producing a higher amount of energy we can do it with

lower emissions. And so better operations and the beginning of a diversification of energy sources towards low carbon. That I think is what energy companies can do to be consistent with a future where there is more affordable energy for a growing world population but we also address some of the challenges of climate change. But Giulia, I'm sure you have a lot more to add on that.

Giulia Chierchia: I fundamentally agree. As you know, we're in action on methane emissions. And if I can react to the point in terms of changing the energy mix, there's a number which I find quite telling, which is, if you take India and you project energy demand in India, which is projected to grow exponentially over the next 30 years, if that growth instead of being actually generated through coal-fired power plants were actually supplied through combined cycle, geo gas, you would actually reduce emissions by two gigatons. Now, to give a sense of the order of magnitude we're talking about, the amount of emissions last year in India is approximately the same amount. So it gives you an order of magnitude of the impact that the shift from coal to gas can actually have in terms of optimizing that energy mix.

And so I agree with you that the challenge is how do you provide more energy with a lower carbon intensity? And that's what we're actually aiming for. And I think to add maybe to what you were saying, Michele, in the frame of potential levers to get there, we will have fossil fuels, we will have gas in the system still in 2050, right? Gas has a more resilient profile. Oil, I talked to some of the numbers. We have the technologies, including specifically CCS today, to actually abate emissions from industrial use of fossil fuels. So let's not forget this is not a -- net zero doesn't mean no fossil fuels in the system in 2050. So the question becomes how do we actually also accelerate those technologies to prepare for that?

Allison Nathan: Let's turn to an area of innovation. Many sustainable startups are entering the scene from electrical vehicles to eco-friendly food producers and more. And these players are now pushing legacy players into innovative spaces really just to stay competitive. How is BP navigating managing their current business practices while staying competitive against new players?

Giulia Chierchia: So, no, you're right, it's an exciting environment. Many startups, many new companies

playing a role in particularly in the space of mobility and EV but not only also in the broader energy transition space. We actually in BP have our own organization it's called Launchpad and ventures, which focuses on venturing, incubation of internal ideas, and then Launchpad is the startup building and accelerator. And I actually have the pleasure of having that organization sitting within my areas of accountability.

So if I look at Launchpad, which is a startup builder, we now have seven companies into Launchpad. We have the potential to build interesting accelerating transformational opportunities. So to give you an example of one of the companies which I had the pleasure of visiting a few weeks back when I was in New York, this is Blueprint Power. What Blueprint Power does is it basically converts residential buildings into virtual power plants, so it aggregates energy demand from residential buildings. And it gives you the opportunity to then generate and trade that energy.

The way they do it is by putting a box in your building, basically real-time measuring of energy consumption. And on the basis of that, they can help you actually optimize

the consumption but also recommend storage low carbon. And if you link that to our trading activity, you can see how that becomes a virtual power plant. So it's a very interesting company led by an amazing CEO, Robyn Beavers. So we're active in that space.

I would also say, Allison, that I think for the energy transition to be successful, you need both. You need startups. You need new companies. But you need players such as us to transition. The way I actually see it is you need it for the world. And take Tesla. You mentioned Tesla. Tesla in 2021 sold I think one million cars, and I think that was double from 2020. It's great, but it's 1.5%, 1.4% of global market share. So you need the Teslas of the world, but you also need the Toyotas and the Volkswagens of the world to actually transition.

And if I bring that back to the world of energy, similarly, we need new players and startups, but we need companies such as BP to transition. And if I look at it from an investor standpoint, to the previous question you asked me, it actually -- we defined this as a greening company. Or we define ourselves as a greening company. And I think one of the pluses is it exposes you to the upside in terms of

the resilient hydrocarbons oil and gas demand while also exposing you to the growth in terms of our transition play.

So, yes, we're active but I think we need both. And at the end of the day, it's all hands on deck to make this happen.

Allison Nathan: Oh, interesting. Innovation is clearly going to be a key part of this. Michele, if we look at the performance of integrated oil companies, they've done very well year to date. I actually think they're the only sector up year to date. But despite that, they are still trading at historically low multiples, so do you think that they are undervalued at this point? And if so, what will it take to re-rate them higher?

Michele Della Vigna: I do believe that they are undervalued here. And I think that there will be three key drivers of outperformance here. The first one is the companies themselves taking advantage of the low multiples through buy backs. And some of these companies are currently buying back 5-10% of their own shares on an annual basis.

Secondly, I think there is a rethinking about natural gas as

a green transition fuel and as a key driver of energy security. And this makes up almost half of the business of these companies which has long duration and which has a key role for society.

And then finally, I think there needs to be a real appreciation that, although these companies are not green today, they're some of the biggest global investors into green technology and that the path of reduction in carbon intensity of the businesses is consistent with the Paris Agreement. Giulia was highlighting it below, but our carbonomics analysis where we've looked at reimagined big oils into big energy would support the same conclusion that these companies have the key pillars of decarbonization that can make them consistent with the Paris Agreement.

So my sense is it's a three-fold drive here towards a re-rating. Cash distribution to shareholders, ongoing capital discipline and buy back, a reevaluation of the role of natural gas, and finally a rethinking of these companies as greening companies consistent with the Paris Agreement.

Allison Nathan: Michele, Giulia, so glad you could both

join us today.

Michele Della Vigna: Thank you, Allison.

Giulia Chierchia: Thank you very much.

Allison Nathan: Thanks so much for joining us, this Tuesday, June 28th, 2022, for another episode of Exchanges at Goldman Sachs. But before we go, I'd like to share news about an exciting new project we've been busy with. Every week on Exchanges, I sit down with top Goldman Sachs leaders and thinkers to discuss how the most pressing macroeconomic issues are moving economies and markets.

But have you ever wondered how other top investors are navigating today's market headwinds? In our new special series, Exchanges at Goldman Sachs Great Investors, Alison Mass, our chairman of the investment division, and Katie Koch, our chief investment officer of public equity and our asset management division, will be speaking with some of the world's most respected investors about their investment strategies and views on markets and global economies. Catch this limited-run series on the Exchanges

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