

Goldman Sachs Exchanges

Navigating the trillion dollar path to a more sustainable economy

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Allison Nathan: The path to net zero has never been more complicated as businesses and governments look to balance short-term energy demands with long-term sustainability goals. So, what will it take to make that transition?

Kara Mangone: So, you look at the numbers of potential investment required to achieve the UN Sustainable Development Goals or Global Climate Goals, you're in the trillions. You're not in the millions or the billions.

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

[MUSIC INTRO]

Allison Nathan: The global transition to net zero is a decades' long effort that requires trade-offs between investing in carbon intensive projects and increasing investments in clean energy technologies. To help us understand the path to achieving this balance, I'm sitting down with the Goldman Sachs Research's Michele Della Vigna, head of natural resources research in EMEA, and Kara Mangone, global head of climate strategy whose team recently released Goldman Sachs' 2022 sustainability report that takes a deep dive into these topics. Michele, Kara, welcome back to the program.

Michele Della Vigna: Thank you, Allison.

Kara Mangone: Thanks. It's great to be here.

Allison Nathan: So, let's start with the fact that we are, obviously, in a complicated macro economic environment. Businesses are putting sustainability goals on the back burner as they deal with high interest rates and a slowing economy. How has the economic uncertainty affected the

pace of the energy transition? Michele, maybe you can start.

Michele Della Vigna: Allison, it's a great place to start. And as you were saying before, it's a very complicated period with a lot of conflicting changes in the economic environment. I think in many ways, renewables and clean tech has moved away from a pure ESG consideration and has taken on relevance from the point of view of energy affordability and energy security.

And this is why, despite the weaker economy, we're actually seeing a clear increase in energy capex, both in traditional oil and gas, but also in clean tech, with, on average, a 15 percent increase in overall energy spend. Which, we think, will also continue into the coming years.

We're still not quite back to what the world used to spend in energy capex ten years ago. That's still 20 percent higher from today. So, I think there's still a long way to go before we can feel like we're doing enough for energy security.

But some of the breakthroughs in regulation, like the Inflation Reduction Act in the US and the Industry Zero Act

in Europe continues to support this path towards more renewable power. But without doubt, it's a mixed picture. And in some cases, we're seeing projects that were supposed to go ahead, which are, instead, slowing down because of the uncertain economic environment.

Allison Nathan: And Kara, what are you hearing in your work with the firm's clients? How are companies balancing sustainability with profitability?

Kara Mangone: Allison, it's a great question. And I think first principle, it doesn't necessarily need to be a balance. So, in many ways, sustainability can be a driver and is a driver of profitability. Think of this in three ways, and this is how it shows up with clients for us. One is, sustainability can be a set of risks to consider and manage. Right? So, a great example is the potential physical impacts of climate change on an investment portfolio or on a company.

A second is sustainability for a lot of clients is really a way to save costs or improve operational efficiency. This could be, for example, how you reduce waste in your supply chain. And the third area, and I think really important area

that's gotten a lot of momentum, is how can sustainability be a thematic that you invest in? Or how can it be a way that you are actually driving returns for shareholders through your investment? That could be investing in solar, wind, or emerging low carbon technologies or solutions.

And so, I think on your question of balance, it really manifests itself in much more of an integration format, similar to the way that we would think about any investing theme. Now, all of that said, of course there is some nuance, right? When you're in a CEO or CIO seat, or CFO thinking about where do I want to invest my incremental capex, or how do I want to shift my portfolio allocation over time, there's always going to be some nuance in that. And, of course, not all low carbon solutions have achieved commercial viability. And so, that is something that you need to think through.

This is going to look different depending on the company, depending on the geography and industry. But I actually think there's a lot of momentum that we are seeing with clients where sustainability is a driver of profitability, not something that sits outside of that calculus.

Allison Nathan: And Michele, when we spoke last year on this topic, you made the point that investments in legacy oil and gas projects are still important to keeping the transition sustainable, affordable and accessible. Those three words continue to resonate in my mind. How would you characterize the complexity of the trade-offs we all need to make to get of the net zero?

Michele Della Vigna: I think, Allison, we are finally moving away from the divestment push we've seen in the last three or four years towards more of the push for investment in lower carbon energy. And I think this trend is very evident, for instance, in the reporting season of the European big oils who are moving away from targets to shrink the oil and gas production. But at the same time, they're still increasing the green capex that they're going to put into renewables.

And I believe this is a major improvement in their strategy. The world needs more energy. It just needs that energy to be cleaner.

And therefore, we still need more gas to substitute coal. We still need more oil for another three to five years as mobility

continues to recover in places like China, which are coming out of the lockdown. But we also need a huge amount of incremental investment in clean tech. And, again, this is why I believe energy capex can continue to compound at about 15 percent for the next three to five years to satisfy these two goals, which don't need to be conflicting, which is more energy for a growing work population and lower carbon intensity to be consistent with the Paris Agreement.

But this, again, requires more investment. And a helpful policy environment, which we're starting to see emerging, especially on the two sides of the Atlantic.

Allison Nathan: Kara, the complexity that Michele speaks to is a central theme, and it's the title of the firm's sustainability report this year. What comes through in the report is the mindset shift from a complex set of challenges and risks to multiple opportunities. Talk to us about why that opportunity mindset, particularly on this topic, is so important.

Kara Mangone: I think complexity comes through in the report, Allison, because we are in a really complex time with respect to energy transition and goals of improving

our growing in a more sustainable way. And Michele mentioned a few things. He mentioned historical underinvestment in energy, which is one component. There's a lot of supply chain considerations as you transition from a fossil fuels-based economy over time to a more minerals-based economy. And then we have Russia's invasion of Ukraine creating additional energy shocks. And additional challenges on the ground as you look to deploy capital as it relates to just getting projects off the ground.

So, there's the challenges of permitting and practical things. And then there's also big challenges that need to be tackled like intermittency, for example, and storage.

And so, I think that's all to say that it is a pretty complex backdrop. And we've always been pretty clear in articulating our strategy, all the way back in 2019, actually, when David Solomon put out an op-ed in *The Financial Times* to say this is going to take time. A transition to a more sustainable economy is going to take decades. And we need to be able to walk and chew gum at the same time. Meaning we need to be able to continue to provide affordable energy, support the most carbon intensive sectors who are going to drive a significant

amount of decarbonization across the economy over time. They already are as Michele just articulated. And also, be able to invest in the greenest of green companies, low carbon solutions, etcetera. So, both are really needed.

And I think the added perspective that amidst a lot of complexity, it's easy to feel overwhelmed and this is an insurmountable challenge. But actually, there's been a tremendous amount of progress. And in complexity always lies opportunity, right?

And so, if we think about where our clients are really engaged and spending time with us, the need for better metrics to evaluate how we are participating in energy transition, not staying out of energy transition, which is what Michele started with and his comment on divestment, we're spending a lot of time with clients who are looking at ways that they can design climate-aligned portfolios that help them to invest in carbon intensive companies today that are leaders. And also investing in green capex and leading decarbonization in the future.

We also are spending a lot of time on emerging areas like investing in nature, biodiversity, circularity, which is really

important if you think about transition to a more minerals-based economy. We also need to have a lot of conservation. We need to be able to sequester a lot of carbon. And so, that's a growing opportunity that we talk about.

We also mention this concept of gray to green transition, which is how do you work with the most carbon intensive industries today as they look to transform their businesses over the next few decades? And then taking on important areas around economic opportunity and inclusive growth as well, where we've seen a tremendous amount of momentum.

Allison Nathan: You've both made the point that all of these complexities will require a significant amount of investment to get to net zero. In fact, Goldman Sachs Research notes that more than \$6 trillion is going to be needed globally every year until 2030 if key UN Sustainable Development Goals are to be reached. So, clearly there's a scale question here. What do you see as the levers needed to reach that sort of scale? Kara, maybe you can take that.

Kara Mangone: Happy to start. It's a great question, Allison, because scale is so critical. If you look at the

numbers of potential investment required to achieve the UN Sustainable Development Goals or Global Climate Goals, you're in the trillions. You're not in the millions or the billions. So, it's a really big task at hand.

And when I think about scale, I go back to my Goldman Sachs Investment Banking 101 days. And there's really two components of that. One is, how do you decrease costs? Michele's done tremendous work on this concept looking at cost curves of different technologies and where are those inflection points where you really can start to get a tremendous amount of scale. Innovation can also play a really important role.

And so, one thing that we've explored a lot throughout our business and partnership with our clients is how do you start small and then get to those economies of scale point? And a great example is taking technologies that are at infancy, but then going and investing and deploying and bringing others along and getting them to scale.

I think a great example is the work we did with Japan Renewable Energy. We started at effectively zero megawatts of installed capacity. And over the course of the next eight

years, by the time we exited that investment with them, brought them all the way to 400 megawatts of installed capacity. And that's just one example that we've looked at across our business. So scaling what is proven is one.

I think the second is looking at places where there are gaps and unlocks. And market mechanisms can really help this. So, we've partnered with Xpansiv is a great example, which is a vertically integrated market platform that connects buyers and sellers of environmental commodities. So, think voluntary carbon credits. RECs is another great example. And this can help companies on their sustainability journey to be able to accelerate what they're already doing in terms of operational decarbonization.

When I think about gas storage is another big area where we need a lot of solutions. And so, another great example there is a company we're working with called GridStor which is looking at battery storage at a utility scale. So effectively building utility scale grid infrastructure for battery storage.

So, I think, Allison, it's those two components which have taken what is proven and just scaling that up in terms of

investment capital. And the second is there are certainly these unlocks throughout the market, throughout the ecosystem which are really important to address as well. And some of those may be market solutions. Some of those may be investment frameworks. But those could help add additional acceleration to really get at this pretty significant goal that we're all working towards.

And look, we've seen a tremendous amount of momentum in this space. So, if you think about our \$750 billion sustainable finance target, that's a 10-year target. After just three years, we're 55 percent of the way there. So, a lot of activity across climate transition, inclusive growth, both when we're advising clients financing and investing in these themes.

Allison Nathan: Michele, you've just put out a new report which focuses on the nature of energy supply in the US. And really the necessity for what you call a third energy revolution. One of the key drivers of that is the US' Inflation Reduction Act, which you mentioned at the start of this conversation. And you call a breakthrough for carbon capture and clean hydrogen. How does that legislation change the economics of investing in carbon intensive

sectors versus renewables?

Michele Della Vigna: It's difficult to overstate the importance of the Inflation Reduction Act in the US. We think it's the biggest and most revolutionary cleantech set of incentives any country has ever done before.

And I think this goes well beyond just decarbonization and sustainability. This really will create a new energy revolution in the US which we think will be 2X the scale of the US shale revolution, in both volumes and investments. And which, I believe, will be badly needed for the US to maintain its energy competitive advantage at a time when shale, 15 years into its life, is starting to mature and will ultimately decline.

We've put some numbers to this. And as Kara was saying, it's not in the billions, it's in the trillions. So, we believe the total amount of incentives unlocked by the IRA will be around \$1.2 trillion. Which, in turn, will unlock \$3 trillion of investments in the US in cleantech in the coming decade. And effectively make the US the cleantech capital of the world.

Even more specifically, I think the state of Texas will become the single biggest area of deployment of renewable technologies, which may seem strange given its background in oil and gas. But its presence of energy intensive industries, its advantaged solar and wind, its network of carbon capture, I think, will make it the world's biggest clean tech experiment.

And what this also does, at the same time, is I think it moves away from renewables just being solar and wind. It moves away from electrons to actually give serious incentives in large scale to renewable molecules. Clean hydrogen. Carbon capture. Bioenergy. And I think this just makes for a much more interesting, complex, attractive and profitable renewable ecosystem.

And this is why every other country in the world today is looking at the US and the attractiveness of the Inflation Reduction Act and trying to work out where they want to match the incentives to make sure that not all of the cleantech money of the world ends up going to the US, like most of the recent M&A would suggest. Almost all of the M&A done from European energy companies have been aimed at the U.S. IRA in the last year. And that has,

understandably, risen some concerns from the European politicians.

Allison Nathan: And that's particularly striking because the EU has long been a leader in developing low carbon technologies. So how is the EU now responding to the IRA? And what are they trying to do to maintain more of that investment and focus on clean energy?

Michele Della Vigna: Europe has definitely been at the forefront of all of this. But there is a fundamental difference between European and US policy which some companies portray as carrot and stick. Maybe I would portray it slightly differently.

Europe is trying to change demand by effectively forcing the consumers to change their behavior. The US is, instead, changing supply by making renewable alternatives cheaper than traditional hydrocarbons. And this is at the core of the difference.

I still think Europe will retain leadership in a lot of the cleantech technologies. But there is no doubt that the US model feels much more attractive from a corporate returns'

perspective.

The reaction of Europe has been mainly on three fronts to the Inflation Reduction Act in the US. The first one is to reutilize the money left from the Recovery Fund, \$270 billion, towards cleantech. It's a little bit of a green repainting of money that was already there. But there's no doubt that this can actually go quite a long way in incentivizing some of these investments.

Second, there's clearly been a problem with permitting and red tape. And this is definitely something the EU wants to sort out by shortening the time of approval for new renewable projects.

And finally, but most importantly, the EU has given the power to each start to match the cleantech incentives that other countries are offering. Now, this doesn't become a consistent, broad EU strategy in the way the IRA is in the US. But I do think that it could unlock very material incentives, especially for local content in some of these important value chains like solar, like wind, like batteries, and electrolysis for green hydrogen.

Allison Nathan: Kara, let me ask you about a phrase you often use, gray to green clients. Serving gray to green clients is something that GS speaks a lot about. Again, I saw it a lot in the Sustainability Report. What does that gray to green transition mean? And what does it look like?

Kara Mangone: This is a concept that David talked about, I know, when he was on the podcast as well in terms of transition to a more sustainable economy just taking a tremendous amount of time. And part of the reason that's the case is that the highest emitting, hardest to abate sectors, so some of the gray industries, are absolutely critical to a well-functioning, global economy today. And Michele ran through a lot of the reasons why that is.

But what we talk a lot about in the Sustainability Report that we just released are examples of companies that we're working with every day who are in very carbon intensive industries today, but are making significant investments, increasing green capex to be able to start to deploy new technologies that will help them decarbonize their businesses over time and contribute to a lower carbon economy.

And I think these can be pretty big sizes. So, we worked with Chevron on its acquisition of Renewable Energy Group. That's going to help Chevron expand their lower carbon solutions to meet customer needs. It's going to help them accelerate progress to a significant goal they have, which is growing their renewables fuel production capacity to 100,000 barrels a day by 2030.

And really importantly, the most carbon intensive parts of the economy, airlines, automotive, these are companies that have a lot of expertise and skill set, right, as well in how to deploy the energy that we need at scale. And so, I think that's a really critical component. Investing in sustainability cannot be about excluding the most carbon intensive parts of our economy. It needs to be about how do we allocate capital and support those industries as they look to invest in decarbonization over time.

And I think the second point I would make on this, Allison, which we talk about in the report is if you look at projected investment to meet global climate goals, we estimate that about more than half, about 55 percent of capital need to be deployed into Asia. And a lot of that is south and

southeast Asia.

Another investment that we talk about is work that we are doing on the ground with Bloomberg Philanthropies and the Asian Development Bank to structure catalytic investment opportunities in markets. And we're piloting in India and Vietnam. But in markets where we have not seen low carbon solutions hit that commercial viability point, which is really important and, perhaps in some instances, has hit that point in developed countries, but hasn't in those markets.

And two of our first investments through our work in that facility have gone into electrifying transport. So, take a very heavy, diesel bus fleet inner city bus routes in India and Vietnam, and transforming those into electrified bus fleets for the first time. And that can have very high impact in terms of reducing emissions, improving health.

And so, gray to green is a really important concept. That's why we talk about it a lot. And we think it's also an area where there's tremendous opportunity.

Allison Nathan: This conversation so far has focused

primarily on the climate transition, which is what we normally think about when we talk about sustainability. But the social or inclusive growth piece is often a key part of ESG and our clients' mandates. Talk to us about how access and innovation in healthcare and greater education and more contributes to the sustainability picture.

Kara Mangone: These are really important elements of the way that we think about sustainability and sustainable finance, Allison. So, I really appreciate the question. I think the first thing I would say is that these are all investable areas. These are thematics where you can invest. You can make strong returns in improving access and increasing affordability.

And as just two examples, if you look at digital health services, the expenditure in this space is expected to grow at, I think, a 16 percent CAGR through 2027. That's one example. And actually, through our research department, where both of you say, we've done phenomenal work looking at Womenomics and Black Womenomics. And we estimate that reducing the earnings gap for Black women in the US can improve US GDP by almost 2 percent on an annual basis, if we can do that.

So, I think the first point I would make on your question around how do we think about inclusive growth and how important is that piece, it's a really important piece. I think first and foremost, it's an investable area, right? So, that's one.

I think the second is, there's a lot of intersectionality, actually, between energy transition and climate and everything that Michele and I just talked about and inclusive growth. So, Michele mentioned several times this concept of affordability. It is important to think about job creation, affordability, and intersectionality between those.

One of the companies that I think is just amazing is BlocPower. This is a New York-based company which is looking at how they can improve real estate and use more renewable energy, also make it improve health outcomes. And we worked with them on this Civilian Climate Corps program to look at ways that job opportunities can be created for New Yorkers who are at risk of gun violence in green economy industries doing solar installation, heat pump installation. So, I think that's a great example of a really innovative company that sits at the intersection of

both inclusive growth and climate transition.

And I'll also just say, we've learned a lot in this space from the work that we've done over the past 15 years around increasing access for education and capital to women through our *10,000 Women* program, through our *10,000 Small Businesses* program. There is actually a tremendous amount of learning in that partnership work that we do because while these are all investable areas, there are still gaps. In the same way that we talked about gaps on the climate side, there are gaps here. And so, partnership and looking at different sources of capital, not just commercial capital, but also philanthropic capital or blended capital, I think, could be a really powerful tool as well.

Allison Nathan: And you've made the point that public/private partnerships are key to achieving sustainability goals. The private sector has stepped up in many ways from commitments to cut greenhouse gas emissions to tech innovations changing consumer behavior, such as electric cars or plant-based foods. We can list all of these. But is there tangible evidence that shows these partnerships are working?

Kara Mangone: Absolutely. I think the best criticism just to take it head on around blended finance and partnerships can be how do you take what is clearly a powerful case study, and we have a lot of statistics to support this - great example, one of the first investments we made in our Climate and Innovation Fund in south and southeast Asia, we were able to, with the blended finance that we put into one of the projects in Vietnam, which was a sustainable transport project, we were able to leverage that capital 44 times. So I think absolutely we have a lot of proof points in investment.

Through our *10,000 Women* facility we structured at the IFC, we were able to reach over 164,000 women in terms of providing access to capital through that program.

The criticism can sometimes be, how do you take it from a one-off case study and really ensure that this is actually a proof point, and you can get scale through partnerships, and you can use it as an accelerant?

And I think the proof there is how quickly this space has accelerated. And part of what we try to do when we enter these partnerships is we say, "How do we make this

catalytic? And how do we use this as a proof point or a platform to show what can be done in a certain area?"

And so, the specific ones that we're using in the innovation facility that we're working on in south and southeast Asia around climate is not just taking any investment on, but looking specifically at investments that have not been commercially viable. But that through a proof point can really lead to a lot of increase investor confidence. So, that those can become, in a year, in two years' time, market rate of return opportunities that private capital is interested in investing in. So, I think that's one of the ways that we really look at success. And not only just, of course, impact, but also how is this being used? How can these partnerships be used as proof points for what can happen in other markets and other jurisdictions?

There's been amazing progress. But there's a lot more work to do.

Allison Nathan: And finally, we talked a bit about the progress that has been made towards reaching sustainability goals. But if we take a step back and just put this into the context of The Paris Agreement, what more

needs to be done to reach those Paris Agreement goals by 2050?

Michele Della Vigna: My sense is there are three main areas where we need to see more development. The first one is I think we need a better global coordination on incentives and targets. It's been brilliant to see the Inflation Reduction Act. But I think it would work even better if that was coordinated with Europe, with China, with the rest of the world aiming for similar outcomes.

Second. I think investors need to engage more with some of the current high emitters and hard to abate sectors on a clear path towards net zero. Which doesn't just get measured in terms of net zero commitments in 2050, but also with clear metrics of carbon intensive and how those need to develop over time.

And then thirdly, I think some of the metrics used by investors have to become more forward looking. Too many investors are just looking at today's carbon intensity. That just measures the difficulty of the task. It doesn't mean that a company isn't doing something to change it. And on one side, I find the EU green taxonomy, with all of its limits

at least becomes more forward looking, measures the change the percentage of green capex that can drive decarbonization.

But my sense is there are more and more tools that need to be deployed to understand better change. And back to Kara's point, that really start to measure this transition rather than just look for companies that are already fully green. And I think these tools can really help to achieve The Paris Agreement in a way that is affordable, that engenders clean tech innovation, and that, ultimately, can bring economic growth.

Allison Nathan: Kara, do you have anything to add?

Kara Mangone: Michele said it all. I think the big thing that I think about in my seat is just focus. We're in a world that is ever changing, evolving. It's complex. We didn't talk as much about the fact, Allison, that ten years ago we were all operating in terms of voluntary disclosure, right, in this space. And a lot is changing from a regulatory perspective.

And I think my hope is that the recognition of the complexity, ultimately, translates in a lot of capital and

focus and attention and investment, as Michele said, really into the most important parts of the economy, which may be carbon intensive today. And they are. But that's ultimately going to set us up for success.

And that this next decade is not one where we're just spending it pumping out regulatory reporting. But we are really spending it using that information to put capital in the places that need it most.

Allison Nathan: Kara, Michele, thank you so much for joining us.

Kara Mangone: Thanks for having us.

Michele Della Vigna: Thank you, Allison.

Allison Nathan: Thanks so much for joining us this Wednesday, April 26th, 2023, for another episode of Goldman Sachs Exchanges.

And before you go, we'd like to introduce a new podcast from Goldman Sachs Exchanges. It's called The Markets. Each week in just ten minutes or less, we'll be breaking

down the key issues moving markets that week, giving you the information you need to stay ahead. Search for Exchanges: The Markets on all podcasting platforms.

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