



MACRO Voices

with hosts Erik Townsend and Patrick Ceresna

Arjun Murti: Navigating the 2020s Energy Transition Landscape

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Erik: Joining me now is Arjun Murti, many of you know Arjun's name as a former Goldman Sachs partner. He's now a partner at [Veriten](#). And very much a energy markets expert. Arjun is kind of famous for having made the famous super spike call when oil was at 50 bucks. And he said it was going to \$105. And sure enough, that's what happened. Arjun, let's talk big picture, oil market, energy transition. A lot of people have convinced themselves that, you know, it's all over for the oil market, because nobody's gonna need it anymore. I don't see it that way. How do you see it?

Arjun: Erik, I actually have a very similar perspective in the sense that, there's this idea that people know for sure that oil demand is going to peak at some point in the next 5,10, maybe 15 years. I don't think there's a decade, let alone year where anyone can at this point know, when oil demand is going to peak. And I spend a lot of time talking about there's the lucky 1 billion of us, those that live in the US, Western Europe, Canada, Japan, Australia, New Zealand, we consume about 13 barrels per capita. The other 7 billion people on earth use just three barrels of oil per capita and all of them aspire to the types of living standards we have. And I think, is all of that going to be oil use? No. But the idea that we know today, what are going to be the displacement technologies, I push back hard on that. I think there's a pretty strong outlook for oil demand. Again, looking out for the frankly, for the foreseeable future.

Erik: Now, we're talking about oil demand, it seems to me like maybe the more important question is not even oil demand, but the reaction function of what's going to happen as a result of the declining investment in the oil patch, long term, because so many people have convinced themselves that oil demand, as you said, you know, people think it's going to go away in the next few years. If it doesn't, as you and I think it won't, what is that going to mean, in terms of the investment that hasn't been made? What could that mean for available supply? How would that affect prices? And if it turns out that you and I are right, and we ended up with, oh, we're going to need oil longer than we thought. How long will it take the industry to recover from what might be a supply deficit, because of bad planning?

Arjun: I mean, right now, we're in this world where, from a policy standpoint, this is especially true in the rich Western world, we see it clearly in Western Europe, we see it in Canada, we see it here in the US where there's an overarching focus to solve too much carbon emissions. And I think, Erik, I've listened to your podcast, it's a real pleasure to be here. Yes, there's a need to

deal with this stuff. But I think the policies right now are focused on, that's all we're going to solve for. And I think there's this false notion that we know what can replace all the uses of oil, which, of course, are far more than just driving our car. And even that part of it, I think, we can question whether EVs as an example are really a 100% solution, or just a portion of the market. And so when you have this dynamic, where if you're an investor, and I grew up at Goldman Sachs dealing with institutional investors, prior to 2020, that previous decade, it was a really tough decade for profitability. So if you're a traditional investor, you say, hey, this industry had really poor returns on capital for over a decade. And if there's some uncertainty, due to all that I'm hearing about all day, then why do we need to bother investing in the sector? I think these things are starting to not be true, meaning we're getting the signs. Erik, because you know, the IEA call for 2019 and I think even BP had this, that 2019 was going to be our peak year, and that post COVID, we'd never even get back to that level. Well, those forecasts have already been pushed out to 2028, or 2030. And I think they're going to continue to get pushed to the right. But the market hasn't quite caught up with this idea that, the outlook for the sector, I think is healthier than it was last decade. And these cycles are very long term, 10 to 15 years, up 10 to 15 years down, we're coming off a really tough period last decade, we had a couple good years coming out of COVID. Some people thought that was artificially goosed by Russia/Ukraine, and it's going to be volatile. I think we're in, maybe year to year favorite period, where sector profitability is going to be better. But there's still a lot of skepticism and doubt. And it is leading to, I guess, I'd say at this point in over dependence, that shale will always be there. It has been over 90%, as I know, you know, Erik, have a global oil supply growth over the last decade. And I think the idea that, unlike at any point before my career, people are not trying to find what's next. They're presuming that at some point, we're going to have peak demand or a plateau and perhaps even a decline if that turns out to not be true. I think the question is what comes next and when are people going to start looking for it?

Erik: Well, that's exactly the issue. And something that I think a lot of people really don't understand or appreciate, is back in the early 2000s, a whole bunch of people talking about peak oil, got all worked up thinking there was going to be a crisis and they have since been just ridiculed as, oh, nobody's ever gotten anything that wrong. They were totally all wet, they didn't know anything. Well, really what happened is they have their story pretty much right. What they didn't anticipate was the shale revolution. And the shale revolution is the only thing that stopped the global energy crisis that those guys were predicting from happening. Now, shale has been amazing. It's utterly astonishing what the US oil patch has accomplished. But if we didn't have the US oil patch making up for declining production around the rest of the world, we would have a global energy crisis. So, the question I have to ask is, okay, they've been doing an amazing job, I think they've exceeded everyone's expectations. How long can that last? How long can we go before the shale plays run out? And when they do, I mean, if there's something that comes next after shale, I'm not sure what it is. Obviously, there is something that comes next. It's deeper deepwater, offshore, it's Arctic exploration and so forth. But those things are very expensive. And I don't think they have the potential to deliver the kind of volume that shale has delivered, do they?

Arjun: I think that's right. And I guess, I'd say that we all have to be humble in our shale forecast. So, if I go back to my time at Goldman, 2012, 2013, when shale was first emerging, to varying degrees, we had some growth expectations for the next several years. And it was all a sort of three or four or five years out, we had shale slowing and then rolling over. And of course, that went to shale peak and rollover, has kept getting pushed to the right. Here, even in 2023, last year, shale grew by about in round numbers, a million barrels a day, well above people's beginning of year forecasts of about half that amount. And so, I think we have to be humble.

On the other hand, shale, like any resource is not regenerated. And I think what really concerns me most is there's been a real give up. And it's not just investors, it's the companies as well. Throughout my career companies have always been trying to figure out what is next. And if you go back to that 2000s era that you referenced in the opening, in that time, when China started coming on, post the WTO acceptance, and we started having really good developing market growth, we've continued OECD oil demand growth. Everyone was trying everything. Is it going to be deepwater Gulf or Africa or Brazil, to people learning about the Russian Arctic, they were worried about, wondering about oil sands, we were trying to hold bunch of different things. And you know, what we weren't trying was actually shale. Now we ended up having the shale gas revolution first in the 2000s. And I still remember Mark Papa, standing up at our Goldman conference in Miami, declaring sometime was 2010 or 2011, the next big thing is going to be shale oil. And we EOG are going to fully transition from a shale gas company to a shale oil company. But the industry had spent 10 years, ramping CapEx and trying to figure out what's next. What are they doing now? You're seeing mergers and consolidations that consolidate positions and might get some more efficiencies that might allow productivity gains to perhaps continue longer than those that think shale is going to peak next year. I think shale can still grow at some 200,000 to maybe 400,000 or 500,000 barrels a day level per year for the next several years. But that's a far cry from saying we can easily grow 1 million barrels a day and account for all of oil demand growth into perpetuity.

And again, we can be humble and saying we've all gotten wrong, this sort of shale is going to mature and roll over forecast. But at least in past cycles, we've always been trying. And I'll say, not just investors and not just policymakers, but the companies themselves are not going out and trying to figure out what's next, that we don't have major exploration going on. Oil sands in Canada, huge potential opportunity that may be starting to get some girdles of new life with the trans mountain expansion that's about to come online. But where's our deepwater exploration cycle? Where's our trying new stuff cycle? And maybe it's just, was a such a tough last decade profitability wise, that the world's not ready to accept that we can start a new investment cycle, maybe there's still too much skepticism about oil demand. Again, as those forecasts get pushed to the right, as we see places like India, Southeast Asia and the rest of the world move up their energy and economic eschar with it will come energy demand. And a good chunk of that is going to be oil and natural gas. And there's going to be a need to meet this stuff. The world hasn't started trying yet. And it's really just a matter of time before that comes home to roost.

Erik: Now, let me just ask about the other side of this equation. Because, as you say, it may be difficult to continue this growth in US production where, every year we're adding in a million,

another million barrels a day. That's been necessary because the rest of the world's production was declining by a million barrels a day and we had to make up for it and we did make up for it. And that was great. Is there any reason to think that the rest of the world can make up for it if the US can't? Is there anything I'm missing there?

Arjun: I've never thought the world was short oil potential. It does require actual dollars to go in, so, huge issues related, as you well know, to geopolitics. You know, Venezuela used to be over 3 million barrels a day, they're now under a million, thanks to President Chavez and his successors that have really eviscerated that oil industry. But it's not like the oil is not there. And so, we might be waiting a long time for a better government or a healthy situation to rise. But the world isn't short resources. It is short, the desire to invest. I think there's large parts of Africa, which are still prospective. Getting Canada is a hugely untapped type area that has growth potential. Alaska is an area that, for whatever reason, has this sort of environmental overlay that is hard to understand. It is a critical strategic resource for our country, as the Arctic warms, due to both climate change and other reasons. It's going to open up and we know Russia is going to go and try and develop their portion of the Arctic. I think a big question is going to be, can they do that on their own? Well, they're certainly going to try, why aren't we trying to do that with our companies that are involved with Alaska, either currently or in the future? But we're not trying. And that is what is going to change, that is going to be two or three or four more years of good returns on capital before people can get excited. That's probably, somewhere in there is the answer. But there's going to be a need to actually spend money. So I don't think we're "running out of oil." But it does take actual spending.

Erik: And now, there's a view that I don't agree with, but a lot of people do. And I think that it's affecting a lot of investment decisions, which is, look, you guys keep worrying about this oil thing. The climate community has already got this under control, there's going to be a lot more investment in solar, the price of solar is coming down. We're building electric vehicles, we really are going to eliminate that demand because we're moving to electrifying the economy. And we're going to do it all with renewable green energy. Is there any room for truth in those statements?

Arjun: I mean, so the idea that we are going to "electrify everything," which I think is one of the taglines people who are most passionate about the climate use, but some of them do it only with intermittent renewable energy. I just find, frankly, preposterous. So, it's not that there's no room for solar and wind. There absolutely is. We are going to need some form of backup for baseload. I know, Erik, you've had some great podcasts on the nuclear sector, especially those ones around year end, that is going to be one of the solutions out there. Natural gas is going to be part of the solution. I think, if I was to speak positively about solar and wind, and this gets to electric vehicles as well, if you are a region like China, that is short crude oil, and are generally short crude oil and natural gas, you are going to try your hardest to limit your future imports. So if China has gone from, basically being balanced in oil supply and demand to now importing 11 million barrels a day, and Erik, they've only gone from one and a half barrels per capita oil demand to about four barrels, we are at 20, Canada's at 20. South Korea is at 20 barrels of oil consumption per capita. Europe's about 10 to 13. So yes, China is not poor, and there

are certainly pockets that are rich. But overall, it's sort of the middle-income economy. We can certainly debate, have their demographics changed, is it too authoritarian, is there going to be some, you know, diminished GDP outlook going forward, but they're certainly going to try to be rich. If you are China, you are motivated to try and limit your future oil imports. And can you do that with electric vehicles? It's about a quarter of the demand barrel globally, it's about a quarter of the demand barrel in China, that will be one of their solutions. They are highly motivated to do that. I don't think that experience in China, where to some degree, you have the domestic critical minerals processing capacity, you have BYD and the battery manufacturing capacity, you've absorbed or made deals to get all the raw materials that go into it. That is very unique to China, including their authoritarian government, which can force this upon their consumers to some degree, they're going to be highly motivated to not go from 11 to 20 million barrels a day. And can you imagine, we're in a world where the US has gone from importing that amount of crude oil to basically be imbalanced, especially when you add in Canada.

And so the geopolitical implications of this, I think, is the driver that marries the climate objectives with some notion of decarbonization. If you're a developing country, can be true for India, it's going to be true for large parts of Southeast Asia. If you are not long crude oil, and also natural gas, you're going to try and figure out new technologies. The tricky thing from the climate standpoint is I know you know, Erik, is China and India both have a lot of coal. And so, you can see it in their actions and there's lessons for us. China is of course, now half of global climate coalmine. Coal demand hasn't peaked. It's making all-time highs every year. We've never used less of anything including wood and biomass. So, this energy transition, the idea it can be quick and easy, is a pipe dream. The idea that you can do it only with renewables is also a pipe dream. But if you have solar, wind, and if you're a country like China or India, once those solar plants are up and running and solar farms etc., is a domestic resource. So, for those that poopoo solar and wind as just being an intermittent resource that greenies like, I think for the developing world that, especially if they're not long natural gas, it is going to be a complementary fuel to their coal growth. And I think it's trying to understand the geopolitical drivers of these new technologies, I think it's going to be the more important driver than just trying to solve for a singular variable, like carbon, which is what I think you hear in most of the rhetoric today.

Erik: You mentioned nuclear, and you're right that I'm the world's biggest advocate for nuclear energy. But look, it's not able to solve any problems in a short timeframe. Unfortunately, in the West, we still have nothing but conventional nuclear technology, where Americans take about seven years to build a nuclear power plant. South Korea's much more efficient at it, they can do it in four or five years. But still, it takes several years to bring new nuclear capacity online. Now, China is going gangbusters, they are moving very aggressively on both conventional and advanced nuclear energy. And I think that's because they see exactly what's coming. But the West isn't. And although I'm extremely excited about small modular reactors, and thorium and all of these other exciting technologies, they're still several years away. So there's nothing that can, in the next two or three years, help anything from a nuclear standpoint, other than it's definitely the right long-term solution when we get our act together, which we haven't yet. So that's not going to be the solution. I agree with you that wind and solar are a worthwhile

technology. But look, we spent \$4.6 trillion in the last two decades alone on renewable energy, primarily wind and solar. So far, they've made great progress, they've improved those technologies tremendously, to the point where they've now solved exactly 3% of global energy demand, no more than that. If we do have an oil and gas energy crisis, at some point, because of lack of investment, we're not going to suddenly just build a few more windmills and solar arrays and solve it. And I don't see what we are going to do to solve it. Because, if we get into that situation where we've under invested in oil and gas, because everybody convinced themselves it was going away, it seems to me that the time lag, once you figure out oops, we made a mistake, let's invest in oil and gas. How fast could we fast track bringing things online? Some of the drilling technologies have improved in offshore, I see that the Guyana development, at least until they got into a spat with Venezuela, was moving faster than I originally thought it was going to. So, is there an out if we suddenly figure out that we really do need more oil and gas than we thought? How many years does it take to kind of get our act together and get supply catching back up with demand?

Arjun: Erik, there is no free lunch and in energy, nothing happens quickly, right? It's why these cycles are long term in nature, 10 to 15 years, up 10 to 15 years down, we can say this one sort of began in 2021. And maybe we're in year three of it. But again, unlike past cycles, we're certainly not really trying to grow, especially our oil supply, we are going to grow LNG in this country. So, I've spent a lot of time talking about the development needs of these sort of, I call them the other 7 billion people on Earth, and that seemed to be nine over the next 30 years, extra 2 billion people mostly in the developing world, and how do you solve for their desire to move at the energy and economic escrow and these are all long term questions that need to be addressed. But, we now have a near term development in this country, and it's going to be true around the world. And I apologize that this has become a buzzword. But artificial intelligence, and the data center growth, that that is going to imply suggests that we are, for the first time in 20 years, going to have positive load growth. Positive power demand growth in this country has been flat to maybe up half a percent over 20 years. And these numbers are inflecting positively. They're inflecting positively, also because of electrification and electric vehicles and all the sort of climate-y kind of goals, but they're getting turbocharged. And what is interesting to see is to see big tech, absolutely freak out about power, availability and reliability. And it gets to the point on solar and wind. Again, it is going to be part of our mix, it can be a distributed generation source, which has its points of attractiveness. It can be a domestic resource, because once it's up and running, it's not subject to an embargo or some other external adverse actor, negatively impacting the supply. But no one who was running a data center says, well, I'll just run it when the sun is shining or the wind is blowing, right? It's absurd.

And there's a recognition amongst big tech. They're going to call it, and I apologize for the phrasing, but they're sort of fluffy, feel good net zero by 2050 promises. When you think about how important technology is to our economy, and our iPhones being such a huge component of energy demand, not dissimilar in aggregate, to what gasoline demand is. And you think about all the other compute power that's coming, they now recognize look at the deal that Amazon signed with Talen energy for a data center next to a nuclear plant last week, huge deal, hugely important. And while again, I'm an energy guy, when energy guys are talking about AI, be

careful, maybe there's too much hype to it. But what you are seeing in these markets, some of that demand inflect positively, and there's going to be a recognition that you need to have reliable power. And so these things are long term, but the mood around nuclear has gone from, it's not green and not part of anything, and we need to continue to do away with it, like we saw in Germany, to now, recognition from some of our most important companies, that we need to study this. And we need to be real about our goals. And I think that's a really important big shift that we need to combine that with the needs of the developing world. But I've called a NESSY energy transitions, but my motivation to sort of unretire after a decade of doing board and advisory work, to starting this substack, called [Super Spiked](#), it's about discussing this messy energy transition narrative, the world is getting a wake up call. And I do think big tech, in this sense, has a chance to help turn this conversation and narrative, in a more positive direction. And so when you talk about long lead times in nuclear, not that Amazon can fix those lead times, but you get more than just the energy folks talking about the need for reliable, available, affordable energy that's there 24/7, 365. We have a chance to at least move the needle forward in a better direction.

Erik: Are there any other energy sources we haven't talked about? I mean, you're the big picture strategic thinker, it seems to me, like nuclear is the right solution, it's just going to take a while to bring it online. And we haven't even made the real commitments yet to bring it online. So, it's quite a ways off. Wind and solar will continue to grow. But it's taken 25 years to get to 3%. So, you know, it'll go faster in the future. But how much faster? I don't see anything but more oil and gas supply being brought online, to fill in any deficits. And it seems like that investment, as you said, is not happening. Am I missing something? Is there any other Hail Mary pass here?

Arjun: There is no Hail Mary pass. There's no short term, "Here's how you fix it." It requires time, it requires investment and requires a policy framework, especially from countries like the US, we have so much to offer the world with our substantial oil and gas resource. Our refined products that we now export to the world are LNG, that we are, despite this pause, which is an unfortunate development, we are growing our LNG exports to the rest of the world. We also have technology to export to the rest of the world. Tesla, whatever one thinks about its equity as a car manufacturer, it sells 1.2 million vehicles. That's a luxury vehicle. As we know, I personally drive a Tesla. I enjoy driving it, it is not 100% solution, but is an example of a successful technology that I think can be exported to the rest of the world. There are lots of other examples, folks in Palo Alto, Austin, Houston, studying and developing all sorts of new technologies. And there's going to be a motivation, again, for these countries to figure out, hey, I don't want to be a hugely dependent on Russia, or Saudi, or maybe you don't want to be dependent on shale. If you're China, as an example, you are going to try your hardest to figure out new technologies to displace energy demand going forward. But I'll tell you what's a scary stat. You look at Norway, a country of about five and a half million people, they are now about 85% electric vehicle sales. That's all through policy, I think as a percentage of their fleet, they're still working through it and maybe over 20% of the fleet right now. But over this period of time that they've gone from essentially zero to, within a decade, 85% sales of EVs, total hockey stick, total homerun dream that every climate activist would have totally signed up for. I mean, I was

shocked to find out that their oil demand in aggregate is actually up slightly over the same period. And it's because all the other uses continued to grow, PET can, diesel, LPGs, and so forth. And so, EVs address, about a quarter of oil demand. And the idea that this is a ubiquitous solution everywhere, we can already see in the United States, the nature of driving is very different. In Norway, gasoline is about 16%, it was 16% of its oil demand barrel, is down to 7% with the EV push, other uses of offset that. In the US, it's 45%. We have a suburban, as you know, Erik, suburban rural type environment here, you drive everywhere, unless you're in New York City where you, if you're not scared, you may still take the subway, and by and large, you're driving everywhere.

So the idea that we're going to force, or, that somehow we're going to have 100% EVs is ludicrous. So when you talk about new technologies, I do think hybrids have a chance to make a dent. And so, from a policy perspective, why would a state like California say, we're going to have 100% mandate, 100% EVs by 2035. There's nothing that is just about that, when you think about how expensive EVs are for most of the population. Hybrids can put a dent in, and I think there's no silver bullet. It's going to be all the above policies, all the belief technologies. And I think at some point, is going to have to be a motivation to say, we have substantial resource still to be developed in the US, both in oil and gas, but also Canada, and including Alaska. And do we have the type of policy framework that doesn't say, we hate you oil companies, and you know, you're going to grow despite us, because the state of Texas kind of gives you a little more leeway than we do? How do we create a positive investment and policy environment to encourage more development, so that we can meet the world's energy needs? We're not there yet. I think we're moving that direction. And again, oddly, and it's more for power generation. But I think the involvement of the technology sector and recognizing, really the shortfalls of our current policy and sort of climate-only mindset, I may be being optimistic or hopeful that will be a catalyst to having a better conversation going forward.

Erik: So assimilating all of these ideas, what's your outlook for oil and gas energy prices over, say, the next decade?

Arjun: My framework, at the time being, has been, I've used the phrasing super vol, super volatility, rather than supercycle. And I think there's a couple things that I take pause, and I'm a regular MacroVoices listener. So you know, I'm a fan of Jeff Snider, and yourself, and these other guests you've had, the economic concern that we have in China, Europe, and even the United States at this moment, keeps me from using the supercycle language, that coupled with the fact that I'm very humbled to the fact that we've all underestimated, all oil equity analysts and commodity analysts have underestimated the resilience of shale. And we've spent already enough time talking about the fact that that won't go on forever. But at least over the next couple of years, if we have some shale growth, Guyana and Brazil are ramping up, and you're getting some continued growth out of Canada, that might be enough to match. I'll just call it a low-end oil demand forecast, of about a million barrels a day of growth. If it turns out, and even myself who said, hey, I don't think there's a decade let alone year where oil demand globally is going to peak. I have acknowledged or thought the OECD may be more mature and but even there, there are signs that even I, who am generally sort of, "bullish" on oil demand, had been too

pessimistic. And it's quite possible and even in the rich western world, where we should actually be having declining oil demand for efficiency and EV type reasons that we could actually be flattish. And, this is at a time, Erik, as you know, where no one thinks we have a booming economy, no one thinks Europe has a booming economy. And even China, no one thinks they have a booming economy. And yet, there might be as much as a million and a half barrels a day of oil demand growth. And so I've been using super vol language to recognize the fact that there's a sort of this, let's just call it recession or lackluster economic uncertainty. And that will, I think, we're back and forth between trending towards 50 in oil and then going above 100. I think, if the oil demand numbers start coming in closer to one and a half, if we end up flattening OECD demand and we don't have a decline there, and if shale matures finally, then you start sowing the seeds for, let's just call it that next supercycle in that sense. We know the capacity of recycles. Typically, it's been a 5 or 10 fold increase in oil price, not a 20% or 30% increase. I'm mercifully out of that game of publicly forecasting oil prices. But you don't have supercycle, you don't end up getting to where you need to destroy demand, by having modest increase in the oil price. That's not the nature of these things, you tend to have 5 or 10 fold increases. They may not last forever but that's the type of upside volatility you get, to the extent we don't get back to investing in our oil business in particular.

Erik: Well, let's talk about that not investing, not just in the oil business, because, you know, look, we've got our opinions, but other people have different opinions. But I think almost anybody who's a sane analyst, looking at energy markets have to agree that we're setting up for an energy deficit in coming years. And what seems to me is different this time, and I don't understand why is, you would expect a lot of speculative investment in energy. Now, maybe some people don't agree with you and me, and they're going to say no, it's not all about oil and gas, it's all going to be nuclear. Well, look, we're not seeing speculative investment in developing nuclear power plants. Yes, there's a lot of speculation in uranium right now. But that has to do with the supply squeezing some geopolitics and other things. It's not about building more nuclear power plants. Likewise, you don't see much speculative investment at all in the advanced nuclear technologies, which is where I think the world is really headed. Other people don't see it my way. Well, where are the speculative long energy investors who don't see it my way? What are they investing in? I don't see any real increase, even in the wind and solar side. They've got the sustained climate driven investment, who's looking at the coming deficit in energy supply and speculating on it? As far as I can tell, nobody. I don't understand that.

Arjun: Erik, I don't mean to be flipped. But my sense is they're all in Nvidia, right? I mean, it sounds like, I'm respectful of it, The Magnificent Seven stocks, they're exciting. And a lot of those companies have revenue growth. And unlike the dotcom bubble, that sort of was at the start of my Goldman career, the current Googles and Microsoft's, they are very profitable. So, I have a lot of respect for why it's just easier. And now we have AI, I personally believe that is a new computing paradigm that is an exciting area, what we are going to learn? And again, I don't know whether it's going to be next month, next year or three years from now, is you don't have technology without energy. You don't have anything without energy. And I do believe that tech companies are struggling to get this. I've been impressed with what Microsoft has done. I think they're the ones who originally had that sort of fluffy promise, we're going to eliminate all of our

emissions and all the emissions from when Microsoft was founded to 1976. And gone from that, these kind of pie in the sky rosy scenarios, like, oh my gosh, simply buying sort of solar offsets and other regions doesn't power this data center. And planting a forest in Costa Rica, which last time I checked, was a quite a few trees to begin with, isn't really doing much for the climate anyway. And so now you've seen them sign up for nuclear studies, and you've seen them sign up for direct air capture, and we could still debate the timeframes. But there's a recognition there. Look at Meta, the former Facebook, they've hired my friend, John Arnold, who you probably know, very successful natural gas trader from 20 years ago, probably known more now as an energy commentator investor, he's on some advisory boards. We were both on a couple advisory boards together, but they've hired him. I don't think they hired him just because he has some interesting views and how to fix the education crisis in San Francisco, I'm pretty sure it's to have a better understanding of energy.

So the sign that the dominant companies in the marketplace today are recognizing this deficit of energy knowledge, right? Erik, I've been doing this for 32 years, I had a great first 22 years at Goldman and a few other Wall Street stops. I enjoyed my 10 year of "retirement period," where I just did advisory work. But I felt compelled to, I may not always be right, in fact, you can look at my track record, I've definitely made a lot of wrong calls. But I, at least know more about energy than what you hear from a lot of our leading politicians and policymakers today. And it's at least a different perspective. It is not pie in the sky, solar and wind and electrify everything, with just these two intermittent resources is going to solve all of our problems. And so, I think we're not there yet. But I think the needle is starting to move away from climate and CO2 is all that matters, to now recognizing, people call it a trilemma. I don't even like that language, you have, it is a hierarchy of needs. Everyone absolutely needs energy to be available at all times, you don't actually care if it's affordable, you prefer it, but you don't care. You'd prefer it be geopolitically secure. But I always say the worst day of my career was at Goldman Sachs, when 9/11 happened. And the next day, I was out buying gasoline that, de facto was in part fueled by Saudi Arabian crude oil resources. And so, you don't even care about geopolitics, at the end of the day, energy has to be there. But there is the potential, when you think about geopolitics to also solve our environmental and climate challenges. It's not about ignoring them, it's about understanding what the drivers are. And so I think, I will be hopeful and say that, how many years of profitability do we need? This is a sector that has 0% return on capital, the energy sector, especially the shaley, oily, ENPs, last decade, 0% return on capital, they're now on track to be between 15% and 20%. 2024 should be the third year of plus or minus doing that kind of number. That's a very good level of profitability for some of the leading companies, their profits are actually competitive with some of these giant technology companies, believe it or not, in terms of a return on capital type metric. And so, I don't know how many years of good returns. But what I do appreciate about investors, they will always chase the money. It may take some time, the momentum can overwhelm in the short term, but high profitability is going to be irresistible. And the longer you do not invest, the greater the odds that your profitability stays at a good level, at least at the sector, and at least for the leading companies. And I do think people will come back in, but I just can't tell your audience that's going to be next quarter or next month, it might take another year or two,

Erik: Based on the lack of investment that we've already seen and the confluence of the various factors that we've already discussed, do these things lead you to the conclusion that some kind of global energy crisis is inevitable eventually? And if so, when, approximately on what timeframe?

Arjun: I think we're going to continue to bump up against a crisis environment. And so, you know, we can say that the shock to Europe that, hey, guess what? Russian gas is not dependable. And I can't remember if anyone warned them about this, but I know this is not a political podcast, so we'll save that rant. This type of crisis environment, I think it'll be a regular feature going out over the next 10 to 15 years. When you get periods where things spike up, what I think is going to be hard to predict, Erick, is what the exact nature of it's going to be. So I wouldn't have had that, you know, Russia shutting off gas after invading Ukraine was going to cause the equivalent of \$500 a barrel equivalent local gas prices in Europe. And so, it's hard to predict the exact nature of what happens next. I think OPEC spare capacity is one of the most overstated numbers out there. Saudi Arabia, in the history of the country, has never sustained more than 10.5 million barrels a day, maybe they can do 12 on a sustained basis. They've never actually demonstrated it. And I don't know why the market or observers or politicians, take them at their word for what they say their capacity is, when there's a huge inherent motivation to overstate it.

And again, maybe I'm wrong, maybe they can do a lot more. Why would you want to run your country or economy on the assumption they are absolutely 100% telling the truth on their spare capacity? And the point would simply be, if we're in a world where shale does suddenly mature, we spent some time talking about this idea that Saudi is going to be there to fill the gap. Well, yeah, they're at nine today, they can go back to 10.5. How much CapEx? They just cancelled, as you know, an expansion project. I think the same, you know, UAE has some spare capacity. I think most other countries within OPEC, I'm going to say, they basically produce what they can at all times. So, there's just not a lot of cushion in the world. We're generally low on above ground inventories. And we're generally low on below ground inventories, which is your, "spare capacity." And we're at a time where CapEx, despite three years, I'm sorry, this will be the third year, a 15% to 20% returns on capital, which is a really good number, and is competitive with any sort of history. And it's competitive other, with the industrial sector, competitive with technology in aggregate, it's competitive with healthcare. It's a competitive number, you're still seeing CapEx for this industry, much closer to trough levels than anything above. And if anything, all we're seeing is M&A activity. That is, I hate to use the word, defensive, because they're not all defensive deals. But they're acting like we need to get synergies, we need to get productivity gains. We're not seeing new capital formation. We're seeing, especially in the US, big private equity mostly move out of the traditional space and not yet come back. We're seeing public investors trade this sector off of its lows, it was 2% of the S&P at its lows, this sector is, energy has generally been 8% to 12%. The estimate is up to 4% in round numbers today. So yeah, it's up off its trough, its earnings contribution to the S&P is 10%. It's still way under punching its weight. And so, we're going to need to see enthusiasm come back to the sector, it's just not happened yet. And I'm sorry, So, every couple of years, I would expect some different area to creep up as being that source. Could it be a refined product situation? Right now, the

market is convinced gasoline is going to plateau due to EVs, especially in China. You know, it might, but what if it doesn't? And what if in a world where a refining capacity does not have a lot of access, you suddenly have some outages. So we don't have the nature of what's going to cause the crisis. It was LNG and gas last time, it could be gasoline next time. And I think that's going to be an every-couple-of-years kind of thing. And of course, I am not a power market expert. That is the next area that is clearly ripe, the idea that we're even going to risk having brownouts or blackouts in our country is insane. That, if not just due to intermittency from solar and wind, that is part of the issue. There's also a lack of investment there, Erik, we've shut down existing nuclear plants, and gas plants and coal plants, which is fine if you had a whole bunch of new stuff that we're bringing on. But in the absence of bringing that stuff on, it's a recipe for disaster. And I think the power market would be the one to watch. It's not quite like an oil price spike where it makes the headline news, but I do think blackouts and brownouts will make the news and it should not be acceptable. And it doesn't have to be stopped shutting down, please, let's stop shutting down the old stuff before the new stuff can demonstrate that it can be there 24/7, 365. Not just some of the time.

Erik: Let's talk about the changing strategy of Saudi Arabia. I'm actually working on putting a whole show on this subject together next month. But I was really taken by the recent announcement, for anyone who's not familiar with it, previously, the policy position of Saudi Arabia was that their production capacity was supposedly 12 million barrels a day, could be increased to 13 million barrels a day with additional investment. That's what they told the world to plan on. Recently, what they announced is that they've made a strategic decision not to increase capacity, they are going to stay at 12 million barrels a day indefinitely and not increase their capacity. And some people celebrated that as, oh okay, that means Saudi finally got the memo that, you know, the Green Revolution is succeeding. I don't take it that way at all. What I think is going on is the Saudis have realized that most of their country's wealth in their sovereign wealth fund needs to be diversified. And they're very actively investing all around the world through their sovereign wealth fund. And I don't think they want to make further investments in oil and gas, because the rest of the world has essentially doomed the industry long term. They want to invest in other places. And something I just don't think the world is ready for at all, is the day we get to that coming global energy crisis, you and I both think are coming, and everybody says, okay, Saudis, you guys are the swing producers. Come on, crank it up, we got to get you to 13, 13.5, try to get 14 million barrels, and they say, o, actually, we're not going to go from 12 to 13. We're going to go from 12 to 11. Because we're going to continue to diversify our investments internationally. And we're not going to make continuing investments in the oil patch. If that were to happen, what would the consequences be? And am I crazy to think that that's a possibility?

Arjun: I think that that is a possibility. And I agree with your perspectives, that there's a diversification imperative there. I think the exact reasons for why they decided to delay or not go forward with this expansion, as they say, from 12 to 13, but let's just call it plus one. So for me that the 10 and a half to 11 and a half, I think it clearly is a political decision. I think whether it was meant to keep Russia on sides with, I do believe that this idea that Saudi and Russia, at least rhetorically, had been more on the same page since the terrible price war at the start of

COVID. That was important to them. Maybe that was a driver. But there's no doubt I think these Middle East countries are, they are interesting. United Arab Emirates as well, the recognition that they have a huge resource advantage, and that resource advantage can be used to help develop places like China and India and the rest of Southeast Asia, and they're going to do it proactively. But they're also going to do nuclear, as we're seeing in the United Arab Emirates, as an example. Saudis are going to try and diversify their economy, I think we'll see how successful that ends up being. There are probably some cultural challenges to how much tourism and these kinds of things, you're really going to have, that I might be a little skeptical of, but they're certainly going to try. What I respect and appreciate about their strategies, is this outward looking, it is we have this energy advantage, how do we use it to our advantage to help develop the rest of the world? Which is a very different, at least outward sort of statement of values than what we're currently seeing in the United States and Canada, which is, we need to limit our domestic industry, whether we've been successful or not, we need to yell at them about new developments in places like Alaska and offshore and elsewhere. And we're not going to have lease sales, and we got to, "keep it in the ground." And we're not going to prove pipelines, and we're not going to try and accelerate the nuclear permitting process. Like, we're taking the opposite view, when in fact, our oil production is higher than Saudis. I don't have the stat myself, but someone just told me, if you add up production in Canada, it's now bigger than the Persian Gulf in oil production. That's a remarkable, remarkable stat. Never mind, our LNG exports with what Saudis are going to try and do. Never mind, we are leaders, the United States, in innovation, and can export a whole bunch of new technology. So that sort of outward focus that a country like Saudi has towards developing the rest of the world, I applaud them for it, I applied the United Emirates for it. And I do think there's a lot we could take away from that. And hopefully, we'll have a chance in coming years, to have maybe a more outward looking view of how we can use our natural strategic advantages for the betterment of our country, the United States, but then to help develop the rest of the world.

Erik: Well, Arjun, and I can't thank you enough for a terrific interview. Before I let you go, please tell our listeners a little bit more about what you do at Veriten and what services you offer, and how they can follow your work.

Arjun: So Veriten, it's a bunch of colleagues from both Goldman Sachs, and many people will remember Tundo-Pickering and Holt. What we do is we help energy companies, primarily think through the energy outlook transition and strategic type questions. So it's mainly geared to, sort of what we call them our partner companies, we don't have an institutional investor type model. We do also have a small fund that focuses on newer technologies as well. I write a weekly blog post called [Super Spiked](#), it can be found at arjunmurti.substack.com, It's also available on the Veriten website, veriton.com, you can also get our weekly [Close of Business Tuesday](#) video interview podcast, are the two things we produce. And then I'm pretty active on Twitter, Erik, [@ArjunNMurti](#) as well, but thank you for having me on. I'm, as I mentioned when we started, a longtime listener, first time caller kind of thing and it is both an honor and a pleasure to be here with you. So thank you.

Erik: Patrick Ceresna, Nick Galarnyk and I will be back as MacroVoices continues, right here, at macrovoices.com