

3 Takeaways Podcast Transcript
Lynn Thoman
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Ep. 170: Chevron CEO, Mike Wirth, On The Race To Meet The World's Energy Needs With Lower Carbon Solutions

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INTRO (male voice): Welcome to the 3 Takeaways podcast, which features short, memorable conversations with the world's best thinkers, business leaders, writers, politicians, scientists, and other newsmakers. Each episode ends with the three key takeaways that person has learned over their lives and their careers. And now your host and board member of schools at Harvard, Princeton, and Columbia, Lynn Thoman.

Lynn Thoman: Hi, everyone. It's Lynn Thoman. Welcome to another 3 Takeaways episode. Today, I'm excited to be with Chevron CEO, Mike Wirth. Chevron is one of the largest companies in the world. It's ranked number 10 on the Fortune 500 list of the largest US companies by revenues, and it's the second largest oil and gas company in the US after ExxonMobil. Chevron is also one of the world's largest investors in green energy, spending billions of dollars on new energy technologies. I'm excited to find out how Mike sees the oil and gas market, the transition to green energy, and some of the exciting new energy technologies that Chevron is investing in. Welcome, Mike. And thanks so much for joining 3 Takeaways today.

Mike Wirth: Thanks, Lynn. It's a real pleasure to be with you.

LT: The pleasure is mine. Mike, let's start with the current situation, the reality, if you will, of the oil and gas markets. Over the last year and a half or so, energy has been in the headlines. Energy always seems to be in the headlines, but particularly with the Russian invasion of Ukraine and OPEC supply cuts, it's been a volatile market. What can you tell us about where the market is now and what we've learned?

MW: Well, it's interesting. I was with the New York Times not long ago and observed to them that energy has kind of gone from the obituary page to the front page again. A few years ago, people thought that everything had changed. And yet we've seen, as you said, with the Russian invasion of Ukraine, some of the things with OPEC, energy still matters. So really over the last year and a half, what we've seen is there are three things that fundamentally matter about energy. Energy, first of all, has to be affordable to create economic prosperity. Second, it needs to be reliable to ensure energy security and economic security, and in fact, national security, as we've seen recently in Europe. And then third, energy has to be ever cleaner to protect the environment. And whether you're a policymaker in a country or whether you're an executive in the industry, you have to remember that these three things matter: affordability, reliability, and environmental protection. And over-indexing on just one of these at the expense of the other two can have significant and serious unintended consequences.

LT: What's happening to US oil and gas production? Is it shrinking as many people believe?

MW: Actually, no, it's growing quite strongly. If you go back right before the pandemic in

November of 2019, the US reached an all-time high production of about 13 million barrels a day of crude oil. The world used about 100, a little bit over 100 million barrels. So the US is better than 10% of world production and the largest producer in the world. That came off during the pandemic, but the last few months here in 2023, we're back up to almost 13 million barrels a day, 12.7 last month. So US production is growing. Chevron is growing US energy production, and lowering the carbon intensity of our operations. So we're producing at record levels in the US, the highest we've ever produced, and have plans to further increase production in the near and the medium term. And I think that's important. You talked about our size in the beginning. One of the things that's really important is a company like ours are among the most efficient and environmentally responsible in the world. And as the world continues to use these products, we believe companies that operate at very high standards are the ones that should meet as much of that demand as is possible.

LT: How about world oil and gas production? What's happening to that?

MW: Total supply this year looks like it will reach record levels of, as I said, a little over 100, about 102 million barrels a day. It looks like it'll grow again next year to maybe 103 million barrels a day. So that's good because demand is actually growing faster than that. Demand is set to rise about 2 million barrels a day this year on top of 2 million barrels a day last year. So demand is growing a little bit faster than supply. There's large inventories and some spare capacity in the world that helps balance all of this out. Most of the growth in demand is coming in developing economies. China accounts for more than half of the global demand growth. India's growing strong as well. So world oil and gas production is growing. The US is certainly a contributor to that.

LT: Let's talk about the energy transition. You've pointed out, Mike, that oil and gas will be part of the energy mix for decades and that the industry continues to make investments in oil and gas projects that also span decades. What does that mean for the energy transition?

MW: Well, a responsible energy transition and an orderly energy transition is going to require three things: solutions, scale, and speed. First of all, there is no one solution. Electric vehicles are great but they're not the only answer here. So we're going to need everything. We're going to need every solution. Demand continues to grow. We need more forms of energy. So we shouldn't be ruling things out right now. We should try to be ruling solutions in and proving solutions that can work for the future. The second thing is that the scale of the energy system is just enormous. And this last year has shown how much modern life depends on it. If you look at the risks in Europe and the concerns related to the war, the prospect of insecure energy supplies is of great concern to economies around the world.

MW: So we need solutions that can scale; not just things that can work, but can scale. And those two things will govern the speed at which we can evolve the energy system from the one we rely on today to one in the future that is lower carbon. And the last thing I'll say about speed is this transition will happen at different speeds in different places. There are parts of the world like the US or Western Europe where we're going to see renewables come in more quickly. There are other parts of the world where renewables may not work so well. And so the speed and the pace of this will vary by country, which is actually the beauty of the Paris Agreement, which allows each country to lay out their own path based on their realities.

LT: Where are we now? What percent of US energy comes from oil and gas, from coal, nuclear, and zero greenhouse gas renewables?

MW: The numbers are usually a little surprising to people. The US has an agency called the Energy Information Agency that reports on energy supply. In 2022, the mix was, in the US, 70% oil and natural gas, coal was next at about 10%, nuclear at 8%, renewables were about 6% of US energy, and then the balance was biomass and hydro. And most of the energy consumed in the US, 70% oil and gas, 10% coal, about 80% still are fossil-based. That number, if you go back 20 years ago, was around 84-85%. So, there is a shift underway, but because the system is so large, it can't shift rapidly.

LT: I think those numbers are surprising to many people. Can you put the US in perspective? How does the US compare to other developed countries?

MW: The mix is always shaped by some local factors as countries have their own resources and own economic drivers. It's about 40% of the world's energy today is used in developed economies, but only about 16% of the population lives there. So you can see that the developed economies use a disproportionate amount of energy, which isn't surprising. The mix in the OECD today is similar to the US. It's 63% oil and gas, 13% coal, so you get to about 76% fossil, so a little bit less when you get to the total OECD. 9% nuclear, similar to the US 8% , biomass only 3% renewables, wind and solar and 2% hydro. So less renewables, less oil and gas, more coal is the simple way to think about the OECD in total.

LT: And what sectors consume the most energy and emit the most greenhouse gases?

MW: 40% goes into electricity generation, 20% is used in industry. So think big manufacturing, steel, cement, aluminum. About 18% is transportation, 14% is buildings, and then there's some losses in processing and distribution, your power losses as things are transmitted through grids, etcetera. So if you look at greenhouse gas emissions, and this comes back a little bit to perceptions versus reality, about 35% of global greenhouse gas emissions come from power generation and heat, about 25% from industry, about 20% from agriculture and forestry and land use, about 15% from transportation, and the rest from buildings and others. And so people often think that vehicle transportation is a primary source of greenhouse gas emissions. It actually sits in the fourth place behind power, industrial activity, land use and agriculture. And that's why we're developing solutions that apply to these sectors in the economy that don't have viable alternatives. Electric vehicles are great, but they only address a portion of the emissions.

LT: Electric vehicles, people are really excited about those. And people feel like they're green if they have an EV and plug in their EV and don't purchase gas. What's the reality?

MW: Well, look, they're a part of the solution. I said earlier we should be ruling solutions in and not out. So we're supportive of EVs. They work well for people in some applications. They don't work for everyone because of either cost or range or recharging. But there are other things. Right now, EVs, if you were to live in the northeast of the US or in California where I live, you would think EVs are everywhere. They accounted for about 8% of US light duty sales last year, so still 92% are not EVs. And the fleet turns over relatively slowly because vehicles last for a long time. Globally, there's about 25 million EVs on the road out of 1.5 billion light duty vehicles. So still a very, very small percentage. EVs have their own environmental impact as you look at particularly battery manufacturing and some of the minerals that go into it, which need to be accounted for. Then, of course, they depend, their emissions profile depends on how the power is generated that

they use. So and EV running off of wind has a very low emissions profile, one running off of a coal fired power grid less so. Norway is a very interesting country to look at. 80% of the light duty vehicles sold in Norway have been EVs for the last several years. Norway is a small country, 5 or 6 million people, a very wealthy country and so we've seen EVs penetrate quickly there as a percentage of total sales. Their oil demand is still very strong because oil is used in shipping, in aviation, in industry and other heavy duty transportation etcetera. So EVs are part of the solution but they're not the only thing. One of the things we're investing in are renewable fuels, which can drop into the existing fleet, have a lower emissions profile than conventional fuels, and so they can make an impact across the entire vehicle fleet today as opposed to waiting to see the vehicle fleet turn over.

LT: But, on average, if someone in the United States plugs in their EV, they are essentially fueling it with the US average, which is 70 to 80% oil and gas. Is that right?

MW: Yeah, the electric grid is a little bit different than that in the US. So that was total energy including from transportation. But yes, the electric grid in the US has a heavy component of natural gas. Coal has come down. Renewables have come up. So you can think of the grid as 50/50 fossil fuels versus renewables and that varies by time of day and geography, of course. But it's still not 100% renewable which is what a lot of people, kind of think in their head, when they plug in their EV.

LT: Mike, you mentioned Chevron's efforts and investments in new green energy. Chevron has made some big acquisitions over the past few years, both in traditional oil and gas assets as well as in renewable energy. And you've got an active venture investing arm and are pursuing emerging technologies. Can you talk about some of those new energy technologies that you're focused on and why?

MW: Sure. Our strategy is to leverage our strengths, things that we're good at, to safely deliver lower carbon energy to a growing world. Part of that means we need to lead in lower carbon intensity, traditional products, the oil and gas products we manufacture today, and we're bringing those emissions down. But then the second part of that is we need to advance new products and solutions that can reduce lifecycle carbon emissions for major segments of the economy, major industries. And so I mentioned renewable fuels, which is a big business, we're the second largest renewable fuel producer in the United States. Carbon capture and storage is a business that we're looking to build. In certain parts of the world today, we capture CO2 and store it safely away under the ground. We're working to build that into a larger business with a focus in the US and Asia.

MW: We're working on hydrogen, which can fit into the mix, particularly for industry, for heavy duty transportation, and then other emerging technologies like geothermal where you can use heat from within the earth to generate power and heat. So we're not investing in wind and solar. There's good wind and solar companies out there. We don't have proprietary technology or experience that would be better than what others can do. So that's a space we haven't really invested in. We use it in our own business, so we'll integrate it into our operations. But we're really looking at and investing in technologies that can help shipping, aviation, mining, agriculture, heavy duty transportation, industry reduce their emissions, which are some of the hardest sectors to electrify.

LT: Why is fusion viewed as the holy grail and how do you see it?

MW: For anybody who's studied physics in high school or in college, I think most of us fell in love with fusion. I certainly did when I was young. It's what powers the sun and the stars. There are no emissions associated with fusion. It's virtually limitless in terms of supply because you essentially can use the most abundant element on earth, hydrogen, to power a fusion reactor. Hydrogen is abundant in the water. But it's hard. You've got to get to really high temperatures. You've got to be able to contain these temperatures. You've got to safely sustain a fusion reaction. And so it has been the holy grail. We've invested in fusion technology.

MW: In fact, I recently visited one of the companies that we've invested in. It's made a lot of progress. They've been working on this for 25 years. They're on their fifth generation of a fusion reactor. They can contain a reaction with pretty conventional metallurgy and equipment at 70 million degrees, which is a mind-numbing number. Their sixth generation reactor, which they're working on today and expect to have running by the end of the decade, would be able to contain a reaction at 100 million degrees centigrade, which is where you really could have a fusion reaction sustain. It's very difficult, from a science and engineering standpoint, and there's a stigma attached to nuclear that needs to be overcome. But any serious discussion about climate needs to acknowledge that nuclear, both fission and fusion, should be considered as part of the solution set.

LT: Can you tell us more about Chevron's venture investing strategy?

MW: For more than 20 years, we've had a venture fund within the company, a venture firm. We've had several funds. We look at it as an on-ramp for external innovation into our company. Large organizations do research and development, but they may not be as innovative as a lot of the smaller startups out there. And so we, as I said, 20 years ago, began investing in small companies, smart people that have brilliant ideas that oftentimes need a partner to not only invest money but to bring expertise, to offer opportunities, to pilot technologies. And so we've seen a lot of progress. And not every company works, but many of them have.

MW: We've brought technologies into our company that have changed our traditional business. For the last several years, we've been focused on these new energy technologies that we've been talking about. We've committed nearly half a billion dollars in venture investment, which goes out typically in relatively small amounts. There's a lot of companies that we've invested in: Technologies in industrial decarbonization, emerging mobility like autonomous driving, circular carbon economy. So everything from fusion, which we just talked about, to more efficient motors, to different types of battery and storage technologies, hoping to find ways to capture innovation, find ways to scale it and bring new solutions into the solution set.

LT: That sounds very exciting.

MW: It's one of the most popular places to work within the company. We've got brilliant people who love working there. Every year, I go down there and go through a pitch day where they pitch me as if I were an investor in some of the companies that they've invested in, and I'm convinced that part of this is where some of these solutions are actually going to come from.

LT: These technologies sound so exciting. Are there any others that you can talk about? Any other investments that you are making from this venture arm?

MW: Yeah, I'll give you a couple examples. One in carbon capture and storage where we've

invested in two companies, one called Svante and another one called Carbon Clean that have different approaches to capturing CO2 emissions off of industrial sources. So think of power plants or fertilizer plants or petrochemicals, and they've got CO2 emissions. If we can capture those so they don't go into the air, we can continue to have economic power generation from a variety of fuels and eliminate the CO2 footprint. So Svante and Carbon Clean have different technology approaches. They work on different CO2 concentrations in the stacks, the emissions from these industries. And we've invested at both a venture round of funding in these companies, so think single digit millions of dollars. But then also at the growth scale where the investment pilots have been successful and we're looking at the companies now scaling up and becoming commercial, where our investments may get into the tens or hundreds of millions of dollars and bring in a broader set of investors and beginning to move into the marketplace. So some really exciting things in carbon capture, which is the most expensive part of the carbon capture and storage equation.

MW: The other one is geothermal, where traditional geothermal is taking water down into the earth to areas where we've got very hot rocks. Think of places like Yellowstone where you've got geysers and the like. Indonesia, Philippines, Thailand have some of this. But there's other technologies to try to get a lower temperature, geothermal technologies that could allow you to do this on a more geographically broad basis. So we've invested not only in technology companies that have got interesting technology approaches, but also a Swedish-based private investment company that has novel financing and project scaling concepts that they're working on. And so it's about putting the whole ecosystem together of technology, capital, sighting, and investments to bring some of these things into the market. Those are a few of the things that I'm excited about.

LT: Those sound amazing. Mike. Before I ask you for the three takeaways you'd like to leave the audience with today, is there anything you'd like to mention that you haven't already touched upon? What should I have asked you that I have not?

MW: Well, the one thing that I would just emphasize is a lot of people would like to move to what I'll call Energy System 2.0, this new energy system that has all of these lower carbon technologies at its core. And the world today, as we talked earlier, runs 80% on oil, gas and coal. This new energy system is maybe 1% or 2% or 3% built. And the risk of shutting down what runs the world today is great if we don't have the new system built. And so there's a lot of discussions I get involved in where people say, "You should just stop producing your traditional energies." You know, the risks of that are what we've seen happened in Europe. If you shut off the system that powers the world today before these new systems are well established and can take the load, they're reliable, they're affordable, you can create chaos, economic chaos, you create supply security concerns.

MW: And so it's managing this transition. I use the word "orderly transition" in a way that doesn't have a lot of negative impacts in terms of price spikes for economies, doesn't have supply risks and other geopolitical ramifications. And that's going to take time. And it's going to mean we're going to be building kind of the second system while we're still running the first system, and you can't just turn one off before the second one's ready. And I think there's an overly simplistic kind of a mental model that I often encounter that people say, "But I've seen wind and solar. Why can't you just shut everything else off?" Well, the scale is oftentimes what people really miss in that equation.

LT: Mike, what are the three takeaways you'd like to leave the audience with today?

MW: First of all, the future of energy is lower carbon, and Chevron intends to lead in that future. That's both in lowering the carbon intensity of our oil and natural gas that the world uses today, and in building these new energy products and solutions for tomorrow. Second takeaway, we need a more balanced conversation about energy. If we're going to make progress toward a lower carbon future, we've got to move away from either/or and a polarized conversation towards one that's more pragmatic and recognizes these challenges of scale, many solutions, and speed. And then the third one is the future is exciting. I've been in this industry for more than 40 years and I've never seen a richer set of opportunities, a more exciting set of challenges, more technology that is evolving to meet these solutions. We're at the center of one of the world's greatest challenges, meeting the energy needs of a growing world and doing it in a lower carbon way. I'm an optimist and I'm excited about the future. I wish I were just beginning my career and coming into this industry today because I think the future is really bright.

LT: Mike, thank you. This has been wonderful. And thank you for all of your work in providing energy and security and creating new opportunities in green energy for the future.

MW: It's been a pleasure to talk to you today. Thank you.

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