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## The Future of Energy | Episode 3

Daniel Yergin, Vice Chairman of S&P Global and Author of *The New Map*

We continue *The Future of Energy* this week by welcoming Pulitzer Prize winning author Daniel Yergin back into the SmarterMarkets™ studio. Daniel is Vice Chairman of S&P Global and author of the bestselling book *The New Map: Energy, Climate, and the Clash of Nations*, as well as the Pulitzer Prize winning book, *The Prize: The Epic Quest for Oil, Money & Power*.

SmarterMarkets™ host David Greely sits down with Daniel to discuss his recent report [The Return of Energy Security](#) – and how energy is reshaping geopolitics and the new map of the future of energy.

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**Daniel Yergin** (00s):

Let's take shale oil. The US went from importing 60% of its oil to being energy independent because of shale. So I was looking at the numbers the US was spending, let me go back to 2008, something like \$400 billion a year on its import bill. Now that bill is down 99% and the same thing with LNG. I mean, this is accruing a lot of economic benefits to the United States that run through the economic system, which kind of just gets left out of the discussion.

**Announcer** (33s):

Welcome to SmarterMarkets, a weekly podcast featuring the icons and entrepreneurs of technology, commodities, and finance ranting on the inadequacies of our systems and riffing on ideas for how to solve them. Together we examine the questions: are we facing a crisis of information or a crisis of trust, and will building Smarter Markets be the antidote?

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**David Greely** (01m 17s):

Welcome back to The Future of Energy on SmarterMarkets. I'm Dave Greely, Chief Economist at Abaxx Technologies. Our guest today is Daniel Yergin, Vice Chairman of S&P Global and author of the bestselling book, *The New Map: Energy, Climate, and The Clash of Nations*, as well as the Pulitzer Prize winning book, *The Prize*. We will be discussing the return of energy security and how energy is reshaping geopolitics and the new map of the future of energy. Hello Dan. Welcome back to SmarterMarkets.

**Daniel Yergin** (01m 49s):

Well, thank you David. I am glad to be on and it's a good topic, the future of energy.

**David Greely** (01m 54s):

Yeah, it's so good to have you back and to have you back for this series. I can't think of anyone with whom I would rather talk about the future of energy and I know a little earlier this year you published a report that you called the Return of Energy Security, in which you argued that the pendulum had swung from a focus on climate and decarbonizing our energy system to a focus on energy security, making sure energy was affordable and reliable and I am curious how you see this dynamic playing out over time. Do you think the pendulum will continue to swing back and forth between these two competing concerns?

**Daniel Yergin** (02m 34s):

Well, I think what had happened is that climate just entirely took over the discussion and energy security kind of just left the room, you know, because and it was during COVID prices collapsed demand plummeted and so, you know, just people just took supply for granted but then came the Ukraine war and disruptions of markets and I think that's what is a prominent Japanese said. It was a real wake up call and actually it was even on the coming back before then because the Biden administration did its first release from the strategic petroleum reserve four months before the Russian invaded Ukraine and I think now you look at actions as well as rhetoric and you see that it is, you know, energy security is, is part of the equation and if you don't have that energy transition becomes more difficult and you get a political backlash by the way, as well as really economic problems. So I think, you know, leaders now really need to think about energy security as well in a way that they didn't for a few years.

**David Greely** (03m 34s):

In terms of where they are at now, do you see, do you feel like we are at kind of a good point in terms of balancing this discussion between security and decarbonizing or do you think we still need to make an adjustment one way or the other?

**Daniel Yergin** (03m 48s):

I think we have to, you know, prices go down and it's important not to forget it, but also energy security. If you are a developing country, energy security is something you live with every single day. I mean, it's remarkable to think that 3 billion people in the world today use less electricity annually than an average size American refrigerator. I mean, so there are different perspectives depending where you are, but if you look at policies that even Germany and others are doing you can see that energy security is now part of the equation, even if they don't give it the same rhetorical attention.

**David Greely** (04m 25s):

Can, can you give an example of that?

**Daniel Yergin** (04m 27s):

Well, Germany is committing \$17 billion to build natural gas fired electric generation quietly to balance out its renewables and that's so that they don't have disruptions in their electricity supply. I think that's an example I think we saw over the last few years, the Biden administration, even while criticizing the oil industry also saying to it, oh, by the way, could you produce more supplies. So we don't have shortages.

**David Greely** (04m 54s):

Yeah and I know the Biden administration received a lot of attention for the moratorium, so to speak, on LNG, export approvals, future approvals. How did you think about that episode? How did you put that in context?

**Daniel Yergin** (05m 07s):

Well, I think you know, I guess like everything, of course there's a political context to it. There's some of the parts of the environmental world are critical of LNG and the buildup of LNG. I think you have to look at it in overall context. The US went from nowhere in 2016 to being the world's largest exporter of LNG today. Europe, the coalition supporting Ukraine probably would have collapsed after Russia cut off the gas, were it not for LNG, 40% of which came from liquified natural gas came from the United States. So, and we have, we are gonna add a lot of capacity, but still it adds a lot of uncertainty. You know, at our, our CWE conference this year, the energy secretary Jennifer Granholm said by, you know, March of next year it will be in the rear view mirror and I think there's, you know, uncertainty whether this pause is a pause or it's the preamble to a longer term cap on growth certainly caused a lot of uncertainty in people who are making billion dollar type financial commitments and very upsetting to the Europeans and deeply worrying to the Japanese who depend on LNG as their base load for electric generation and see the growth of US shale and the LNG that results from that as part of their energy security.

**Daniel Yergin** (06m 39s):

So you know, when the Prime Minister of Japan was here in Washington month or two ago, certainly the Japanese were expressing a lot of concern about this. So I don't think we will know until after if I could pick a date. November 5<sup>th</sup>.

**David Greely** (06m 54s):

Interesting date. Yeah, I know when that, when the pause occurred, it made me think back to the last time you were on the podcast with us and you were talking about how permitting is such a challenge. Permitting is such a, an obstacle to getting the investment we need to make sure that energy supplies stay secure. And I'm curious, you know, how much of this is simple effects of bureaucracy or how much is a strategy that, you know, people are who don't want to see more oil and gas develop, more oil and gas used are using the permitting process as a way to keep that from happening?

**Daniel Yergin** (07m 31s):

Well, I think permitting is a endemic problem across the energy spectrum from natural gas pipelines to transmission lines. We are seeing now more opposition local opposition to wind deployment. So every aspect of building anything is a challenge. Certainly, you know, there is concern about minerals that you need for the energy transition. Can you get a mine permit in the United States. So some of it is just bureaucracy is the, you know, is a machinery of government and that you might have five or six different government agencies involved. The other part of it is, of course it is a strategy of opponents of projects to do it and to go through the permitting

challenges one after another and then on top of that, the judicial challenges that follow the granting of a permit. So, you know, it's a endemic feature of our political system that this occurs. There is an effort in the revising the National Environmental Protection Act that goes back to 1970, I believe is a year which would facilitate renewable development according to the administration, but would actually might make it even tougher for conventional energy projects and yet you look at electricity demand, you're gonna have to about build a lot of things that aren't in place now.

**David Greely** (08m 53s):

Right and I wanted to go back for a second because you mentioned earlier in the conversation that part of that pendulum swinging to like an almost exclusive focus on decarbonization and climate at the expense of security was around the COVID pandemic period, loss of demand and plentiful supply. And then in the report you put out earlier this year, you noted that at the end of this year, at the end of 2024, demand for oil will be 3 million barrels a day higher than before the pandemic in 2019. So I am curious how much of a head fake was the COVID pandemic loss of demand and what are your thoughts on when or if we'll reach peak oil demand?

**Daniel Yergin** (09m 38s):

Well, you know, I would say, you know, plus or minus 3 million barrels a day demand is a little weaker now because of the persistence of high interest rates and that the recovery in China's not been as strong as has had been anticipated. That said, it certainly will be, you know, those few million barrels stay higher. I think COVID, you know, the social effects linger. I mean just look at work patterns, how life has been transformed by, by Zoom, you know, I think we will see the delayed reaction in terms of commercial real estate as renewals of leases and so forth come, come due and everybody's, you know, business is generally reducing their footprint. So I think there are a number of different impacts and certainly I think it led to, to use your term ahead, fake, just saying, oh the energy problems are over and we just have a straight line from here to there and your question about peak oil, that's been such a persistent question. I still think when you look at growth in the developing world, when you look at another 2 billion people by 2050, you know, I think it's a reasonable expectation that oil demand continues to increase until the early 2030s. But it doesn't by the way collapse. It just goes, starts to get on a declining plateau. Obviously a lot depends upon the speed at which electric vehicles come in the one side, but economic growth on the other, particularly in the developing world.

**David Greely** (11m 05s):

Yeah. And with the developing world, I feel like people are, are beginning to put a little bit more attention to the importance of demand and energy security for people in the developing world as we think about what an energy transition might look like and you have certainly been one to, to highlight this and shine a light on it and I am curious, you know, in your conversations, where do you think we are in terms of policy makers and others and do we need to get the energy security of the developing world closer to the top of the list during any discussion of an energy transition?

**Daniel Yergin** (11m 42s):

Well, I think that's the reality. I mean, one of the things I talk about in the new map is this, this emergence of a new north south divide where there are different priorities in a developing country than a developed country. Germany has a per capita income of \$60,000 a year, depending how you measure it. Senegal, 4,000. In Senegal they think about energy differently. For them it's still women gathering wood and indoor air pollution. So it is a different agenda. We did an since I have been with you last, we did a conference called Energy Asia and Kuala Lumpur and it was just striking for me to listen to perspectives from Asians from developing countries that are not what you would hear in Western Europe in an energy climate discussion and it was about the importance of energy for economic growth.

**David Greely** (12m 35s):

Was there any of those things that were said that has really stuck with you that you could share with us?

**Daniel Yergin** (12m 40s):

Well I think that one is actually another circumstance where I was chairing a session of African energy ministers and the minister from Senegal was saying they need to build a natural gas pipeline so women stop gathering wood for job creation and to reduce indoor air pollution, which is, you know, is quite deadly and she said the European banks because of rules in Europe, wouldn't finance them, wouldn't provide financing and she said, you know, not having that finance was like taking the ladder away and her words really stuck in my mind. She said, what do they expect us to do, jump or fly. How do we handle this and I think, you know, that really captured a lot for me that you know, just the perspective of developing country is very different than a rich country that relatively is pretty by relative, you know, has a well built up energy diverse energy infrastructure system.

**David Greely** (13m 43s):

Yeah. And energy security is a day-to-day reality for many people. Or the energy insecurity is a day-to-day reality for many people in the developing world. Yeah, I think for those of us in the US and Europe, probably the, the Russian invasion of Ukraine and the European energy crisis really put it back on the map. You know, it was interesting at that period, as you said, LNG offset half of Europe's shortfall in natural gas supplies during that crisis and half of that LNG came from the United States, which you know, as you said in 2016 wasn't even on the map in terms of exports.

**Daniel Yergin** (14m 16s):

Well, and just let me say that when people were developing the US LNG business, they assumed that Asia was the market. Now talk about impact of COVID because China was still shut down. Supplies that were supposedly gonna go to China could ease relatively easily, although at higher costs be diverted to Europe. In fact some Chinese companies which had contracted for us LNG then pivoted and sent that LNG to Europe and so, you know, if China had been going full throttle, what was a bad situation would've been even worse. But LNG was, you know, it was turned out to be a global market for gas.

**David Greely** (14m 57s):

Yeah. I wanted to ask you, you know, you mentioned your book The New Map and thinking about, you know, how Shale and US production now the US is one of the largest exporters of LNG.

**Daniel Yergin** (15m 09s):

Actually David right now the largest, although gutter intends to recover that crown. But right now the US is still unbelievably in the number one position.

**David Greely** (15m 19s):

And how has that changed the terms of global geopolitics and power with the US being so important in energy now?

**Daniel Yergin** (15m 29s):

Well that was one of the themes I really wanted to explore in the new map and I think the answer is that it has given the US a new element of influence in the world. I worked with Indias, I have been on this energy think tank for the Indian government and the ability to import oil and gas from the United States has been one significant part of an improved relationship between the US and India. I think the most important example actually is Europe, you know, Putin, he thought he could use the energy weapon in this case gas not oil. He thought Europe was so dependent that he could shut the valve and that Europe, that coalition would shatter under the economic pressure and turmoil that would come forward and I have a story in the new map about, now this is a decade ago called it in the old days when relations were not where they are today obviously.

**Daniel Yergin** (16m 26s):

And I was at this thing called the St. Petersburg International Economic Forum and Putin was on the stage with then Chancellor Merkel of Germany and they said to me, oh, why don't you ask the first question, you know, so I started to ask him the obvious question isn't your budget way overdependent on oil and gas revenues and I mentioned shale and he interrupted and started shouting at me and saying, shale is barbaric. It's terrible, it's awful. It will poison people and this is in front of 3000 people. So it was not a comfortable experience to be shouted at by Putin. But I would say that he was prescient. He saw that US shale and that shale gas in general would compete with gas from gas prom, his Russian giant company and that it would augment us influence in the world and I think the events a decade later with the invasion of Ukraine and the response of the global gas market led by the US demonstrated that Putin was right to see that shale threatened the hegemony of Russian gas in Europe and so I think that's the most traumatic example and it's an example we're living with today and that is crucial in this battle that continues to unfold.

**David Greely** (17m 39s):

And what role do you see natural gas and LNG playing in the future of our global energy system looking out on the longer horizon?

**Daniel Yergin** (17m 48s):

I think that one of the main things LNG will do is supplant coal in Southeast Asia and developing countries which actually will reduce emissions. So I think LNG is gonna be a growth business. I'm sure a country like Gutter was delighted to see the pause on I and g development to the United States because they are going gung-ho to build up their position and other suppliers are coming to the market. I saw just the other day CEO one of the companies, international companies said if the US isn't careful, it will lose the

competitive momentum that it has right now. Let's take shale oil. You know, the US went from importing 60% of its oil to being energy independent because of shale. So I was looking at the numbers the US was spending, let me go back to 2008, something like \$400 billion a year on its import bill. Now that bill is down 99% and the same thing with LNG. I mean this is accruing a lot of economic benefits to the United States that run through the economic system, which kind of just gets left out of the discussion.

**David Greely** (18m 53s):

Yeah, it certainly does. It seems to get left out of the discussion as long as people know that it's available when they need it and we don't pay attention to when it's not. I also wanted to get your thoughts. The energy transition to an electrified system powered by low carbon renewables like solar and wind is dependent on critical minerals and metals like copper, nickel, lithium and many of these are produced in a relatively small set of countries and processed in China and given your experience in the oil markets in the past decades, I am curious what lessons from the past should we learn for the future about the consequences of having, you know, our energy system depending on a small number of producers?

**Daniel Yergin** (19m 36s):

You know, it's very interesting because you talk about that three countries produce about 40% of the oil. US, Russia, Saudi Arabia, two countries produce 40% of copper, Chile and Peru and I think Peru has gone through about seven presidents in the last few years. So I think there is a precariousness particularly, you know, the energy transition, a lot of it is about electrification and coppers a metal of electrification. We looked at it, spent eight months on a study looking at it and concluded that in order to meet the kind of 2050 goals that are out there, copper has to double by 2035, David, it takes 20 years to develop a tier one mine. So there is a constraint there. And then you point to the second element of it, which is how much of that is concentrated through China, particularly not mining, but even more so in terms of processing.

**Daniel Yergin** (20m 30s):

We have a trade war with China now on everything from chips to EVs. The minerals are right on the edge of that, on solar panels and you know, barriers and so forth. So it is a precarious situation and you know, our governments and others have noted it, but there's not clear that there is much you can do about it. So you are trading one form of dependence for another form of dependence and you stand back and say are US Chinese relations gonna get better are they gonna get worse and I leave that question for your listeners to decide for themselves, but I think you can, you can read the tea leaves.

**David Greely** (21m 12s):

And I was also curious, you know, thinking about the same question from the perspective of the producers, as you said, there is a number of these countries, Indonesia comes to mind in addition to the ones you cited where they will produce, you know, 60 perhaps 70% of the nickel and to one extent this should be a massive boon to these countries. However, historically, you know, natural resource wealth has often led, as you alluded to, to political instability and it hasn't always worked out so well for the countries with the natural resource wealth. Are there any lessons that maybe some of these countries that are the big producers of the future should heed?

**Daniel Yergin** (21m 53s):

Well, I think first of all, diversification is very important. It's interesting, you know, subtly Indonesia has a very heavy leadership position on nickel. Suddenly people are looking at the Philippines, which has not been a place that people have focused on saying, well there is there, but you do have the relationship between governments and these resource countries and companies and there was an eminent economist named Ray Vernon who was Professor at Harvard, but he is also a great expert on commodities among other things. When he was at the Eminent chocolate company, he took the lead in developing the chocolate covered peanut. So he really studied commodity markets and he came up with this concept called the obsolescent bargain, which is, let's say David, your company and you invest \$6 billion to develop a new mine and you have a great time signing the documents, little flags on the table and a toast and everything.

**Daniel Yergin** (22m 47s):

And then three years later a populous government comes to power and lo and behold they say, well we don't like the deal you made, but you say this was greenfield, there was no history here. We took a great risk, we are willing to do it and they said, no, we want to change the terms and then you go into arbitration, you stop your investment and I think that's the threat that's out there. I mean right now something to really keep your eye on, you know, this effort to diversify supply chains, de-risk them. A lot of that is about building things in Mexico, but look at the outcome of the Mexican election. Is it gonna continue the very nationalistic policies that among other things ensure that there's not adequate electricity supply so there is never stability and so really part of the case has to be

diversification and it has to be on the part of the host country realizing that they're going to benefit much more from the investment from the GDP growth. You know, Panama just canceled a copper concession for reasons that just became a focus of opposition. And there are many theories about it. Some of them quite conspiratorial, but I forgot either that copper project was like 5% of the country's GDP. Oh good, you canceled it and you just lost 5% of your GDP and you've sent a message to investors, you know, think twice before you invest there.

**David Greely** (24m 11s):

And you know, earlier we mentioned your book, the New Map. I wanted to bring up another book that you are of course extremely well known for the prize which won a Pulitzer. And I wanted to ask you if oil was The Prize of the 20<sup>th</sup> century, what do you think the prize of the 21<sup>st</sup> century will be and what lengths should we expect countries and companies to go to win it?

**Daniel Yergin** (24m 34s):

First, let me say good news about The Prize turned out never had an audio book and by next December we are gonna have an audio book of it read by a very skilled narrator. So for those who haven't read the book there will be an audio book which you know, will, if you go, if you are listening while you are walking, will cover quite a lot of walks. People say something in the realm of AI chips, but more broadly than that, it's the tools of AI and the control, you know, oil, you can kind of visualize it, but it, this is a mastery of technology that's unfolding very quickly that can do a lot of good and can do a lot of harm and I think is going to where the struggles will be. It's interesting when you think about the Ukraine war, you know, the Spanish Civil War was like the beta testing for World War II for technology and tactics and you know, we're seeing the new face of warfare in Ukraine and it's a combination of traditional things like shells and artillery, but it's also AI and it's information war and cyber, it's much more complex.

**Daniel Yergin** (25m 42s):

But I think it's I'd say, I don't know if we'd say AI cyber, but in that realm and the power that comes with that.

**David Greely** (25m 49s):

That's a fascinating answer. Thinking about what is going to be the thing that dominate our life the way oil and energy did in the 20<sup>th</sup> century.

**Daniel Yergin** (25m 58s):

Yeah and yet you do come back to energy because, you know, the US electric power industry has been very accustomed to flat demand or very tiny growth and now it's suddenly all the expectations for growth and projections are shooting up partly because of EVs, partly because of smart manufacturing and reshoring of manufacturing and maybe most of all because of data centers and AI, suddenly the US is gonna have to worry about electricity supply and, and you know, making sure that you have the electricity to, to meet all of these needs and that will get you back to permitting and it'll get you back to all the environmental battles and everything. So even as we march into the brave new world of AI and data you still come back to make it all work, you still need energy.

**David Greely** (26m 48s):

Sure do and we talked a little bit about, you know, the extent to which energy is now shaping geopolitics and in a world where we are seeing more open conflicts occurring like the invasion of Ukraine by Russia, I wanted to ask you, to what extent are geopolitics in your mind shaping the future of energy and how do you see some of the policies that are often seen as kind of increasingly nationalistic like CBAM in Europe and the Inflation Reduction Act in the United States in that geopolitical context?

**Daniel Yergin** (27m 23s):

Well, I think it is, you know, more protectionist more nationalistic up until about 2019, people really didn't think about supply chains except people who kind of operate at them and it was all about efficiency. Now they have become strategic and, you know, reshoring United States manufacturing, CVAM, you know, to the Europeans it's a way to pursue climate policies and by the way, to also protect their manufacturing because they have paid for carbon in effect, but to developing countries, it's protectionism and it's imposition of Europe's values on the rest of the world. So, and but you look at US and China, we are still highly integrated, but it's getting more and more fraught and yet the countries, the two economies are so integrated that I think there is some in Washington who just think we can just sunder the links and then you have Secretary of Treasury Yellen who says, well, you can't really do that, but you have to in certain areas you have to be more protectionist and so forth.

**Daniel Yergin** (28m 28s):

But the IRA is amazing. When I was in Japan some months ago having dinner with some Japanese, they were sort of almost joking how the US sort of joking used to constantly criticize Japan for industrial policy and here we have called a new industrial policy or new industrial strategy, but it's industrial policy like on steroids and they are saying, well wait a second, you always told us not to do this, but this is, you know, it's partly driven by climate but it's also very much driven by the competition with China and so I think that's a really good example of your point about how geopolitics is shaping economic decision making.

**David Greely** (29m 07s):

And you talk with so many leaders and policy makers around the world. I am curious if you were to focus on the US and China, obviously there are competing interests, which are what they are, but do you ever get a sense that there is also some misunderstandings of each other's interests or each other's motivations that may get in the way of avenues for cooperation on some of these problems?

**Daniel Yergin** (29m 36s):

Yeah, I think the Chinese believe that we are trying to encircle them and we certainly see China, particularly South China Sea as well as Taiwan and that's why in the paperback of the new Map, I, that whole chapter called the Foregoes who haunt the South China Sea because if you say where could things really blow up I mean it's Taiwan, but could also happen in the South China Sea, which something like 30 a third of world commerce passes through it and China claims it as its own waters. You know, you look at history, you know, you look at World War I and World War II, world War I was almost an acts in some ways an accident and yet there was such momentum. You know, if the driver of Archduke Franz Ferdin hadn't made a wrong turn, there might not have been a First World War.

**Daniel Yergin** (30m 23s):

The assassination Archduke might not have happened. World War II was revanchism on the part of Germany, you know, kind of different origins but you have to look at that experience and say, people make mistakes, people misunderstand and sometimes, you know, I think one of the hardest things to do is to sort out intentions. What are the intentions and you know, the intentions in one part of the Chinese government may be different than the intentions in another part of the Chinese government but obviously the great geopolitical issue for the 21<sup>st</sup> century is the great power competition in the United States and China and how it plays out and that people don't make mistakes you know, I have been thinking about this a lot, a lot of history is just people making mistakes

**David Greely** (31m 14s):

And thinking about that you know, when we look at a lot of the, the big advances globally in terms of things like electric vehicle production, solar power installation, much of it is coming in China and I'm curious, you know, from your conversations and analysis, how do you think the, the Chinese are thinking about the future of energy?

**Daniel Yergin** (31m 38s):

Let's take EVs so world's largest automobile market and they developed a lot of it with partnerships with western companies but I think they came to the conclusion that they would never be able to compete globally with internal combustion engines because they were too late but, you know, too late baby, but not too late in terms of EVs and you know, the third largest EV market in the world is China export of EVs. So I think they saw that this is the way that they could dominate that market. Like they dominate 80% of solar panels. We talked about mineral processing and you see Europe and the United States now very concerned about what this will do both to their conventional automobile industries and also to their own EV you know, it's when the, again, secretary Yeller was in China, a lot of our conversation was about, you know, protecting against over capacity from China and protect our green supply chains. So, you know, China's a workshop has become the workshop of the world and they intend in these areas, they're very advanced. I mean, and they are half of the world's wind and solar is installed in China, even as they are also adding new coal fired plants. So, and I think both Europe, the EU and the US are saying, how do we deal with this onslaught and we saw, why don't we deal with it is putting a hundred percent tariffs on EVs from China.

**David Greely** (33m 08s):

Well, I wanted to thank you, Dan for spending time with us again this morning. I have got one more question for you though, and that is, I just wanted to ask you broadly, what else have you been thinking about the future of energy or, you know, to put it more bluntly, what questions should I have been asking you?

**Daniel Yergin** (33m 25s):

To me, a very interesting, it may sound a little wonky, but how are you gonna meet this electricity demand and how much of that is going to be met by natural gas and how much of it's gonna be met by batteries to manage the system and what kind of modifications will result from that. We are still at the early stages of that. Obviously the IRA is, as I say, is agnostic as the inflation reduction act, it molecules as well as electrons. How, you know, we don't know how carbon capture will fully develop as a, as a commercial business and so those are some of the questions that I am thinking about. And, and do think that the picture of the energy transition that kind of came outta the pandemic thinking during COVID really needs to be rethought. You know, reality I think means the energy transition is gonna be more complicated and take more time and it'll play out in different parts of the world. Going back to your questions and comments about the developing world, we will have a different perspective. So I think when we have our next conversation, we will have more data points to understand the energy transition is actually going to look like not what it looks like on a graph.

**David Greely** (34m 40s):

Well, I'll look forward to that next conversation and I'll look forward to getting the prize on audiobook. That's fantastic. Thanks so much for coming by, Dan.

**Daniel Yergin** (34m 49s):

Thank you.

**David Greely** (34m 53s):

Thanks again to Daniel Yergin, Vice Chairman of S&P Global and author of the bestselling book, *The New Map: Energy, Climate, and The Clash of Nations*, as well as the Pulitzer Prize winning book, *The Prize*. We hope you enjoyed the episode. We will be back next week with another episode of The Future of Energy. We hope you will join us.

**Announcer** (35m 15s):

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