

RICHARD: The world is facing increasingly urgent calls to cut carbon emissions and limit climate change, but at the same time, the global need for energy keeps on growing. So how can these two trends be reconciled. What are the prospects for low carbon energy at a time of soaring gas prices and supply chain disruptions? This is Let's Find Common Ground. I'm Richard Davies.

ASHLEY: And I'm Ashley Milne-Tyte. Our guest is Pulitzer Prize-winning author and energy expert, Daniel Yergin. His most recent book is *The New Map: Energy, Climate, and the Clash of Nations*. He's Vice Chairman of IHS Markit, one of the world's largest research and information companies and Founder of Cambridge Energy Research Associates.

RICHARD: In this episode, we discuss the prospects for finding common ground and the need for energy innovation similar to what happened with the shale revolution that hugely increased the production of U.S. oil and natural gas through fracking and horizontal drilling.

ASHLEY: We also learn why the energy transition is so complicated and the degree to which the world still depends on oil and natural gas. Richard, you get the first question.

RICHARD: Dan, thank you very much for joining us and talking to us about the findings in your book, *The New Map: Energy, Climate, and Clash of Nations*. Let me start by asking you this. The world is enormously dependent on energy production. Are the demands for power, especially electricity, likely to keep on rising in the decades to come?

DANIEL: Yes. Everything is likely to continue rising. It will rise because population increases. It will rise because incomes increase, and it will rise because the world is getting more electrified. And it isn't just electricity, by any means. It's also oil demand will probably rise for at least another decade or so, natural gas demand for longer than that because energy is so tied into economic growth and development and rising populations.

ASHLEY: There's probably greater concern about climate change and carbon emissions now than there's ever been, but can we successfully transition to a net-zero future, or is that a bit of a tall order, at least in the short term?

DANIEL: I think tall order's not a bad term, particularly in the short term. I think there are ideas out there about what you can do in the next eight years that some think actually would be quite disruptive to the economy and would lead to a political backlash that... one thing to aim at 2050, another to aim at 2030. So the question is what's really changed that the targets, the goalpost is being moved? We have an \$86-trillion economy that rests on a very significant energy foundation, 80% of it hydrocarbon. The notion that you just turn that over in eight or nine years is a very big challenge.

RICHARD: You just said that we still get 80% of our global supply of energy from hydrocarbons, things like oil and gas and coal, yet there is now more talk about phasing out fossil fuels. How long is this all going to take?

DANIEL: I think that the only way we get to the targets in 2050 is two things. One is a significant carbon capture because we're going to still be using a lot of oil and natural gas. Two, technologies. Even the National Energy Agency has said half the technologies that are needed aren't in operation yet, and technologies don't come overnight.

ASHLEY: Oil is not just used for transportation, for getting us around, is it? It is used in so many aspects of modern life that a lot of people don't even think about.

DANIEL: Let's take COVID vaccines. The lipids that are part of the vaccine that gets into your body is an oil product. What keeps the vaccines cold so that they can be used is an oil product. You just go down the list. Tylenol is an oil product. Go into the hospital and have a stent put into your heart, the stent may not be plastic, but all the tools that are used are plastic. I was talking to a cardiac surgeon at Mass General Hospital, one of the great hospitals. He said he looks around the operating room, it's all plastic. Oh, by the way, do you want to take a flight on a 787 or an Airbus 350 or maybe a new fighter jet? The body is basically an oil product.

So it is everywhere. People just don't realize how much of it is part of life. The jacket that you love wearing in the outdoors that celebrates environmental values is at least 90% an oil product. So it is everywhere in ways that people just don't think about.

ASHLEY: That example Dan just gave of those outdoor jackets that are largely made from oil products, he's referring to the outerwear brand, The North Face. He has a story about them and a company that wanted to be their customer.

DANIEL: This is a story that really illustrates the complexities of the energy transition, and not taking a position on it, just telling the story tells you this is a more complex thing than one thought. So there's an oil service company, which means kind of technology oil industry that decides to order 400 North Face jackets with their logo on it as a present for their employees. Lo and behold, North Face says, "That's not possible. We won't do that." The question is why won't they do it? "Well, because it goes against our values."

I look up their values on their website. They will not allow their coats with their logos to be used by companies and industries that are in the tobacco business, the sex business including, it says, "gentleman's clubs," and pornography. Add to that, it turns out, the oil and gas industry. Okay. That's your values. You don't want to do it. You know who your customers

are and what you're appealing. The only thing is that at least 90% or more of the jacket is made from petrochemicals that come from the oil and gas industry.

RICHARD: These are the jackets made by North Face.

DANIEL: Yeah, the jackets that are made from North Face are made out of these materials. They're made in Vietnam, China, Indonesia, Bangladesh often in factories that use coal-generated electricity, not oil and gas, but they may be gas power generation, too. Then they're put into containers and sent on ships across the Pacific, which, by the way, are fueled with oil, and then they're delivered to consumers by trucks that use oil. And those consumers then use oil either to fly to Colorado to ski or drive to some mountains to walk around in their coats. So it just shows you that it's a pretty complex question to actually address these issues of energy transition.

RICHARD: In *The New Map*, your book about energy and the global challenges we're facing in our future, you discuss the shale revolution. Now, I'm old enough to remember very severe oil shortages in the 1970s when OPEC, the oil-producing cartel, kind of pulled the plug on oil production and threatened to hold the West at ransom. Much more recently, the shale revolution has transformed the U.S. economy and has also ended an era of shortage for oil. How crucial is that?

DANIEL: I think it's much more crucial than understood. You don't have to go back to the '70s, but if you count them, at least eight U.S. presidents since the 1970s said, "We need energy independence, and we're going to get there." That was a big joke, and people would make fun of it on late-night comedy shows because it obviously was never going to happen. As late as 2008, we were importing 60% of our oil. Now we're essentially self-sufficient, and now it's just taken for granted, as though it was always there and we could just move on from it.

But it's had a huge impact. It's had a huge impact on employment. It's had a huge impact in terms of energy security. You could have crises in the Middle East that would have sent prices flying up. It doesn't happen. It's our balance our payments that keeps \$300 or \$400 billion circulating in the United States instead of going overseas. It's also become very important in terms of foreign policy. It gives a whole new dimension of influence to the U.S. in the world. So it's a lot of different things, but it's funny that it happened so quickly. It transformed the world oil market. Now it's just almost ignored, the fact that the U.S. is the world's largest producer of oil and natural gas. If you'd told me that or anybody that, or I'd told you that in 2008, you'd say, "Not possible."

RICHARD: One way to summarize what you're saying so far is that we have a lot of misunderstandings about energy when we discuss the potential transition to a carbon-free economy. Correct?

DANIEL: Yeah, I think that's true. I think there's a... call it energy literacy, just kind of how it all works. But when the prices are down, people don't think about it much or people think about it more in terms of climate, but they don't think about this big, complex global system that keeps the world economy going, not that it won't change. It will change. Carbon emissions will come down. But it's a big thing to do it.

ASHLEY: Can we at least partly invent our way out of the climate crisis? Do you have examples from the recent past when new technology led to change?

DANIEL: Yes, yes. Let's take the lithium ion battery, invented in an Exxon laboratory in 1976, going back to those oil crises of the '70s that you mentioned, Richard, when the world was going to run out of oil. 1976, the battery is first invented. It wasn't until 2008 that the Tesla Roadster appeared on the road, and it's really... Think how long it took to get there.

Now, what was also interesting, things can speed up. One of my favorite stories in *The New Map* is the story of where Tesla came from. Tesla came from a lunch at a fish restaurant in Los Angeles in 2003 when a young technologist named JB Straubel meets this already-famous guy named Elon Musk and says to him, "I have a great idea for an electric airplane," and Musk waves him off, not interested. Then he says, "But what about taking all these little lithium ion batteries, stringing them together in a car?" And Musk says, "Oh, that's interesting. Let's do it."

Five years later, those first Teslas appear, but it was building upon decades of innovation in the battery to get there. So some things can come faster, but innovation... Wind and solar are very competitive now, growing really fast, but they're industries that are 50 years old, and the first 40 years, they were more or less struggling to get there. But I think technology will provide the answers.

ASHLEY: We're speaking with energy expert and author, Daniel Yergin. This is *Let's Find Common Ground*. I'm Ashley.

RICHARD: I'm Richard. As the end of the year approaches, we're asking for your help.

ASHLEY: If you believe finding common ground is important and want more of it to happen, consider making a charitable gift to support these podcasts and other bridge-building accomplishments of Common Ground Committee.

RICHARD: Please visit commongroundcommittee.org to make a donation today.

ASHLEY: Now back to our interview with Daniel Yergin.

RICHARD: So, Dan, I think I know the answer to this question, but I'm going to ask it, anyway, which is: will we be surprised in the future, even the near future, by the progress that results from innovation?

DANIEL: Yes. One of my mottos and one of the lessons I took away from *The New Map* is, "Be prepared to be surprised." The shale revolution was a surprise. I think what we can call the solar revolution, an incredibly dramatic drop in the cost of solar, is a surprise. So I think there will be other things that maybe we see on the horizon, maybe we don't. Right now, there's a lot of focus and excitement that wasn't there two years ago about hydrogen as a fuel, and suddenly you're starting to see money go into that. The new infrastructure bill that just has been signed into law has \$8 billion going into hydrogen research. We wouldn't have had that two years ago. But I think you do need... I mean, innovation, I've looked at this and studied it for a long time, sometimes it happens, it's steady progress. But sometimes it also just comes from people coming from left field with a different idea and sticking with it and surviving.

RICHARD: And yet there are some, maybe even many in the environmental movement who think we can solve our problems with solar and wind and maybe biomass. How unrealistic is that idea?

DANIEL: The one problem they have, big problem, is that they're intermittent. Even at this recent energy crisis in Europe, part of the reason... It was not only shortages of gas and, it turned out, coal, but also the wind didn't blow in the North Sea, and suddenly England had a lot less electricity than it thought. And in fact, it had to take a mothballed coal-fired electric power plant, even though it says it wants to banish coal, and it had to put it back in operation to keep the electricity going.

RICHARD: And some of that happened during the Glasgow Summit, right?

DANIEL: Yeah, just on the eve of the Glasgow Summit, right.

ASHLEY: One of the things that I've so often heard about, wind power and offshore wind, particularly, as well... I mean, the wind's always blowing, but clearly it's not always blowing strongly enough.

DANIEL: Well, that's exactly what happened in the North Sea. So, as you increase the scale of wind and solar, the issue of its intermittency, the sun not shining, the wind not blowing, becomes a more critical issue. So one of the other really active areas now for innovation is in

the area of storage, being able to store electricity for an extended period of time to deal with that. I think if you have a big breakthrough on storage, that would be very significant in terms of the overall energy balance.

RICHARD: The politics of climate change echo the deep divisions in our political system. What are the prospects? Given all of the nuance that surrounds this debate or should surround it, what are the prospects for finding common ground?

DANIEL: That goes to the heart of your mission, and this is a very contentious area. It's funny, some things that involve molecules and electrons becoming so signified with political passions, and I think that is a problem for finding a balance. You see it right now. It was strange, President Biden asking OPEC and OPEC Plus, as it's called, to increase production but not turning around and talking to the domestic U.S. oil industry about it. It shows you how divided we are.

ASHLEY: Sometimes the lack of common ground comes between we, in the richer countries, and everyone else. Activists in the richer countries can be pretty judgmental about what's going on but not necessarily think of the perspective of some of the poorer countries, and you've written about this extensively, who say, "Hang on a minute. We haven't really contributed very much here to global warming."

DANIEL: Ashley, I think you've really touched on what seemed to me one of the big coming issues in the whole global energy transition debate because I'm really struck by it that, what is it, the 15% or 18% of the people who live in the developed world are defining the agenda for the other 85% or 87% of people who live in the developing world, and they have different problems. So we can have people in Western Europe or North America saying, "Climate is the existential question." But if you live in a developing country, there are other existential questions called survival, called poverty, called ill health, called poor nutrition, called the two or three billion people who burn wood or waste for indoor cooking and indoor pollution from it.

So the developing world, I've found just in the dialogue with them, they have a different take on it, and sometimes I feel the developed world isn't really hearing what they're saying. India is the example that really jumps out at me because I'm the only non-Indian on the Energy Think Tank with the Indian government, and their message is, "We are going to go all-out on wind. We're going to go all-out on solar. We're going to make hydrogen a national mission. But by the way, we're also going to spend \$60 billion building a natural gas infrastructure because we have to reduce pollution in our cities. We have to back out coal. By the way, we need to use natural gas, propane products, get it to villagers so they don't cook with wood and waste."

So their message is, as the petroleum minister in India said, "We don't have an energy transition. We have energy transitions." I've now heard it very vividly from African countries, the same thing, and they're saying the fact that European banks won't lend them money to develop a natural gas system for the reasons we're just describing is a form of discrimination.

RICHARD: Critics or skeptics who are listening to you on this podcast may go, "He doesn't sound like he's taking climate change as seriously or urgently as we are. What's your view of the crisis of climate change?"

DANIEL: Well, I'm in the 2050 rather than the 2030 category. I think that you don't want to pursue it in such a way that, in fact, you create energy crises like has just been created in Asia and in Europe. If you do that, you're going to have a backlash that's going to make it more difficult to pursue climate policies. So I think of climate as something that unfolds over, as I say, maybe three decades, is often given as the dimension, not over one year. And you can't use one year's weather as proof one way or the other, but you've got to keep your eye on the longterm and say, "What are the real solutions here?" The real solutions are around technology.

ASHLEY: What about nuclear power? My childhood in the '80s, nuclear was definitely the bad guy. What role could it play in a low-carbon future?

DANIEL: Well, it does play a role right now. Almost 20% of U.S. electricity probably still comes from nuclear. It's the largest zero-carbon source of electricity we have, far larger than anything else right now. Some people are going all out. China is building plant after plant after plant. Germany has shut it down. Here, in the United States, what's happening is, one by one, they're getting shut down for regulatory reasons or because they can't compete with cheap natural gas for electric generation among other things. But the plants are expensive. So China and Russia are selling plants in the emerging markets, but I don't think you're going to get to huge scale from it, and certainly in the developed world, you're not adding to it.

So this becomes a question, again, of innovation, and right now there's a fair amount of attention to small nuclear reactors, a different way of building them, controlling the cost and dealing with safety. But also, I mention in *The New Map*, there's something like 60 companies and research groups in the United States alone who are working on next-generation, advanced nuclear reactors. So there are people who believe that there are pathways there, and they're raising money, by the way, to do it. But nuclear is something that's going to go through a long regulatory process to get accepted. But I think we're starting to see the emergence of these small nuclear reactors. Then the question is the market. Will there be the uptake for them, and where will that uptake be, and what will their cost be?

RICHARD: In your book, *The New Map*, you speak of innovation and have many examples of innovation by private companies. Are there things that the government can do or governments can do that private enterprise can't?

DANIEL: Absolutely. I headed, actually, way back in the Clinton administration, a task force for the Clinton administration on energy R&D. If you ask me where we should be spending money, that's where we should really be spending money, in that process from basic research to maybe out to demonstration projects. And you need long-term commitment. It was reassuring that, even in the Trump administration, the \$6 billion or so that the Department of Energy spends on R&D was not cut because of the strong congressional support for it.

That is your seed corn for the future. Scientists, researchers need to know that there's a career path, that there's sustained funding to do that and not try and say, "This is a winner, and that's not a winner," but to be able to go down different paths. So I say, if we wanted to do one thing that would really have an impact, it would be to step up the government spending on research and development.

RICHARD: Is there a way that we can frame this great debate over the future of energy that will bring some common ground between Left and Right, between perhaps even climate skeptics and those who think there's a climate emergency?

DANIEL: I guess I'm a believer in the power of ideas. A book I did that we haven't mentioned called *Commanding Heights* taught me about how ideas have so much to shape what happens in the world. If we were able to bring two sets of ideas together, climate literacy and energy literacy, together in a framework where you could see how they interact, that would be maybe the way you could find your way to common ground as opposed to the anger and emotion that is around these questions. So much of the discussion that I read on both sides is really framed emotionally with the issues you're trying to get at with common ground and sort of losing sight of the common ground on which they stand as they exchange their barbs and bolts of lightning.

I guess when I write a book like *The New Map*, what I'm really trying to do is provide a framework so people can have an informed discussion about these issues without, in a sense, taking sides in it but just, "Here's what it is. Here's how it works." One thing we know, in this subject as in many others, there's no monopoly on the truth, and maybe part of the way you get to the common ground is by recognizing that that monopoly doesn't exist.

ASHLEY: Global energy expert and author, Daniel Yergin. The paperback edition of his new book, *The New Map*, is out now. It has a new epilogue updating the first hardback edition.

RICHARD: You can find out more about his writing and research at danielyergin.com.

ASHLEY: Our podcast is Let's Find Common Ground from Common Ground Committee. I'm Ashley Milne-Tyte.

RICHARD: I'm Richard Davies. Thanks for listening.

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