What the Rise of the Electrostate Means for Petrostates… And Everyone Else

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Ariana Brocious: The Trump Administration announced this week that it would pay the French company TotalEnergies nearly a billion dollars to abandon construction of two wind farms off the east coast, and invest the money instead in oil and gas, focusing on Texas.

Austin Colón: Personally, I think it's outrageous. They're using American taxpayer money to pay a foreign company to stop work on projects that would have provided clean, renewable energy to more than a million homes.

Ariana Brocious: Instead, the Administration is doubling down on fuels we know are disrupting the climate and creating air pollution that literally kills millions of people every year.

Ariana Brocious: I'm Ariana Brocious.

Austin Colón: I'm Austin Colón.

Ariana Brocious: And this is Climate One.

Ariana Brocious: Hey Austin. We talk about our global dependence on fossil fuels all the time. I mean, it is the main driver of the climate crisis. But I just learned a kind of shocking figure: **70%** of the world's population lives in a country that imports most of its fossil fuels.

Austin Colón: Yeah!. That's a lot of people at the mercy of countries that control those commodities. Or as they're often called, "petrostates."

Ariana Brocious: Right. And obviously that dependence and power imbalance has really shaped geopolitics.

Austin Colón: Yeah. I mean, how many wars have been fought over oil? Can't even count.

Ariana Brocious: And that brings us to the current war with Iran. Even if oil isn't the main factor behind the U.S. and Israel's initial attacks, we're seeing in real time how disruptions to the global flow of energy can really hurt. The war has already caused global crude oil prices to spike by as much as 57%.

Austin Colón: Yikes. And I'm afraid there's more to come. The mere threat of Iranian attacks on tankers has throttled the shipment of oil and gas through the Strait of Hormuz – about 20 percent of the global supply moves through there..

Ariana Brocious: Plus there have been attacks by both sides on oil and gas infrastructure in the region. Refineries and export terminals take time to rebuild. So even if this war stops tomorrow, it may be a long time before we see prices come back down.

Austin Colón: In the U.S., gasoline prices are up about 80 cents a gallon, and diesel prices have risen even higher. Manufacturing, shipping and trucking all rely on diesel. And then there's fertilizer - much of which also comes from the Gulf region. So that means just about everything is about to get more expensive. To me, all of this underscores how much the global economy is tied up with fossil fuels, and the dangers of that dependency.

Ariana Brocious: Yeah. AND, there's another trend happening at the same time: electrification, particularly of transportation and power generation. As the world electrifies, the global geopolitical power balance is shifting. Already, countries like Spain are bragging about how their adoption of renewable energy like wind, solar and hydro is helping insulate their energy prices during this war. (Though analysts have mixed reviews on exactly how true that is.)

Austin Colón: This is super interesting. Petrostates are definitely not in their death throes yet. Electrons are not yet able to replace liquid fuels in every application, but it does seem like there's an opportunity here for a rebalancing of the world order. I mean, no one wants to be dependent on another country for most of its energy. So the question I have is this: can a country that's providing the world with cheap solar panels – and increasingly, cheap electric vehicles – use that industrial and economic dominance the way petrostates have?

Ariana Brocious: You're talking about China.

Austin Colón: I am. Some are calling it the first "electrostate." For something like 20 years, China has invested heavily in building the factories to make the components and products that are driving electrification worldwide. We're talking batteries, EVs, and solar panels –

Ariana Brocious: Yeah, the scale at which they're churning out these goods is driving down their prices pretty much everywhere outside the US. I just read that China is even providing solar panels to Cuba amid the US oil embargo there.

Austin Colón: Yeah, and while China is definitely ahead of the curve, it's not the only country working to diversify its energy supply. Today we're going to explore what the rise of the so-called "electrostate" means for traditional "petrostates" – and what that means for the rest of us.

Ariana Brocious: To better understand what defines a petrostate, our colleague Kousha Navidar spoke with Tatiana Mitrova. She's a fellow at the Center on Global Energy Policy at Columbia University, and former Head of Research in the Oil and Gas Department at the Russian Academy of Sciences.

Kousha Navidar: So there's this school of thought that as the world electrifies, fossil fuels will become kind of like less of a geopolitical weapon and there'll be a growing divide between these two types of countries and how they get their energy, the petrostate and, and, and the electro states. I wanna break this down for listeners. So let's start with just petrostate. Imagine you're at a dinner party, you're talking about your work, and somebody says, what's a petro state? What do you say?

Tatiana Mitrova: I will say that it's a country which builds its international leverage, its geopolitical power and influence based on hydrocarbons, on oil and gas.

Kousha Navidar: Okay, so hydrocarbons, we think oil, gas, kind of fossil fuels.

Tatiana Mitrova: Fossil fuels. Yeah.

Kousha Navidar: Okay. Okay.

Tatiana Mitrova: And, it's not just about extraction ability to produce oil and gas, but it's also the leverage related to the ability to trade those commodities, to organize financial flows, to organize physical flows, and to control choke points. Yeah, it sounds familiar these days.

Kousha Navidar: Oh yeah, it does. Yes. Yes. Like in the Strait of Hormuz.

Tatiana Mitrova: Exactly, so all the naval capabilities, but also having international oil exchanges and all the financial institutions that serve them, having the currencies. That are serving these transactions, and uh, having an ability to affect very quickly prices for these commodities. So in this respect, we can easily say that Iran, Russia. United States, Saudi Arabia are very clear examples of petro states. These industries, first of all, are important for their domestic economy, for their GDP, for their industrial performance.They are extremely important for their international geopolitical positioning. They are providing them with significant leverage. I mean, if you look at the size of Iranian economy these days, uh, it's negligible, but the leverage it has due to the control over the choke point, Strait of Hormuz is incredible. It can affect the global economy.

Kousha Navidar: Interesting. Yeah, so it's not just that a country gets lucky that the land it lives on has access to all of these natural resources. It's that they have the infrastructure, they have the currency, they have the leverage to actually turn that resource into control on the world stage. Is that similar to the logic behind what you would call a state that's an electro state like they own everything that it takes to make, I don't know, electricity?

Tatiana Mitrova: Uh, to a certain extent with the electro state, uh, it's the similar power. Yeah. So domestic economic growth and international geopolitical influence, which is built on manufacturing capacity to produce equipment to produce electrons. Yeah. So it's a more complicated supply chain. China is not directly exporting electricity, right? Nevertheless, most of the countries which are importing PV panels, windmills, batteries. All the grid equipment, not even mentioning all the critical minerals for this stuff. They feel dependent on China because, okay, you've imported a barrel of oil, you've consumed it. It's gone. That's it. Your dependence is over. If you imported, let's say battery storage equipment, which will operate for the next 20 years, it's much longer lasting dependency, because the technical standards, the very scheme of connection and not mentioning all the maintenance of this equipment and spare parts and further upgrade software, which all the modern equipment needs. It comes then from the electro state, which produced it.

Kousha Navidar: It is a geopolitical energy subscription service.

Tatiana Mitrova: Absolutely. Yeah.

Kousha Navidar: Interesting. That's interesting. Yeah. I never thought of it as like, oh, I'm signing up for Amazon Prime. Not to be glib about this –

Tatiana Mitrova: And then you forget to unsubscribe.

Kousha Navidar: Yeah, exactly. Yeah. And then suddenly whatever geopolitical messes happen. Um, so that is the electro state.

Tatiana Mitrova: And, um, I would say, how it is being implemented so far, uh, it's much more hidden and slow. While petro states usually act in quite a brutal and fast way, and the effect is visible immediately. You just close the trade and, uh, everyone, uh, is, uh, uh, absolutely shocked. with the electro states, it's much more softer, it's less visible. You don't even feel that you are dependent for a period of time.

Kousha Navidar: Right. It's like a subscription service. This is actually becoming a very helpful metaphor in my head.

Tatiana Mitrova: Yeah, yeah. But at the same time, we should keep in mind that electro states are slowly, slowly, already eating parts, uh, of the market from petro states. So this sudden change, which was acknowledged just recently that actually, uh, the, uh, growth of, uh, internal combustion engines fleet has dramatically slowed down. It was happening initially just in China. Uh, then several other countries also started to support EVs. Yeah, including the US European countries. It was popular. It was environmentally friendly. So many people started, uh, to buy a second car ev just to have it. Uh, but, uh, then at a certain point, uh, you look at the global car sales structure and you see that electric vehicles are becoming dominant and this is this slow invisible change. That actually affects a lot of the global oil demand.

Kousha Navidar: This brings up a very interesting aspect. Do you think electricity and clean tech supply chains realistically could be weaponized the way oil and gas have been?

Tatiana Mitrova: Not the way, the oil and gas. Yeah. These are two different mindsets. Yeah. And as I said, uh, oil and gas, it's something fast and furious. Yeah, it goes up to the point very quickly. the electro state mentality. It's much more coinciding actually with China's thinking. Yeah. The whole philosophy, you just sit on the bank of the reef and wait until the blood of your enemy will flow. You don't actually need to go into war, into the direct confrontation and battle. You just create these circumstances which are weakening in an invisible way, your counterparty. And then you take the opportunity when it appears.

Kousha Navidar: Wow. Okay. And on the consumer side, let's say that Europe electrifies and decentralizes its energy system, does that permanently reduce Russia's geopolitical leverage for all the reasons we've just been talking about.

Tatiana Mitrova: Yes, and it actually reduces leverage, of all petro states.

Kousha Navidar: So not just Russia.

Tatiana Mitrova: No, just Russia. It's also, uh, basically it's reducing the leverage of OPEC countries. It's reducing the leverage of the US as long as it is choosing to be petrostate rather than electro state. like four, five years, uh, back from now, it was not clear where the US is moving. The recent years, they have shown more of these petrostate, uh, mentality, rhetorics and action. I'm not sure that it's forever. It can be changed actually what China wasn't electro state like 20, 30 years ago.

Kousha Navidar: Right. And I wanna sum this up 'cause you're starting to answer my last question that this led me to, 'cause you mentioned, five, 10 years ago what the world was like, what the thinking was like. So five, 10 years from now, how do you see the global balance of power shifting as the world electrifies?

Tatiana Mitrova: I have to start with geopolitics, and unfortunately, yeah, it's not our fault. It just happened. Right now, the world is entering into the next stage of, uh, geopolitical turmoil. so, 80 years after the World War II, uh, quite comparatively peaceful and calm coexistence right now, we have much stronger regional tensions. It's a natural cycle. Yeah, again, it just happens. So we cannot stop it at the moment. But it means that geopolitical fragmentation and confrontation will be much stronger, and that means that all these different tools and different mindsets of petrostate and electorates will become very visible because they will have to clash. It doesn't mean necessarily that this is all going to military conflict. But, trade wars, different alliances against each other. tariffs, sanctions, I'm afraid it will be there. Which leads us to the design of the energy systems. Yeah. Because energy is serving economy, which lives in this geopolitical environment. So if you know that your counterparts might block supplies, might put sanctions on your imports or exports, or freeze your financial payments, what would you prefer to do with your critical infrastructure? With your energy supplies, which is absolutely critical for the survival of the modern civilization. You would prefer to make it as much autonomous as possible, even if it is more expensive. Yeah. But just to be on the safe side, which means that petrostates or will use a lot their own petroleum and gas reserves locally. importers, will try to expand their renewable generation and all the electrification in order to apply renewables not only in the power sector, but also you know, all the other demand sectors. But also you might think, okay, if there could be such types of disruption. I myself, as a household owner, I would prefer to have a solar rooftop with a battery storage and a small diesel generator just in case.

Kousha Navidar: Tatiana, thank you so much for joining us on Climate One.

Tatiana Mitrova: Thank you so much for great questions.

Music: In

Ariana Brocious: Coming up, how a reordering of the world's dominant energy powers will – or won’t – impact developing countries.

Vijay Vaitheeswaran: Having enough energy for new jobs, new factories is the priority for many countries. They're not thinking especially about climate change, although climate will affect them deeply. They're thinking about economic priorities and feeding these mouths and having enough jobs. They'll use energy from any source that they can get.

Ariana Brocious: That’s ahead when Climate One continues.

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Ariana Brocious: This is Climate One. I’m Ariana Brocious. Today we’re exploring the idea of the rising electrostate – as a counter to the longstanding dominance of petrostates, namely, countries that produce and export the fossil fuels that the rest of the global economy depends on. But our next guest says those two frames are kind of like comparing apples to oranges. Vijay Vaitheeswaran is global energy and climate innovation editor at The Economist.

Vijay Vaitheeswaran: So when people talk about electro states, I wonder what they mean. Because electricity is a fuel, petroleum is a fuel, but people mean something different. They sometimes takes on a totemic value. Something like the old Soviet Union, uh, versus, uh, the US in the, in the Cold War. and positing that there's, somehow, there's a, a battle between electro states and petro states. And I do worry that it oversimplifies the situation. Most countries indeed all are a mix of electricity and petroleum. That's one thing, right? There's no pure electro state. There's no purely electrical country. That's nor will there be a purely petroleum or a fossil fuel country. That's one problem. The second problem is that we're kind of conflating two different things. Electricity is a final fuel, meaning it's what comes to our, the walls in our houses, right? The great energy thinker, Amory Levins once pointed out that people don't care about energy. They care about cold beer, hot showers, right? Most people don't think about where their fuel comes from. And maybe that's how, how it should be. So electricity, the thing that magically comes outta the walls. It can be made by fossil fuels and it can also be made by renewables or nuclear. And so, uh, we can't conflate the end fuel with the primary fuel. And, uh, there's a third kind of thing that does trouble me that is, just electrifying doesn't guarantee a good end state, although I'm a big fan of electrification. It's very clearly the direction of travel that we're heading in. We're even in something like an electricity supercycle, from an investment thesis point of view. The way that the China Supercycle 30 years ago brought on a commodity boom and so on, it's pretty clear we're heading in this direction and I think good things will come from that. Broadly speaking, when we electrify the end use of energy, you make things much more efficient. Why is that? 'cause when you are stuck with using fossil fuels, you have to combust and combustion is very inefficient. It's a dirty, nasty, polluting process. It's bad for the local environment and it's also bad for climate change and it's, you lose maybe two thirds of the energy in an internal combustion engine when you burn it as gasoline, whereas electrical motors, we know, uh, an EV would be 80, 90% effective, , and efficient at the point of use. and so it's a more efficient way to use energy and transport in industry and in our homes. And so broadly speaking, this is a good trend, but people sometimes use it as a proxy to say, we can solve climate change through electrification and the electoral state is gonna lead the Green Revolution. They often point to, uh, China and I say, just be careful. China is leading on electrification. They've done a lot of it. They didn't do it because of climate change. They did it for energy security reasons for domestic, energy consumption reasons right now, uh, as the world is in the midst of the worst fossil fuel induced energy shock in the world. China is a little bit less vulnerable to that shock because it is an electro state or heading in that direction. But a lot of it is because it has coal. It's gonna use the coal to make the electricity right, to replace the LNG that doesn't come from the Middle East, that liquified natural gas. So it's not the climate narrative, it's an energy security narrative. And I've only told you about my beef with the electric state. I haven't talked about the petro state. We can spend another half an hour on that, but I won't.

Ariana Brocious: Well, we could, I wanna unpack some of what you said there. First this idea that this sort of dominance, hegemony, whatever you wanna call it, that has been exercised by petro states, if we wanna call them that like, Middle Eastern countries and the US to some extent. That's because it is sort of this on off flow that you can control and has immediate real ramifications, right, in the markets for pricing for supply. Whereas electricity, if you're creating electricity because you have solar panels or wind, that fuel's there. That fuel's, you know, I mean as reliable as it ever is. And so I'm wondering along those lines, how you compare the influence that China might gain through technology supply chains rather than the control of natural resources. So, you know, talking about solar panels, batteries, EVs, that they are producing at scale and very cost effectively.

Vijay Vaitheeswaran: It's true that China moved early and moved big on a number of areas of clean energy, right? Of course, the US invented solar panels. Europe subsidized them to become more viable. But ultimately it was Chinese technological prowess, economic scale, state capitalism, and the willingness to subsidize, at scale. Uh, the reason they dominate the processing of almost all

critical minerals in part is because they're willing to accept that nasty environmental pollution that came with it, and the cost to humans that work in those areas, but also because they can agglomerate capital at a very large scale, invest for the long haul with very low returns. They saw it as a strategic investment, uh, very clearly. They saw that as a potential for economic advantage, and they did that. Nothing stopped anybody else from doing that. Right. Um, and there's some small examples of Australia, uh, some countries in Latin America that could certainly expand into this area, but the western markets, capital markets, the way that Wall Street works on short-termism doesn't support this. So they took advantage of an opportunity, and that gives them power. And they've exercised that power pretty recently. When provoked through, you know, American tariffs, they responded with the economic leverage that they had. So that's true. I acknowledge, and obviously we have to, uh, understand that and there's a response. The US is building its own critical mineral stockpile and trying to respond with a western response. Here's the problem. You can't compare that to the OPEC embargo of oil, for example, which people like to point out as sort of a comparison point. Again, the elector state versus petrostate. Here's why. And it's very topical because some 50 years on from the original Arab embargo, which brought the global economy to its knees, we're now at a moment when there is clearly a, the biggest energy shock since then, maybe even bigger than that time the world is living through. When the oil gets cut off once our strategic stocks, which last about 90 days, according to the rules of the International Energy Agency, to become a member of the IEA, you need to keep something like 90 days worth of strategic stocks. Once those are depleted, our cars and buses grind to a halt. That is, the global economy literally stops. It'll be utter chaos if the Chinese or any other putative superpower of clean tech were to cut off the critical minerals or cut off the solar panels. Guess what? You got 20, 30, 40 years of solar panels in your house or in your country, and 'cause the fuel is free, nobody can block the sun. Nobody can block the wind. You know, your batteries will continue to store power for your grid for the next 20, 30, 40 years. And in that time, you can build your own very expensive solar panels and, and replace the Chinese input. So yes, there is an issue, it is a choke point, but you can't compare apples and apples here. Those are very different kinds of leverage in different kinds of power. There are security risks and we need to take appropriate steps: Stockpiling, domestication of supply chains, friendshoring. These are all good things to do. And there's a role for government in this, not just private sector, 'cause Wall Street won't pay for most of this, but we can do those things. That's very different than asking we're on earth did God put crunched up bones of dinosaurs? And guess what, it's four or five countries that have enough oil to last a hundred years. And that's about it. Uh, and so that's a very different kind of concentration risk than with clean tech.

Ariana Brocious: Yeah. And I'm, I appreciate you mentioning the critical minerals 'cause that is something, as you said, China has really invested in and taken on and is really, correct me if I'm wrong, , kind of the power in terms of controlling a lot of those supplies at present, the US is kind of trying to compete, but to my understanding, we are not.

Vijay Vaitheeswaran: So this is just a nascent effort. We're starting. We started a bit under Joe Biden, whose administration did recognize this risk, but it wasn't, they didn't get very far and it we're doing more enthusiastically, or at least with more noise about it under, uh, Donald Trump. We'll see how far it gets but this is not hopeless. Uh, Japan felt the ire of the Chinese critical minerals, embargo 15 years ago where they got into a political conflict, uh, with China and they were cut off from some Chinese exports. And so for 15 years, the Japanese government has engaged in a very serious, expensive, all of government effort with industry and they've had some significant success in reducing their dependence on Chinese critical minerals. Not a hundred percent, but you know, they've put a lot of resources into it. And among other things, it's not just about duplicating the low end, expensive and dirty kind of processing that China does, it's about innovation. And so the most recent data on patenting, for example, in this area and critical minerals shows Japan, now it's, uh, one of the top producers of new world-class patents in critical minerals. What does that mean?

Innovation can help us get around this processing problem. There's new materials, technologies using AI to discover new kinds of materials, substitution effects, so we can find our way around some of the older critical minerals or rare ts, uh, with some new technologies and better ways of doing things. Uh, and the US and Europe should get on that bandwagon.

Ariana Brocious: So I'm wondering about how other nations, setting aside the US and China for the moment, how this spread of cheap technology could enable countries in the global south, Africa, South Asia, Latin America to sort of skip over fossil fuels and really embrace electrification and, and thus, become much more energy secure in their own right.

Vijay Vaitheeswaran: When we look at this from the perspective of developing countries, and I do this quite a lot, um, and my job has been global for a long time at The Economist. I've been based overseas in multiple emerging markets, things look a little different than when you sit in Washington or Brussels or even in Beijing. The primary concern for many developing countries is energy poverty, energy access. I mean, we know this. 800 million people perhaps have not had their first connection to the grid, no light bulb in their home. Often it's women and girls in these countries that walk miles a day to get biomass or cow dung, or other really horrible forms of energy that burn in a very dirty way. Indoor pollution kills millions of people a year every year from this kind of access to bad energy. and energy for development is the other important idea that, you know, in, in, uh, with Africa and, and India achieving a demographic dividend as they call it, that is a young, hungry population ready for growth, having enough energy for new jobs, new factories is the priority for many countries. They're not thinking especially about climate change, although climate will affect them deeply. They're thinking about economic priorities and feeding these mouths and having enough jobs. They'll use energy from any source that they can get. They're concerned about importing expensive liquified natural gas, for example, from overseas LNG, because it’s an expensive form of energy. They'll use domestic coal if they can. India has a lot of coal, South Africa, Indonesia, Vietnam. So countries that have coal will use it. They're not particularly thinking about a green energy leapfrog because it pleases western environmentalists, right? That's not why they're doing stuff. Uh, even though they're vulnerable to climate change and they understand the problems of burning coal. They mostly blame America and Europe for having caused this problem. And you see, I've been to climate summits every year that the UN has held for many years, and we see this from speech after speech from developing country ministers. You created this problem, you go first. We'll come along later.

Ariana Brocious: They're not wrong.

Vijay Vaitheeswaran: Of course not. And so that's why, you know, and, and even China, the great electoral state has been held out by those who, you know, have a certain way of looking at the world. They are the world's leading consumer of coal. They're continuing to expand their coal output and their capacity to use coal. And so,we just take it with a little grain of salt, right? The picture is a little more complicated than people present. Having said this, I think the phenomenal benefit, the gift to the world, given by Chinese willingness to subsidize clean energy technologies these last 30 years, means that now it is cheaper to put up solar than to put up new coal anywhere in the world, and certainly cheaper than gas plants. and battery costs are falling even faster than the costs of solar did, which matters because of course solar is intermittent. You can sun only shines during the day, but if you can pair it with a battery, then you can get firm power 24 7 power over time. That's what we're gonna see. If you can pair it with wind with, again, China has brought down the cost dramatically because of market forces and bottom up cost effectiveness. We saw this in Pakistan a year and a half ago, where suddenly a fifth or more of the country's electricity capacity came from informal solar panels that people bought at the local corner store, the bodega, as it were, and with no permission given by the government. It wasn't the utilities, frankly, the official utilities which had coal were letting them down. They were power cuts all day. And so the people found an informal

Chinese solution and that's fantastic. So across the Sunbelt, this is what's happening. It's happening 'cause it's inexpensive. In Donald Trump's America where the government is anti-solar, officially as policy, anti batteries, anti wind. The official government agency, the Energy Information Administration predicts that 90% of new energy is gonna be zero carbon or low carbon in America, even under these hostile policies, with solar being the leading source of new generation installed in Donald Trump's America. Why? 'cause it's cheap. You go to Texas. Deep red, Texas pro-Trump, Texas batteries, solar are, are going gangbusters. And so I think that's fantastic. It's great for local pollution 'cause it saves lives today. It's terrific for dealing with climate change and the long haul, but that's not why it's being done. It's done because it's economic. And I think that's, again, a gift that Chinese are given the world. People around the world in developing countries are welcoming this, and, and they should. And those who are willing to accept Chinese cars, like BYDs, which are fantastic, much cheaper and much higher quality than those that America has produced so far. Um, they're seeing a great leapfrog to electrification. And we're seeing innovation on the back of that battery swapping out of India and Kenya, for example, for two and three wheelers. And so we're seeing innovation on the back of innovation coming from the developing world. So I do predict a leapfrog, but it's happening mainly for organic bottom up reasons, not because of enlightened government policy or climate change conferences.

Ariana Brocious: Mm-hmm. So given China's dominance in the clean tech manufacturing as you've just been describing, driven down prices dramatically for solar panels, EVs, and so on, how should we think about the trade off between. Affordable, competitive green tech and the threat, the sort of competitive threat, it poses to nations that have traditionally relied on fossil fuel exports to support their economies like the us, which is I think currently the biggest exporter of fossil fuels.

Vijay Vaitheeswaran: I don't shed a lot of tears for the Saudi Arabia's or indeed the United States of the world, which are able to weather a decline in fossil exports, if that, you know, if that should happen. There are 20 or more middle income and middle sized fossil exporting countries that are not as big as Saudi Arabia or the Emirates, not as big as the United States, and that are high cost producers. They're gonna get into trouble pretty soon. And so in the next 10 to 20 years, a bunch of national oil companies that don't have the capacity of a Saudi Aramco, which is extremely well run, very professional oil company in Saudi Arabia that has world-class technology. They're deploying AI, they're actually controlling their methane emissions. This is not what you have in many parts of Africa, Latin America, and Asia, where you have small countries, sometimes their institutions are not great. Sometimes they're corrupt. The local companies have not learned much in the last 30 years. They have let their foreign partners like Exxon or Chevron or Shell do the heavy lifting,

Ariana Brocious: Venezuela is a good example of this.

Vijay Vaitheeswaran: Exactly. In fact, you see they've gone in the wrong direction. They've really driven it into the ground through corruption and cronyism and so on. You know, 30 years ago, Venezuela's company PDVSA was considered the best run national company in the world. I mean, really phenomenal cadre. Most of those people have left. And so in these places you're gonna find debt crises, maybe on par with the Latin America debt crisis of the 1980s coming because they're petro dependent states. They're petrostates, but they're not sinister petrostates. The way that, again, uh, the simplified elector state versus petrostate dynamic calls it out. These aren't sinister countries. These are troubled countries, many hundreds of millions of people will be in a tragic state as the world weans itself off of oil in the coming decades. These countries cannot compete against Saudi oil, which. The old joke in Arabia is you stick a straw in the ground and the the oil comes out. The lifting costs are so low in, in the Gulf. Most other countries will not be able to compete and all those other countries that are so-called petrostates along the way will be victims. Collateral damage of this transition.

Ariana Brocious: Hmm. So there's a lot of hand wringing in the United States about the rise of China in many sectors. And we've seen a total 180 in federal industrial policy that we saw under Biden and now with the Trump administration in terms of meeting the moment and really embracing all of these different forms of renewable energy and investments. If you were advising the US government on industrial policy, how would you suggest they meet this challenge?

Vijay Vaitheeswaran: I don't think it makes sense to take on yesterday's technologies. You know, the great hockey player, Wayne Gretzky, explained his success by saying, I skate to where the puck is going to be. And so I don't think trying to take on China on solar panels, which is a utterly commoditized technology, makes much sense. Uh, the US can't compete on a commodity product where China has scale and market dominance. So when you say renewables, not those renewables, but maybe next generation perovskites as they're known, right. Much more high, high efficiency, more expensive, more complicated. Not yet commercial or again with fusion or with, hot rocks, geothermal, you know, there's a multiplicity of low carbon technologies. That might even provide clean firm renewables energy, something that, again, solar alone or wind alone cannot. There's the AI enabled control systems that manage all of this. There's the technologies for enhancing the grid, stuff like, uh, superconductors in, in wires and so on, that lets you expand how much energy goes through wires without building new rights of way or dealing with the NIMBY problem, the US is in the world lead on multiplicity of climate tech innovation, energy innovation. I would say we need to invest much more and figure out how to scale those up. So many of these companies die on a death by pilot. They can't get money for their second plant. And so , I could usefully see industrial policy or some public-private partnership coming in to help scale those up the way that the Chinese did with the solar, with the wind, with one after another, with EVs, uh, I wouldn't go as far as the Chinese, uh, by, uh, you know, downplaying the environmental harms or the labor abuses and so on that go there. But we could certainly do more on that. And that I think is where the US could contribute to the world. And I think frankly, the US is on that track. We could double down on that.

Ariana Brocious: Vijay Vaitheeswaran is Global Energy and Climate Innovation Editor at The Economist. Thank you so much for joining us on Climate One.

Vijay Vaitheeswaran: It's been a great pleasure.

Austin Colón: Coming up, how and why China has put so much effort into advancing renewable energy and clean tech:

Li Shou: They are building their economy based on this new power system, which is cleaner, more low carbon, and in many ways, you know, uh, at a lower cost.

Austin Colón: That’s up next, when Climate One continues.

Ariana Brocious: This is Climate One. I’m Ariana Brocious. Today, China’s factories make 80% of all the world’s solar panels. That staggering figure shows just one way the country has jumped to the front of the pack investing in clean energy and new technologies. China may appear to be the first “electrostate” – but the actual picture is more complex. I talked with Li Shou, director of the China Climate Hub at the Asia Society Policy Institute, about the country's path in the last twenty years.

Ariana Brocious: China just released its 15th five-year plan, which reinforces rapid expansion of clean energy with a target to double non-fossil energy over the next 10 years. But some have criticized the new emission reduction targets are not quite meeting the moment. What do you make of the plan?

Li Shou: Well, I think, this plan is of course, drafted in a very volatile geopolitical environment. I

think it reflects two desires from the Chinese government. The first one is in light of all the global volatilities, they want to play safe. There is a very strong emphasis in this plan, ensuring energy security. And of course, in the Chinese context, when you talk about energy security, you will inevitably need to rely on coal, which is, you know, a fossil fuel resource that China can supply itself. The second signal from the five-year plan is, uh, the Chinese government is going to double down on their clean tech sector. These sectors have really matured over the last 10 to 15 years, to the point that when you look at, for example, wind, solar, batteries, electric vehicles, China now really, uh, occupy a very large share of the global market. Solar, for example, China, single handedly produces 80%, uh, of the global solar panels. Um, so.

Ariana Brocious: I know that, but that's still such a huge number.

Li Shou: It is, it is. And the government basically decided over the next five years they're going to continue a large-scale integration of clean power sources in Chinese power grid.

Ariana Brocious: Right. Okay. So, so that's kind of the context we're in right now. Let's step back, maybe 15 to 20 years back. At that time, what was China's core energy problem? What vulnerability was the government trying to address?

Li Shou: Yeah, well, I mean the Chinese government back then were trying to address, uh, quite a few pressing challenges, number one, if we go back to the two thousands, this was a, a period of where China saw very rapid economic growth, and as a result of that, the government was trying to ensure sufficient energy supply. So that's their challenge number one, or challenge number two is China entered into the WTO in the early 2000s, but he was not satisfied to just, you know, make t-shirts for the rest of the world. The government wants to, uh, have the country climb gradually up the industrial chain. They want to be able to produce and manufacture higher value added goods. The third concern is toward the end of the 2000s, China encountered very, very significant domestic environmental problems. Mostly air pollution. You know, the “aircopalyps” that we saw in major Chinese cities, for example, in Beijing. And they're also trying while ensuring energy supply, trying to clean up their domestic environment.

Ariana Brocious: So China's trying to deal with a rapidly expanding economy, wanting to advance that economy, further develop it, get into some of these, uh, more advanced sectors simultaneously, they've got. Pressure at home because of very real environmental risks and threats that are coming in large part from their long dependence on coal.

Li Shou: Exactly. And, their answer, to addressing these three challenges all at the same time is to, uh, really put, uh, political support and resource into a set of new industries that could actually help the country upgrade its, uh, economy drive growth, but at the same time also clean up its domestic environment. And those actors. Are basically the ones that we, see now very much maturing and you know, globally competitive wind, and solar at the very beginning. But then over the years batteries and electric vehicles.

Ariana Brocious: Right, And I just think it is worth stressing. It's not just that there's government investment, a significant amount, but also just simply the scale that you're talking about allows for prices to come down over time. Right.

Li Shou: Yeah. And, and that all led to, you know, really astronomical numbers that we have sent in recent years. You know, last year China installed 370 gigawatt of wind and solar. The US. I think installed a bit more than 20 gigawatt. So we have, uh, we have almost 20 times difference during last year between the US and China. So China's really kinda way ahead in this game. It's in its own league. The scale there is just, you know, unlike anywhere else in the world. And that, I think, is the

reason that many analysts now call them an electrostate. They are building their economy based on this new power system, which is cleaner, more low carbon, and in many ways, at a lower cost.

Ariana Brocious: And we'll get into a bit more of the Petrostate/electro state conversation in just a few minutes. I'm curious though, as this was happening, in the last 20 years or so, how this transition has been framed by the government within China to the Chinese people?

Li Shou: Sure. Well, I mean, you know, at, at the very beginning, if we go back to the two thousands, you know, we, we still saw this very strongly held. view that embracing, renewable energy, uh, such as wind and solar, is not necessarily in line with the country's economic growth agenda, right? But, based the growth of the clean tech sector in China, really contributing to a very large share of China's GDP growth. last year, for example, the Clean tech sector contributed to about a third of China's GDP growth. So that's a very notable share. and I think that gave the Chinese policymakers confidence that, really, they can, reduce their emissions, clean up their domestic, uh, environment, will grow their economy at the same time.

Ariana Brocious: Yeah. There's this longstanding way of thinking that you cannot do both things. You cannot grow your economy while decarbonizing. And obviously China has proved that that is not the case, that you can do both and grow quickly and invest a lot. So despite this huge electrification push and the dominance in renewables. China's continuing to build coal plants. What's the logic there?

Li Shou: So coal is a source of fossil fuel that China can better supply domestically compared to oil and gas. I mean, we're now seeing how the situation in Iran, putting uncertainties. on China's global oil supply. but in contrast with that, China can largely supply its coal demand, just based on domestic resource. So that's why, politically coal has, has long been perceived as the safe option when it comes to energy security. And it has really played a very large role in China's economic reform and opening up, right, really providing the lion share of energy that the country so needed. Uh, but in more recent years, as China, uh, managed to integrate, uh, more and more wind and solar, uh, a lot of coal fire power plants were used to help the country regulate the fluctuating, power grid. to kind of provide that load management, for many energy analysts, is not sent as the smartest option, China can actually embrace other, market reforms to actually better balance their, grid. and hopefully that's what will happen. coal growth can be reduced and China doesn't need to build more coal fire power plants.

Ariana Brocious: Yeah, and I also understand that the country's building a lot of nuclear reactors, and so that's another form of carbon free, base load power that reliable, always on power that, um, a lot of utilities depend on to balance out the intermittent factors of solar and wind. Though of course, with the combination of batteries, they are increasingly reliable. So how would you, how would you say this shift toward electrification and renewables? How has reshaped China's political economy, like who are the winners and losers?

Li Shou: Well, China could reorganize its whole economic strategy, right, based on electricity. Uh, so just think about, you know, the EV sector. If you have a lot of power, supply in your system, and increasingly the power supply is becoming greener, it could actually enable you to deploy more electric vehicle at a lower cost, both for, you know, consumers, but also at a lower cost for the planet because we're, talking about more wind power from wind and solar. And, also abundant electricity supply could enable China's ambition, right? To embrace, high tech sector. you know, AI is a hugely energy demanding sector. And China, I think at this point in time, uh, is much better positioned to actually, uh, supply the power demand required by AI than the United States. So the general point is the more electrified you are as a country, as a economy. the better positioned you will be, to reorganize your economy, and to embrace more technologies.

Ariana Brocious: Mm-hmm. You mentioned that one reason China has used coal is because they have a lot of domestic supply and that makes it a very reliable and stable fuel source. China imports about 70% of its oil and there's been a lot of market instability as the US military action has taken place in Venezuela and Iran. I'm curious if you think electrification has materially reduced China's exposure to some of these fossil fuel price shocks.

Li Shou: Oh, absolutely. Absolutely. just looking at the transportation sector. Right. If China will continue to rely on traditional vehicles, then, China's reliance of imported oil will be even higher than it is now. By embracing electric vehicles and I should say electric vehicles now, is, uh, more than 50%, I think it's getting closer to 60%

Ariana Brocious: That's incredible.

Li Shou: of new vehicles sold. So, yeah, I mean, if you go to a big city, uh, in China these days, it's actually difficult to spot a traditional engine vehicle in China. Uh, so,this is also helping the country to move away from these red reliance on risky fossil fuel supply from overseas.

Ariana Brocious: So we've spent a fair amount of time talking about how much China has invested in many of these clean tech industries and how successful they've been in taking over market share. you know, China sells a lot of things. It's not just supplying its own market. Are there risks here of developing over capacity in the clean tech space?

Li Shou: Yeah. Well, it's a very interesting question, right? I mean, I think from a purely climate point of view, we all want abundant supply of low cost, clean tech products. I think at the end of the day, that will help the world decarbonize in a faster way. Kind of a counter argument is, if we consider, the need to actually, tackle, climate change, instead of over supply, maybe there's under demand, right? Maybe deployment is not fast enough. The bottom line of this is, it's very important to realize that the, Chinese industrial competitiveness, in particular in the CleanTech sector, is really a feature now of, the country's economic growth and economic strategy. The low cost solar panel from China, we're not gonna wish that away. They will continue to produce solar panel at a cost competitive rate. simply because they have a large domestic market. They now have integrated their supply chain so effectively. and, um, they're producing also at a large scale, which helps them to manage, cost. So their competitiveness is deeply rooted so then the real question for I think, the rest of the world is how do we react to that competitiveness, right, in our respective national interests? and I think there are actually ways to leverage that smartly so that, you know,cheap and good quality lower carbon solutions can benefit other countries. And there are also ways to ensure that, some of the concerns, for example, related to national security and so on, can be managed.

Ariana Brocious: You used the term, electro state, and that's sort of the focus of this episode is trying to dig into this idea of,if the 20th century was shaped by petro states, are we entering a new century shaped by electro states? And if so, is China serving as the prototype?

Li Shou: Well, I mean, I think China is already firmly on track to become, uh, an electoral state, right? powering its economic growth with electricity, and greener and greener electricity. And to actually use that to enable further economic growth. and this is really going to be a snowball rolling by itself. I also genuinely see that this is a direction, to go, really for the rest of the world. petro state sounds very much like a concept. from the last century. and I think, more and more countries will increasingly realize, which, concept actually represents, the direction of travel.

Ariana Brocious: Well, yeah, and I mean, we are seeing the US engage in international conflicts that at least have partly been tied to oil supply, and that's, that's not dead, at least in terms of this administration's view on things. but I hear you saying it's kind of the past and not the future. So in

that context, how do you think about China's role with other countries, the leverage it has over, you know, other countries in a geopolitical sense? the appeal it offers to other countries in a partnership sense.

Li Shou: Yeah, no, I mean, we are, uh, now still looking at the, the, the situation in Iran unfolding. Right? And a lot of countries are looking at that and they're worried about their oil and gas import. and, I'm sure many of them are, thinking and looking into alternative sources of energy. maybe not in the immediate term, but, you know, as, as part of their, you know, medium to long-term planning. And I think, renewable energy in general will, become more appealing. as a result of the crisis now, in Iran, and of course, you know, China, is really the most competitive provider of renewable energy, products to the rest of the world. So, the stronger desire to ensure energy security will indeed also, empower China geopolitically,

Ariana Brocious: Yeah. When we spoke before, you mentioned the example of Brazil, which has really worked to not just allow Chinese EVs for sale, but actually try to recruit those companies to do the manufacturing in Brazil. Can you speak a bit about that and how it kind of exemplifies what you're talking about?

Li Shou: Yeah, I think Brazil is a very interesting example, right, in terms of how they have reacted to Chinese Cleantech, competitiveness, Chinese products and investment. The Brazilian government realized that in addition to just be a consumer of Chinese, export, they also want China to come to Brazil to invest in the country and to help them strengthen their industrial competitiveness. And that's exactly what they did. They put in some tariffs. Just to trigger that foreign indirect investment from China, and Chinese ev makers like BYD, indeed followed that direction. BYD ironically actually took over a old Ford factory in Brazil and converted that into a EV plant. And by doing all of this, I think Brazil will be able to benefit from some of the Chinese industrial know how. and It will also benefit the consumers there. I was in Brazil last year, and what I can tell you is, I saw really auto brands from all over the world. German ones, American ones, Japanese, Korean, and of course also Chinese. Ev One thing that you realize, uh, if you kind of, you know, take a Uber there in Brazil is a lot of the cars you actually need to roll the window, up and down, by your hand. They still have this, you know, handlebar there, which, uh, reminded me of, you know, maybe the vehicles that I took in China 20 years ago. Why Because for a long time, all the other non-Chinese automakers, they do not see Brazil as a very exciting market. So they were, very comfortable just selling Brazil, really old style

Ariana Brocious: Hmm.

Li Shou: And by having Chinese EV brands, uh, the Brazilian authority actually were forcing other auto brands to actually work harder and provide better products to the Brazilian market.

Ariana Brocious: That's a really interesting story. So, the case of the US there's a widespread consensus that the US in this moment under the Trump administration is ceding a lot to China and other countries in terms of competitiveness, You gave a great example now about how Brazil has worked with China. What do you think are some smart ways that the US could work with China as an elector state to advance its own interests? Probably under a different administration.

Li Shou: Yeah. Well, I, I think, you know, policy consistency, is, uh, is very important, right? I mean, uh, in particular when, you're trying to, work out an industrial strategy. the Chinese experience show that, uh, you, you really need long-term planning and you need, commitment and dedication. You cannot afford to, swing from the left to the right overnight. That is not good news for market. That is not good news for you to cultivate a globally competitive industry. and, in terms of ensuring that policy consistency, one. Essential question that the US needs to answer is, do you need Chinese

inputs? and if yes, how do you ensure that you can benefit from Chinese industrial inputs who at the same time accommodate some of the other concerns or considerations such as national security and protecting domestic industry? It's going to be a hard balancing act, but I think the most important, thing that the US needs is to be very clear whether you need a Chinese inputs or not.

Ariana Brocious: So we've spent much of this interview talking about high level things, you know, economies, government, investments, markets, so forth. I just wanna take a second and ask what this transition has felt like for an average Chinese person. What does it feel like today, on the ground in Chinese cities and industries and households?

Li Shou: I'll tell you two things. One is, despite the fact that air pollution is still a problem in large part of China, if you go to a major Chinese city, Beijing, on Shanghai, you stand just, on the roadside. you begin to realize the, the roads are becoming much quieter and you don't, you don't smell fume out of, uh, the vehicles. And this is simply because of the, the very rapid transition to electric vehicles. The second thing, hypothetically, if you're an average Chinese, these days, you come to the US, you get on an Uber. Or you just kind of look at the cars, the vehicles here, you will start to realize that, uh, this is a bit like traveling back to history. The style of the cars here, the technologies, compared to the Chinese. Vehicles. I think there's at least a one generation gap there. And if we kind of fast forward this dynamic, this gap, uh, five years or 10 years, I think a lot of Chinese people, if they come here to the US they will start to feel like they're probably coming to maybe not Cuba, maybe not that extreme, but, this generational gap here in the US vis-a-vis what is happening in China.

Ariana Brocious: Yeah, we're gonna be left behind if we haven't already been.

Li Shou: There is still a chance to catch up, I think, but it requires, again, policy consistency. It requires, you know, a very dedicated effort to figure out what is indeed a very complex China question or China challenge.

Ariana Brocious: Li Shou is the director of the China Climate Hub at the Asia Society Policy Institute. Thank you so much for joining us on Climate one.

Li Shou: Thanks for having me.

Ariana Brocious: Hey everyone, it's Ariana and Austin. We've reached the end of our show, so it is time for climate one more thing, Austin, what have you brought to talk about?

Austin Colon: Well, Ariana, have you heard of the New York Times 50 States 50 Solutions Project?

Ariana Brocious: Yes, it is great and gives me a lot of hope. Lots of climate solutions in there.

Austin Colon: Right. So they basically picked out our climate solution for every state in the country. And on top of that, they also had thousands of responses that didn't make the cut for the series, and they published a few of those last week.

Ariana Brocious: Oh, cool.

Austin Colon: Right. And you know, some of them are small, some of 'em are more like system change things, but I think my favorite one is this small group of fly fishers who were concerned about having, you know, cold clean water. They constructed more than a hundred Beaver dam analogs to keep more water on the landscape.

Ariana Brocious: Oh my gosh. Uh, where was this?

Austin Colon: It was in South Dakota.

Ariana Brocious: Wow. Did they use their teeth?

Austin Colon: I don't think they used their teeth. The article didn't say, but I'm guessing they did not use their teeth.

Ariana Brocious: Well, that's a cool way to protect their local watershed. Make it more resilient against climate.

Austin Colon: Yeah. So Ariana, what do you got?

Ariana Brocious: Well, I have been fascinated by a story I read a couple weeks ago on the meteoric rise. It seems of balcony scale solar. It's a little solar panel you can plug in,

Austin Colon: right?

Ariana Brocious: And it helps contribute to lowering your electric bills, giving you that resiliency. But it's not at all, you know, as complex or expensive as doing rooftop solar. This has become super popular among people who wanna have a bit of their own. Energy production, but maybe they live in an apartment and they don't own their roof. Oh, and so far, 28 states have introduced bills that are allowing this, and so we'll have to see what happens there. There's only one state right now that currently does, and that's Utah. But it would be great if more states adopt this as a resilience and energy supply solution, especially as we're seeing just really high energy bills for so many reasons. And then of course, increasingly high gas bills on top of it.

Austin Colon: Yeah, and as a renter myself, I am very excited about this technology and I hope that New York approves it soon because I will be putting plug and solar panels. We don't have a balcony, but I could put them in our little backyard space and yeah, generate a little power. Why not?

Ariana Brocious: And that’s our show. Thanks for listening. You can see what our team is reading by subscribing to our newsletter – sign up at climate one dot org.

Austin Colon: Climate One is a production of the Commonwealth Club. Our team includes Greg Dalton, Brad Marshland, Jenny Park, Austin Colón, Megan Biscieglia, Kousha Navidar and Rachael Lacey. Our theme music is by George Young. I’m Ariana Brocious.