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The Texas fiasco and the global push for green energy
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DOLLAR: Hi, I'm David Dollar, host of the Brookings trade podcast, "Dollar and Sense." Today, my guest is Jeff Ball, a scholar at the Stanford Center for Energy Policy and a nonresident senior fellow here at Brookings in the Energy, Security, and Climate Initiative.

We are going to start by talking about the immediate energy news—the failure of the power grid in Texas—and then move on to larger issues of transforming the power system and carbon reduction. So welcome to the show, Jeff.

BALL: David, it's really nice to be here. Thanks for the invitation.

DOLLAR: So, let's start with the catastrophe in Texas. Why did the power system fail so spectacularly?

BALL: I guess, in two words, it failed spectacularly both because of Texas's policy and because of Mother Nature's cold. So, let's try to unpack that. There were some policy choices that Texas made over the years that were very different from choices that other jurisdictions made, and those choices set the stage for deep physical vulnerability that we saw play out in February in a really dangerous way for residents of one of the biggest states in this country.

Many years ago, Texas very intentionally set a policy designed to minimize the regulation of its electricity market. Ostensibly, that was to promote competition, and thereby to reduce prices that consumers pay for electricity. But it also must be said it was designed to maximize profits for energy producers. One result of that is that Texas, unlike other places, has what the energy geeks call an "energy only" market rather than what the energy geeks call a "capacity market." Here's what that means: In many other states and in many other countries, power producers are paid not just for selling electricity, but also for investing in extra power plant capacity that they can turn on in the event of a shortage; it's essentially an insurance policy. Texas intentionally decided to design its system not to do that, because doing that almost certainly would have added to costs. So, the result of that is that when the power went out in Texas, there was very little extra to call on.

There were two physical outgrowths of that policy decision that played out in really horrific fashion in Texas. One is that Texas's grid is physically cut off from other power grids to a much greater extent than is the case elsewhere in the United States and in most countries. It's not absolutely an island, but it's more an island than other grids are. What that meant when the cold snap happened in February is that Texas was less able to call on other places—to import power—than it might have been had it had a grid that had more connections.

The second, and really, I think, hugely consequential physical result of all this, is that Texas did not require energy producers in its state to winterize their facilities. It didn't require power plant operators to do that, and it didn't require the operators of natural gas production to do that. Several times in the past—I mean, everyone thinks of Texas as a really warm place, but it actually can get quite cold in the winter, and there have been a couple of cases in the past where it has gotten really frigid in Texas in the winter. And there have been similar things to what happened this February happening. There have been blackouts and freezing down of the natural gas infrastructure. There was a very famous example of this 10 years ago, almost literally 10 years ago in February 2011. There were a bunch of experts from the federal level who came in and basically told Texas, "you should force power plant and natural gas production operators to winterize their facilities." Well, Texas decided not to do that, and the chickens came home to roost this February.

DOLLAR: One of the eye-popping headlines that caught my attention was some poor household that got a 16,000-dollar power bill. How did that happen?

BALL: The free market, that's how that happened. I mean, as part of Texas's unabashedly, proudly, laissez faire approach to energy, the market goes where the market goes. Texas's system allows prices to go very, very high in times of high demand on the theory, as a free-market economist would endorse, that high prices mitigate themselves because they change demand and the prices come back down. So, that is a free-market economists dream. It's also a very expensive proposition for Texas energy consumers.

Now, there are, as we speak, hearings going on in Texas, in the legislature, where people are screaming and yelling and trying to blame people and figure out whom to blame. And I think it's fair to say that one question they are going to be asking is will people and companies that got bills like that indeed have to pay them or will there be some relief? But bottom line, this is a consequence of a very intentionally designed free market energy system.

DOLLAR: So, you mentioned that the Texas grid is somewhat isolated. By not being part of a larger system, Texas avoids federal regulation. Nearby states like Oklahoma and New Mexico had similar weather. Did they get better experiences? Does this help us understand the particularities of the Texas situation?

BALL: It does. And they didn't get better weather, they just withstood the weather better. What's so interesting, David, at least to my mind, is that it's not just states that border Texas that did better than Texas. It's actually edges of Texas that did better than the center of Texas. This gets into a little bit of electricity grid wonkery, but let's give it a shot. I think it's actually quite interesting.

We have been talking here about Texas having gotten walloped by the storm in February and Texas as a whole having lost a lot of electricity. In fact, it was a particular grid. It's called the ERCOT grid. ERCOT stands for the Electric Reliability Council of Texas. It is the power grid—the system of wires—that serve together about 90 percent of Texas. It's most of the state, but it's not all of the state, and specifically it's not the western edge of the state around El Paso and it's not the eastern edge of the state around Beaumont. If you look at who lost power in Texas, the people around El Paso and around Beaumont didn't lose power. They are on different energy grids than the ERCOT grid, just like the people in New Mexico and Oklahoma are on different grids.

So, again, what this shows is that this pattern of deregulation, this decision not to compel winterization, had discernible effects in a geographically constrained area where those decisions played out. Essentially right next door, even within the boundaries of the same state, the outcome was different because the policies were different, not because the weather was markedly different. So, it just goes to show how policy that sounds wonky and esoteric has incredibly important human impacts.

DOLLAR: Texas Governor Abbott was very quick to blame the whole problem on renewable energy—wind and solar. Can you tell us, what role did wind and solar play in this shutdown in the power grid or weakness in the power grid?

BALL: Renewables play pretty much the same role in this drama as every other source of electricity in Texas—including coal and including natural gas and even including nuclear—which is that much of their generation capacity froze. The context here is that, last year in Texas, renewables provided about one-quarter of all of the state's electricity. That's a pretty high proportion by U.S. standards. About 23 percent of Texas's electricity in 2020 came from wind, and about two percent came from solar. As it happens, Texas is one of the biggest producers of wind power in the United States, and it is fast becoming one of the biggest producers of solar power in the United States, which is sort of in and of itself interesting given the extent to which most people think of Texas as just an oil and gas state.

Here's the indictment of renewables in the February fiasco in Texas: When the bitter cold hit, wind production was one of the first sorts of production to suffer as wind turbines froze, and natural gas production in particular ramped up to cover that loss of wind.

Now, here's the defense of renewables, and there are three things I'll quickly say. First, although about half of Texas wind turbines froze in this storm, of the other half that didn't, many of them ended up producing more electricity in the storm than experts projected that they would produce. Second, coal, natural gas, and even nuclear production also suffered in the storm. And even if all of Texas's wind turbines had remained operable, that still would not have been enough to compensate for the lack of power from fossil fuels and from nuclear power in Texas. Third, the fact that lots of wind turbines froze in the storm in Texas is not necessarily an indictment of wind turbines; it is an indictment of a regulatory system that does not require the operators of wind turbines, just like it doesn't require the operators of coal plants or natural gas plants, to winterize those facilities.

Let's remember that there are plenty of cold places in the world, from Minnesota to Denmark, that have wind turbines that work just fine in very, very cold winters. And again, these lessons are being learned, and I suspect that there will be rules in Texas that will require wind turbines just like other kind of power plants to be bulked up for the cold to the extent that they were not before.

DOLLAR: I appreciate that very clear explanation of what was happening in Texas. I want to now take us up to a somewhat higher level. For me, the whole experience is not just a lesson in deregulation, but it also says something about climate change. We can't tie every specific extreme weather event directly to climate change, but I certainly feel that this proliferation of extreme weather events is related to climate change. So, we are going to need to decarbonize the economy, the power sector is a good candidate. I know you have been involved in several research projects looking at these issues, starting with your project on the solar industry, national comparative advantage in the solar industry, and how that can develop in a healthy way. So, can you tell us a little about that research?

BALL: Yeah, I'd love to. Let me just say one thing quickly about climate change in the case of Texas, because I think it's interesting. When I was writing a piece about this in the past several days, one of the things that struck me as really interesting is that Texas, unlike some other electric power grids in the world, has a particular methodology for looking at the kind of storms that it is going to face that is backward-looking rather than forward-looking. It's not uncommon; it's a very traditional way to look at this, but the notion is that we are going to look back and see what we have experienced before to create some model of what we are likely to experience in the future. If you are correctly assuming that the world in the future is fundamentally going to be like the world

in the past, that's a perfectly smart way to do things. But, when you introduce climate change, the prospect emerges that the world in the future will actually fundamentally be somewhat different from the world in the past. This is really important because it's causing everyone in the electricity industry and the energy industry around the world, at least particularly forward-thinking people, to start to question how it is that they assess what's going on in the future. And it may be the case that in Texas there's a kind of reassessment of that, too.

Now, let's shift to your question about the work at Stanford that we are doing. As you mentioned, I am at a center at Stanford that's based at the law and business schools that is devoted to the examination of policy and financial mechanisms to more economically efficiently scale up cleaner energy. That's the premise of the work.

There are two specific premises of this work looking at decarbonization and how it comports with the change in the global energy system. One is that the shift to lower carbon energy sources, and more broadly to a lower carbon society, is shaping up to be the most epic economic transformation in human history, potentially. It will reshuffle the geopolitical and the global economic decks. It is going to create big new winners and big new losers, and almost no one—no person, no company, no country—is going to sign up for an environmental revolution that they think is going to hurt them economically. So figuring out how to structure this global shift toward decarbonization so that it maximizes the winners economically and minimizes the losers is going to be crucial to making it environmentally meaningful.

The second premise is that there actually are ways to structure this to maximize the winners and minimize the losers and therefore maximize the chance that the revolution happens to a degree that's meaningful enough to actually change the trajectory of climate change. But doing that involves every player, and in particular the big polluting players, the big polluting companies, the big polluting industries, the big polluting countries, strategizing very soberly and ruthlessly about where in this new decarbonized global economy they can best eke out their comparative advantage. Not just piling in and saying we're going to do everything, because they are probably not going to be able to do everything, but figuring out how best to harness their strengths in an old energy economy for a new energy economy. If they did that, two things would happen. Number one, the cost of decarbonizing the world would fall, because each player theoretically would be doing what it does best. And number two—and this is really important in terms of the way human beings work and society works—the process of global decarbonization would redound to the benefit of companies and countries.

So if you're a politician—and perhaps we'll get to talk about Washington—but if you're a politician, even if you're Joe Biden who ran on a ticket of caring quite a lot about climate change, it's not going to do you much good politically to say, "dear Americans, my fellow Americans, let's please sublimate our national interests to a desire to cool the climate." You are likely to get voted out of office. So, you need to figure out a way where you can say, "my fellow Americans, decarbonizing the climate actually is going to improve your pocketbook." You need to be able not just to say that, but to follow through on that, and that's kind of a sweet spot.

DOLLAR: I would say Biden has been saying that, and it is potentially true, but it's also not a simple thing. So, how would you recommend the U.S. go about that?

BALL: It is not at all a simple thing, and your listeners, I'm sure, will remember lots of talk about green jobs going back many administrations. It's a wonderful little term and it has happened in

certain places like Texas, interestingly. But it needs to be remembered that every time a green job is created, a not green job may be lost. So, again, to get very personal about this, the challenge for a politician who wants to affect this kind of revolution is to ensure that to the extent that a green job jeopardizes some other sort of job, the person in that other job can be brought along. That's hard to do.

One of the things I think that's important as Biden pursues this is getting clear and honest with people about what made in America means and the difference between the objective of everything being made in America and the objective of decarbonization. It's not absolutely the case that they are antithetical, but they are also not necessarily the same thing, and one has to think deeply about how to try to get them to work in sync rather than in opposition.

So let me just say one more thing about this. The economically efficient way to achieve meaningful decarbonization, which is a fancy way of saying the only real way for the world to decarbonize enough to deal with climate change, is for the important carbon emitters to figure out how to eke out their comparative advantage. If their advantage is to make stuff, to manufacture stuff in factories, great. If their advantage is to invent stuff that gets made elsewhere, perhaps fine.

We have done a lot of work at my Stanford center analyzing this in the context of the global solar industry, which for many years has been the subject of a trade fight between the United States and China in particular. What our analysis shows is that in the case of the United States and China, each of those countries has its own comparative advantages in solar. And it turns out that those comparative advantages in solar, they track quite clearly to other emerging industries such as batteries and electric cars. Broadly speaking, China manufactures commodities more cheaply than the United States does. Broadly speaking, the United States, at least historically, has done deeper research and development than China does. I just want to be clear: those are vast oversimplifications, and those situations in both of those countries are changing as the United States tries to get its mojo back in terms of manufacturing and as China absolutely gets more sophisticated in terms of innovation.

But as the world tries to scale these technologies, the goal ought to be able to produce them as inexpensively and as well as possible. That means that each of these countries, in the case of the United States and China, in the case of Joe Biden's United States and Xi Jinping's China, needs to be smart enough here not merely to decree that they have to own all of the business but to be very clear on which portion of the business they can deliver for their domestic constituencies.

Just to tie a very quick bow on this, our research shows that it is not at all the case that the United States cannot manufacture things in solar or in these other areas competitively. Indeed it can. But it has to be very targeted about what it's going to manufacture, when that that it is manufacturing has become sufficiently commoditized, that it is likely to be manufactured less expensively elsewhere—particularly in China, maybe somewhere in Southeast Asia—and at what point then the United States needs to sort of shift to the next wave of innovation and ride that. That's a very detailed endeavor. I'm certain that Washington is up to that, but that's a very different thing from just thundering from the bully pulpit of the White House, "it all shall be made in America."

DOLLAR: That's really fascinating, Jeff, because it really kind of runs counter to a lot of the political dialog we hear in Washington and in the United States these days. Your idea is that in some sense, if there is more trade and investment integration between the U.S. and China, in the right

framework that can help us with this whole agenda of creating new technologies, implementing them, reducing carbon.

BALL: That's absolutely true. And I'll just say very briefly, I think one of the fascinating things to watch as the Biden administration plays out is an underlying tension that no one really wants to talk about but that is likely to get much clearer, and that is the tension between the expressed desire for the United States to show its supremacy, ostensibly against China, and on the other hand, the desire to deal with climate change. Because the reality is that the U.S. and China pummeling each other geopolitically is probably not the best way to affect real decarbonization given that these two countries are the world's biggest carbon emitters. That doesn't mean that the solution has to be a big kind of geopolitical group hug and singing Kumbaya, because that's not going to happen, but it does mean that the relationship has to be something other than "we are better than you and we will beat you in every economic endeavor." It has to be more thoughtful than that.

DOLLAR: So last topic, Jeff. I do want to get to your current research, which I find very interesting, which is looking at infrastructure investment in emerging economies. I worked for the World Bank for 20 years, so this is a topic close to my heart. Tell us a little bit about that research and how it relates to the climate reduction agenda.

BALL: I appreciate the question. I think that there's a tendency in much of the United States to think that solving climate change is about putting more solar panels on our suburban roofs and switching from SUVs to Teslas, and if just enough Americans did that than we would be good. But the reality is that we wouldn't be good. The reality is that the United States is decreasingly important in the game of solving climate change.

The game of solving climate change is almost exclusively about what happens in emerging economies, and one of the biggest determinants of the trajectory of carbon emissions in emerging economies—we are talking about Southeast Asia, Latin America, Africa generally—is the carbon implications of the infrastructure that is being built in those places as we speak. This is big stuff, big metal, everything from power plants to roads to factories. The reason that this is so important is that kind of infrastructure locks in trajectories of emissions for decades. To the extent that someone builds a coal power plant, that power plant is presumably going to be belching out carbon dioxide for decades. To the extent that someone builds a wind or solar plant, that is not going to be belching out carbon dioxide for decades. That's sort of the broad dichotomy.

It turns out that China, as in almost everything, China is the biggest player. China is the biggest financier of infrastructure in emerging economies, period. But it is not the only one. So, what we are endeavoring to do at the Stanford center at which I work is to assess, to quantify, the flows of capital from Chinese entities and from non-Chinese entities going into the financing of infrastructure in emerging economies—to almost map that. That is to say, who are the players? Who is financing it? Who is building it? Who is deciding to accept the financing and enact the policies in a host country way that is determining that the country is going to want coal as opposed to renewables? We want to map that and then look at how those flows differ when they are being financed by Chinese entities as opposed to non-Chinese entities, and understand what we can about whether China is much different from the United States, is much different from Europe or Japan or Korea in terms of funding this.

The reason to do this is not just simply to have an academic exercise but to really unpack these flows so that we can come up with suggestions that are not just kind of theoretically attractive, but that are geopolitically actionable, that actually have a chance of working. Back to a point that you and I were discussing earlier, at the end of the day, this is a game of redrawing of the map of winners and losers. And to the extent that China has an important industry of coal producers—companies that build coal fired power plants—to the extent that the United States does, or Korea or Japan, to simply say that they ought to respect the concern of climate change is probably not very relevant. To figure out a way that the swath of their economies that has made its money over the past 50 or so years building coal fired power plants and increasingly exporting those coal fired power plants to other countries can make money, employ its workers, and pay its taxes through lower carbon means is really the goal. And figuring that out is the goal of the work that we are doing.

DOLLAR: This is really important and links closely with the international trade issues that are at the heart of our podcast. All these big economies have a lot of capacity to build coal fired plants. So you take China, China has pretty ambitious targets to install renewables, and that sounds great. But if the result then is that the industry that makes coal fired power plants starts exporting them and investing in other emerging economies, then in fact there's no carbon reduction. And that's true for all of us who have the capacity to make coal fired plants.

BALL: Yeah, I think that's right. I think it is the case for China now, and it also was the case earlier for the United States and Western Europe, that their impact on the global environment initially was what they did within their borders in their periods of intense development. Increasingly, it is what their money does outside their borders, particularly in emerging economies. So as growth within China slows, as it is doing, the real question is what Chinese money does abroad. The real question for the United States in terms of its impact on climate change, beyond the kind of symbolism of what the White House articulates or what Capitol Hill articulates, is what American money does abroad.

I will just say that you and I are talking at an incredibly interesting moment of transition on this point globally. In the last six months, the number of national governments, the number of c-suites of multinational corporations that have articulated what they call "net zero goals," that is they will essentially cease to contribute to the problem of climate change through their economic activities by perhaps 2050, is astounding.

If you had predicted two years ago that you would have as large a swath of the global economy getting green religion in a deep way as you do now, at least rhetorically, I think you would have been probably laughed out of the room. Something is happening now. What is happening is a far piece from them actually doing it, but they are saying enough that if they fail to do it they are going to have massive geopolitical egg on their face. So I think we are at a really interesting moment where everything that you and I have been talking about is starting to be deeply internalized by the people who have their hands on the levers of the global economy and geopolitical power. The question now is going to be to what extent they actually pull the levers.

DOLLAR: I'm David Dollar and I've been talking to Jeff Ball. I would say the common theme has been climate change and how it relates to the power sector. We started with Texas. We moved up to the national level for the U.S., then we moved up to the global level. Thank you very much, Jeff, for sharing your research.

BALL: It's been a pleasure. Thanks for having me.

DOLLAR: Thank you all for listening. We'll be releasing new episodes of Dollar & Sense every other week, so if you haven't already, please subscribe wherever you get your podcasts and stay tuned.

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