

THE BROOKINGS INSTITUTION  
BROOKINGS CAFETERIA: China's epic push for cleaner energy  
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(MUSIC)

DEWS: Welcome to the Brookings Cafeteria, the podcast about ideas and the experts who have them. I'm Fred Dews.

China is leading the way in the global shift to greener growth and its dominance of low carbon industries that range from solar and wind power to electric vehicles to more efficient coal combustion. China is emerging as a clean energy juggernaut. That's according to Jeffrey Ball, the author of a new paper from the Cross-Brookings Initiative on Energy and Climate titled "Grow Green China Inc." In the paper, Ball, a Brookings non-resident senior fellow argues that the west instead of seeing this development as a threat should see it as an opportunity both for business and for the planet.

In today's episode, Ball is interviewed by David Victor, the co-chair of the Energy and Climate Industry here at Brookings. Victor is also a professor of International Relations at UC San Diego and director of its laboratory on international law and regulation. In addition to his Brookings affiliation, Jeffrey Ball is also a scholar and resident at Stanford University Steyer Taylor Center for Energy, Policy and Finance and a lecturer at Stanford Law School. Also, in today's show, a look at how housing and transportation trends in the Washington Capital Region impact commuting, the climate and the economy which any (inaudible) a David and Rubenstein fellow in the Metropolitan policy program. You can follow the Brookings podcast or work on twitter at Policy Podcasts to get information about and links to all of our shows including the current plus dollar and cents and or events podcasts. If you like the show, please go to Apple Podcasts and leave us a review. It helps others find it. And now on with the interview. Here's David Victor with Jeffrey Ball calling into the studio from California.

VICTOR: Thank you Fred. Well, it's terrific to talk with you Jeff about this new paper. Clearly China matters, giant economy, 12 trillion-dollar economy second only in size to the United States 20 trillion-dollar economy. Big emitter of greenhouse gases, largest emitter on the planet right now, roughly doubled the US emissions and it's also at the center of the green energy revolution. I think one

of the points you make in this paper is that, that revolution has been a global revolution from the beginning unlike the rise of automobiles, the rise of electricity which were mainly national affairs and then became globalized over time. So, in the case that China matters is very clear, you're making a different argument in the paper and before we get into the argument of its implications for US Policy to help us understand what's going on inside the green economy in China right now and why is that happening?

BALL: Well, David it's good to be with you. I think maybe some context is important here. We should understand I think is a predicate that China is both brown and green and so, those on both sides have ample evidence for the point that either China is one of the dirtiest places in the world environmentally or that China is one of the most important places in the world for environmental progress. I mean the predicate is, that China as you nodded to in your introduction emits more greenhouse gases than any other country. China burns more coal than any other country. China has extraordinarily problematic air pollution in its big cities. So, that's the brown China and lots of people know about that. The green China is growing faster than the brown China but the green China is starting from a much smaller base. So, at the same time that China is the world's biggest carbon emitter and the world's biggest coal burner, China also is the world's biggest producer of a whole slew of green mobile energy equipment and interestingly China also has become more recently the world's biggest consumer of renewable energy and where the geo-politics comes in here is asking the question of whether if you are outside of China, you think that's a good thing or a bad thing and I think the short way to say it is that for the planet it's probably a good thing. Whether it's a good thing geo-politically depends on whether you want domestic manufacturing in your Country, whether it's the United States or Europe or whether you want non-manufacturing jobs and that's a whole big question about which jobs are more important but that's where a huge controversy starts.

VICTOR: So, the green China's growing faster than the Brown China and some of that growth as

you outline in the paper predates the Chinese government trying to deploy renewables inside China it was China's manufacturer to the world supplying solar cells and other technologies to the German and to give end of the energy resolution in Germany and in Spain and so on but now it's really internal to China itself. Help us understand why the Chinese government has been backing this so aggressively, they've made green energy technologies (inaudible) large at the core of their return in industrial policy. What's motivating the Chinese government to do this and to move so many chips into this square?

BALL: Well, I'll tell you what I think, first of all it's not motivating it primarily and I think what's not motivating it primarily is climate. For public consumption there is a lot of discussion in China angled toward international circles about China's aspirations to peak at greenhouse gas emissions and then have them start to fall and indeed, it's absolutely the case that if China does not do that it's almost impossible to think that the world can achieve anywhere near the carbon reduction goals for the (inaudible) promulgated. But really what's motivating China's green push is not climate change, it's a couple of things that are much more immediate, that are much more central to the domestic economy. One thing that's motivating it is incredibly dirty air above the cities. Incredibly dirty air that is such a public health hazard that it becomes a political threat in China. Another thing that's motivating the green push is jobs and a desire for leadership globally in a series of industries that the Chinese leadership has decided are strategic and are not owned by other countries at this point and this gets to the point that you made earlier about this being a global industry from the start. So, China has decided in a much more aggressive way than many other countries have decided that these are key industries in China, China wants to lead. And so, there are absolutely climate implications of those moves but I don't think climate is the reason that China is pushing.

VICTOR: You document in the paper that this is a state led policy. There's a massive investment of subsidies, other policy supports that are all led in various ways by the state and in some sense the role of state has gotten bigger over time. Help us understand how that state policy has changed and

become more effective over time. What have the Chinese learned about how to make state led industrial policy work in this domain? Because I think for many American listeners and readers this is going to be a toxic concept. I couldn't imagine the United States having such a large state led activity and doing it effectively. How are the Chinese doing this and what have they learned about how to make state led policy in this area effective?

BALL: I think there is an answer to this that comports with the general world view of many people in the west and then I think there's an answer that I can give a more important answer that people don't realize. So, let's start with what is kind of the broadly understood view of China in the west. And that is of a place that because of its governmental structure is able to enunciate policy, make strategic decisions and then prosecute those decisions throughout the economy in a way that looks to western eyes to be extraordinarily efficient. Beijing makes a decision. Beijing decides that any number of industries in the green area from solar to wind to electric cars are strategically important. Beijing enunciates incentives and mandates that then filter down through the provinces to the municipalities and low and behold, China begins to stand up a national structure that dominates these industries globally.

That's kind of the short hand view, I think, in much of the west. And that is the view that either sparks anger in western capitals because western capitals feel that they are unable to compete against China or it sparks admiration in the kind of green left in the west, which is to say China is a wonderfully efficient place to affect environmental change unlike messy western democracies.

I think the more important observation is something different from that and that is that it seems to me and the paper talks a decent bit about this. The history of China's green push is actually a quite messy history of inefficiencies and lessons learned from those inefficiencies and attempts to right those inefficiencies. And so, the short history of what has happened in China with any number of green technologies is the following. China didn't set out to become the world's largest consumer or renewable

energy. To take the solar example, a number of entrepreneurs who were quite savvy and many of them were educated in the west, went home and realized that China was an economic place to manufacture any number of things whether it was tee shirts or televisions or solar panels and they decided that given that there were pervasive subsidies particularly in Europe at the time, they were going to go back. They were going to get help from prudential governments in China, build factories and sell those solar panels into a subsidized European market and that is what they did and that worked quite well until the global financial crisis happened at which point a number of European governments that had been incredibly heavily subsidizing solar energy decided they couldn't afford to do it anymore and so they rolled back those subsidies by which point in China the manufacturing of solar panels had become a quite significant industry in a couple of provinces, not by any stretch it's usually material to the national Chinese economy but in the context of certain provincial economies important.

And so, the industry in China was able to prevail upon the Chinese government to start ruling out a series of deployment subsidies. That is subsidies that incentivize not merely the manufacturer of solar panels for export to Europe, but rather the selling of solar panels within China to be set up within China. So, it started to deploy those subsidies much like subsidies that had been on the books in Europe before the Global Financial crisis and what happened is that those subsidies succeeded too well. There was a whole kind of subsidy machine stood up and for all sorts of reasons owing to unintended consequences. There was euphoria in China among developers of renewable energy who took advantage of these subsidies and capered the landscape with solar panels and similarity with wind turbines until China woke up one day and decided it couldn't afford this subsidy anymore.

And so the world right now is in a period where China has acknowledged publicly that it structured these subsidies in a way that was economically inefficient and China is now trying to dial back these subsidies and dial up the efficiency of them and I think that's a hugely important transformation for China certainly but also for the world because more broadly let's be clear about where renewable

energy is globally. Renewable energy has surged over the last 10 years to become a legitimate global industry and yet renewable energy is contributing, I think it's fair to say negligibly to greenhouse gas emission reductions and so if renewable energy is going to get to the point where it makes much of a palpable environmental difference, the world is going to have to get radically more economically efficient in the way that it pursues renewable energy and what China is doing right now is leading the way and trying to figure out if that efficiency can happen and the jury is still out.

VICTOR: But you see you're telling a story though of aggressive reforms inside China because I think a lot of people outside China have heard stories about wind turbines being built but never connected to the grid, solar rays being installed and used only part of the time, lots of curtailment of these resources and you're saying that that problem is being fixed to a large degree, help us understand how far down the road they are in improving the quality of their policy interventions such that this green energy revolution really takes off in China.

BALL: Yeah, absolutely that's the case and I think it will surprise many people in the west who don't spend a lot of time in China to realize that there is an absolutely public emission on the part of people in the Chinese government that they went about this inefficiently. I mean to some extent, there's a long record of experimentation in Chinese policy making, having nothing to do with green energy having to do with just strict (inaudible) industrial policy at large and the record broadly is that China tries things and when there's things either over-reach or fail for other reasons China turns the dials and that's exactly what's happening in green energy and so what does that look like. That looks like a number of things.

I'll give you a couple of examples. The subsidy that China promulgated that really took solar big in China is something called defeat in care of China borrowed defeat in care of from Europe and what China found is that there are many ways in which it structured this feed in care of that allowed energy developers to get too much money, to get returns on their investments that were just too rich. And so,

one thing China has done is China has dialed back the richness of that subsidy. Another thing China has done, is tried - and it's doing this right now, trying to move away from a feed in tariff altogether on the theory that those of the subsidy was too rich and that the technologies themselves have gotten to a point where they're much more economic.

So, China is trying something called an auction, that is to say if you are a developer of these green energy systems you will get government contracts for these systems to the extent that you offer a lower price than your competitor. That's a very, very different and a quite frankly capitalistic model, a very different model than one that said, we the government guarantee you x-percent above the prevailing power rate and to the extent that you can minimize your internal costs you just maximize your profits and so in a whole series of ways China is taking kind of policy lessons that at least it's theoretically then developed many of them outside China and trying them in a way that's never been tried - of a scale it's never been tried outside of China.

And so, to those who think that China isn't innovating, I think that's wrong both in a technological sense and it's wrong in a policy sense. China absolutely is innovating. China absolutely is willing to admit the error of its ways. It's not all clear that China will succeed in these policy reforms, but the policy reforms are hugely important for the world to watch because they absolutely dwarf anything that's going on anywhere else.

VICTOR: So, I want to ask you about the American reaction rafted from American firms, but just for a couple of more questions about what's happening inside China and in the neighborhood. First is what counts as green? We've been talking a lot about solar and wind, the Chinese state grid companies is in the process of building and operating nearly three dozen very high voltage, long distance power lines that can help move green power around. Some of them are circled direct current DC lines which makes it easier to control the stability of the grid when you add large amounts of renewable power on it. Nothing like that is going on anywhere else in the world. What else is on the list of technologies that



are thought of as green and therefore the focus of all this industrial policy in China?

BALL: Well, so let's push aside, as you suggested, what most people think of as green, the solar stuff and the wind stuff. You rightly point out that state grid is a global leader in what's called ultra-high voltage transmission and indeed state grid is now building ultra-high voltage transmission lines not merely across China but across (inaudible) and Africa and other places around the world. So, state grid has become something of a global leader in this technology which itself is an interesting point again because I think there's a pretty pervasive view in the west of China is not innovating technology in the area of green energy and certainly with transmission that's simply not the case. China is one of the major innovators in this area. So, that's happening.

People often don't think of nuclear as a green technology but indeed nuclear is an incredibly important technology that emits centrally no carbon and most of the nuclear construction that is happening in the world, it's happening in China and that's continuing to go on. There is a lot of interest in China in natural gas, which depending on your world views if you're comparing it to coal its clean, if you're comparing it to renewables it's less clean. China has huge natural gas resources which are harder to get out of the ground and is the case is in the United States but there's real interest in that and interestingly there is increase in foreign interest and in investing in China's natural gas resources.

And I'll just mention one other thing which is slightly broader than energy, but I think it's really important for people to understand and that is that China has embarked on a pretty sophisticated effort stand-up what it calls green finance. There is a lot of discussion in the United States and even more in Europe about the need for investors and for major corporations to take into account in their investment decisions risks that they face from climate change. Risks either to their physical assets or risks more subtlety to their bottom lines either from regulation or from dislocation that the climate itself will cause to their assets. I think it's the case that China is pushing this green finance area arguably harder than the United States than Europe. Now again, as with the reforms in green energy, it is unclear whether

the rhetoric of reform in green finance will be matched by reality but China has articulated requirements for disclosure - corporate disclosure of exposure to climate risks that the worse things that are going on in the rest of the world and indeed if this is played out at Chinese scale then China will become the leader in green finance and that I think is incredibly significant.

VICTOR: So, all of this is going on in China. It's going on in the broader Chinese neighborhood through the Belt and Road Initiative. We'll talk about that in just a moment. Tell us your impression of how Americans are reacting to this and why you think their reaction is basically all wrong?

BALL: Well, I think we should distinguish what we mean by Americans first. If we're talking about American citizens, I think there are a large number of American citizens who weren't thinking specifically through a geo-political lens who like the fact that they get their things cheaper than they would if they didn't get them from China and that has to do with I-Phones and that has to do with wind power and solar energy. So, the reality is that in energy as with anything else a global economy tends to reduce the costs.

The question you're asking though is about American policymakers and I do think American policy makers largely have this wrong. There is a kind of instinctive view in Washington that China is the nemesis and that if the US simply takes a harder line against China and here we can talk not broadly but specifically about the area of green energy that if the US simply takes a harder line, slaps more tariffs on Chinese goods, takes a much more jaundiced look at the notion of Chinese investment in the United States and American investment in China in these areas that somehow that will help the US claw it's way to supremacy in these areas and I think history is, that that's just not the case.

The United States first off has not made the kind of commitment to these industries that China has made and I don't think it's terribly productive to argue the morality of that but the reality is that the United States for its own reasons has not tended to value this stuff like China has and there are a lot of reasons for that owing to the fact that the United States is in a very different place than China is. What

flows from that is that the United States then when it gets worried about what it regards as Chinese supremacy in industries that the United States at certain times decides it now cares about slaps tariffs on those industries and that has proven ineffective.

Let me give you an example, we'll take the solar example again which is something that the paper talks quite a lot about. The United States imposed tariffs on imported Chinese solar products and not terribly surprisingly that led China to impose tariffs of its own on its imports of US solar products. Now, the US never has been a terribly significant manufacturer of solar products with one exception. The US has never been a terribly (inaudible) manufacturer of solar panels which is what most people think about when they think of solar. But the US has been a pretty significant manufacturer of something called poly-silicon which is a raw material that goes into solar panels.

First of all, what the tariff war had not done is radically increase solar panel manufacturer in the United States. The US was not a major solar manufacturer before the tariff war started and it's not now. What the tariff war has done though is cause those retaliatory Chinese tariffs which have basically decimated the US poly-silicon manufacturing industry which employed a significant number of people and so the kind of perverse irony of this is that US solar manufacturing is arguably worse off for the tariff war than it would have been otherwise.

VICTOR: You make a very clear argument in the paper that this antagonistic relationship between Washington and Beijing especially around trade policy, investment policy that that's been running contrary to American interests. So, let's talk in a moment about the politics and how we fix that, but I want to make this a little more concrete in terms of real opportunities.

You lay out in the paper, a lot of opportunities for the two countries to cooperate and for business in the United States, in particular, to do more work in China. Let's talk about a couple of those. One of them is in the electric vehicle market. Help us understand what the opportunity is there and why an American firm should feel confident doing more in China when they look at a lot of other industries

where joint ventures were required, and the firms lost intellectual property and they really felt burned by the Chinese investment experience.

BALL: I will answer the question of electric vehicles in a moment, but I just want to say something by way of a broad point that the paper makes. The argument as you say - the central argument in the paper is that the United States should try to leverage what I call in the paper, Green China Inc. rather than trying to bury it. And the argument here has essentially nothing to do with the planet. The point is you can care about climate change or you can not care about climate change and still the paper argues simply for western economic interests it is a more advisable stance to work with China than it is to work against China.

And so now, let's delve into the question you asked about electric vehicles. Something really interesting, we talked about a kind of transformation in China's approach to green policy. A really interesting example of that has occurred over the last year or two in China with regard to electric vehicles which it will surprise none of Brookings listeners to know our hugely dwelling industry around the world but particularly in China. So, just - let's make the point that China is by far the world's largest electric vehicle market. China is expected to remain the world's largest electric vehicle market by far for many years.

Essentially, every company around the world that has engaged in any aspect of electric vehicle manufacturing or battery manufacturing for electric vehicles is piling into China and now we come to your question. So, Xi Jinping, the Chinese leader announced about a year or two ago that as part of a kind of broader opening up of China he was going to open up the automotive industry in a series of steps to foreign investment without the previous pretty pervasive requirement in China that foreign players signed joint ventures with Chinese players and the first part of that opening was in the electric vehicle market and it will happen over the next few years in other parts of the automotive market.

So, what does that mean? That means that last year it became legal for foreign players that

manufacture electric vehicles to set up factories in China without JV's and that is why Tesla, based in California is now building a huge factory to build electric cars in Shanghai and you raised the question of intellectual property. There's a huge debate about whether western concerns of intellectual property theft in China are overblown or not but indeed there are serious concerns about this and Tesla was clear that it had concerns about this and indeed Tesla's concerns about the potential of losing IP in China were one of the reasons that Tesla didn't want to anchor joint venture as a way to go into China and so Tesla is of the view that Tesla is likelier to be able to protect its intellectual property if it goes in alone which is what it's doing. Now, no one knows to what extent western companies will be able to protect their IP or not.

I think one thing that's worth pointing out is that as Chinese companies themselves grow more sophisticated and more innovated and more global, they themselves start to have much more convincing needs for IP protection within China. And so, there's a growing course of argument that China needs to do more on IP protection, but we shouldn't dilute ourselves. The concerns about IP protection were main concerns, the point is that many companies in electric vehicles and in other markets, that perhaps we'll talk about are coming to the view that they simply cannot sit out the Chinese market because of those IP concerns it is true being a market and they therefore have to figure out how they can deal with their IP concerns and still go in because they've got a play in China.

VICTOR: And so, this is one of the examples of an opportunity for American firms and policy to be more engaged with China that's about business and self-interest and not just about the climate. I want to talk about one other opportunity, which is how should we think about the Belt and Road Initiative. Do you make the case in the paper that green is growing faster than brown inside China and yet when one reads about the Belt and Road Initiative, you're hearing a lot these days about one coal fire power plant after another being financed and built in one way or another connected to the Belt and Road Initiative. Is green growing even faster than the Belt and Road Initiative or what's the opportunity

to engage with the Belt and Road Initiative in a different way?

BALL: As a first point, here's why the Belt and Road Initiative is so important and we should probably just define the Belt and Road Initiative briefly. So, the Belt and Road Initiative is basically the mother of all foreign infrastructure investment programs. The Belt and Road Initiative is a program in which China is making massive infrastructure investments in approximately 65 countries around the world. Those infrastructure investments include things like railroads. They include things like highways and they include lots of things in the energy world, everything from if you say coal fire power plants to solar farms and wind farms and why the BRI is so important is that to the extent that China has been the most important player environmentally in the world for good or for ill, that has largely been about what China has been doing within its borders thus far.

Going forward given the extent of the Belt and Road Initiative China's environmental impact on the world will increasingly be about not what China does within its borders but about what China finances outside its borders. And that is why if you care about the climate, you should care about the Belt and Road Initiative.

Now, let's get to the question of whether the Belt and Road Initiative is brown or green. There is a lot of rhetoric coming from China about China's desire to green the Belt and Road Initiative. There's a lot of pressure being directed at China from allowing the world to greenbelt road initiative because of what I just said about the importance environmentally the Belt and Road Initiative and it is very, very difficult to assess at this point whether the rhetoric is reality. I don't think it's possible to say that the Belt and Road Initiative ultimately will be brown or green.

VICTOR: So, if the Belt and Road is both brown and green, what can the United States and US firms do to help steer the belt and road in a greener direction?

BALL: Basically, what the US government can do and indeed interestingly is doing interestingly despite a kind of (inaudible) rhetoric of animosity toward China on the part of the US government. The

US Government has laid out an aspiration that American companies invest in the Belt and Road Initiative to make money. So - so that's what the government can do and is doing.

What companies can do is get more sophisticated about interacting with counterpart companies and governments in the countries that are receiving Chinese Belt and Road investment because it's the case in many of those countries that those countries are wanting to counter-balance money that they are getting through the Belt and Road Initiative from China with money from other parts of the world so as not to become in their view too beholden to China.

And so, there's any number of energy related projects that western players, whether they're American or European or from other parts of the west can get into now. There is plenty of risk in these projects, but risk is something that these companies go about international investment in energy infrastructure know how to play. I think the point is that - that's it's really important to look below the surface of the rhetoric about the Belt and Road Initiative being a purely Chinese global play and understand that what the Belt and Road Initiative really is, is a broad tapestry of individual projects, each of which has hurdle rates that it wants to meet and that savvy players from around the world can participate.

VICTOR: What you've laid out here, as we wrap up is the need for the United States to understand better what's happening and such on a - in particular green China and to engage with green China in a much more sophisticated and integrated way, closer investment relationships, closer trade relationships, learning from each other, counteracting activities and investments in some Belt and Road Initiative countries even as we get American firms to invest in Belt Road and Initiative activities, that's a pretty sophisticated, self-interest driven strategy in this area and yet here we are the end of May 2019, we've been in a prolonged difficult poor relationship between the United States and China on trade, in the middle of trade war by some estimations and so I'm wondering how do you make this happen politically because the case for self-interest is clear enough but then the politics also create a very strong

pressure to impose tariffs to have trade wars and the politics seem to be trumping the case of the logic here. How do we fix that?

BALL: Well, one way to fix it is that, companies do what they do regardless of the politics and that is happening. I mean, indeed there are significant capital flows between the US and China and between Europe and China and even though protection measures in both Europe and the United States are slowing those capital flows. No one in western industry or American industry in the area of these green technologies needs to be told or persuaded that they should play in China. So, they understand that many of them that they want to do this.

On a broader political level, here's the difficulty, China bashing cells, China bashing cells in capitals in Europe and China bashing cells in Washington and that is true in democratic administrations and that is true in republican administrations in the United States. So, I think this is a long game, not a short game. What is changing here is that the size of the industries that have a state in sophisticated interaction with China is growing. Whereas five or ten years ago these industries were tiny niche industries working against a baseline of industry that believed that antagonism against China was a better strategy for its economic success. That is changing and so the changing in where the money is on this implies a possibility for a change in where the politics are on this and I don't have a suggestion of what the short solution is here because again, at the end of the day rhetoric about trying to be a nemesis, I think, is popular rhetoric in much of the west.

But the kind of slow shift of the super-tanker is toward a reality where economic interest, self-interest, mitigate toward more interaction with China and we should see one thing here. Let's not be naïve, this argument does not suggest that there are not real tensions between western countries on the one hand and China on the other hand. Questions about intellectual property protection, any number of questions are real and it will remain tense and are legitimate questions to think about. The point here is simply that both because the industries that are playing in these areas are growing and are



global and because the climate problem demands it. The world's going to have to get a lot savvier about interacting with China and has a self-interested incentive to figure out some of these difficulties. And so, the status quo of just sort of standing up and saying we're not going to play ball is not going to work anymore.

VICTOR: Well, excellent, thank you very much. It's extraordinary revolution that's under way inside China or generally around the world on green energy and as that revolution accelerates it may well make addressing the climate change problem easier politically because it will lower the cost of addressing the climate problem. We've been talking about climate for several decades now and not doing very much and maybe this will make it possible for the world as a whole to make a more concerted action. My guest today has been Jeff Ball from Stanford University, an affiliate here at Brookings Institution. I'm David Victor. Thank you all very much.

DEWS: The paper "Grow Green China Inc." by Jeffrey Ball is on our website, Brookings.Edu.

And now here's Jenny Schuetz with another edition of Metro Lens.

SCHUETZ: Hello, this is Jenny Schuetz. I'm a David M. Rubenstein Fellow at Brookings Metropolitan Policy Program. Walk through downtown Washington, DC these days and you can see that we're in a construction boom. Cranes tower in the background of National's Park. The southwest waterfront has transformed into a forest of high-rise hotels, apartments and sheik eateries. Their townhouses are sprouting like mushrooms, from Fort Totten to College Park to Fredericksburg, Virginia.

So, with all this new development housing in the Washington Metro area should be abundant and cheap. Right? Not exactly. New research that my colleagues and I conducted shows that over the past 20 years the capital region has added almost twice as many people as housing units. As in many parts of the US, housing prices have been rising faster than income. A predictable outcome of housing demand outpacing supply. The amount of housing that has been built in (inaudible) parts of the region have profound implications for housing affordability and the region's economic vitality.

A key finding from our research is that although gentrification in the district has sparked a lot of debate, most new housing has been built in distance suburbs. Between 2000 and 2017 the regions inner core composed of the district Arlington and Alexandria built about 70,000 housing units. The ex-urban counties, roughly speaking, there's more than 20 miles from downtown DC built about 200,000 new homes. Loudoun County Virginia built as many homes as the district in Arlington County put together even though Loudoun had a much smaller population than DC and Arlington.

Where new housing is built has important consequences for the region. Building homes far away from the region's largest job center in downtown DC and in locations not served by Metro rail means that more people will have to drive long distances to work. That makes traffic congestion worse and harms the environment. The type of new housing being built also effects affordability. Single family homes use more land for each housing units than apartments in multi-family buildings. That means that single family homes are more expensive for families to rent or buy.

In 2000, about two thirds of homes in the region were single family homes, either detached houses or row houses. Since then the region has continued to build mostly single-family houses. Not all the region's jurisdictions are building the same type of housing, of course, in the district, Arlington and Alexandria, three out of four new homes are in multi-family buildings. In Fairfax, Montgomery and Prince George's counties more than half of new homes are single family. The ex-urban counties built almost exclusively single-family homes.

If you have the sneaking suspicion that housing has become more expensive over time, you'd be right. We typically measure changes in housing affordability by comparing how much home prices have risen compared to incomes. The capital region doesn't fare well on that measure. From 1980 to 2017 median incomes in the region rose by 30 percent while median home values rose by more than 50 percent. While advising home values are generally good news for homeowners, they create financial stress on renter households. Housing values in the capital region are much more expensive than in

those to the US even conditional on income. Too little housing at too high a cost poses economic risks for the region.

Expensive housing isn't just a problem for individuals and families who are struggling to cover expenses. Problems in housing markets have brought impacts on the regional economy. Employers have difficulty attracting and retaining workers, especially younger workers. Because renters tend to be lower income and more racially diverse than homeowners rising housing costs are most damaging to economically vulnerable families. The spatial patterns of housing growth across the region, more construction in the exurbs than the urban core means that more workers spend more time sitting in traffic and driving longer distances. Commuting is neither productive nor pleasant and comes at the expense of time spent with family and friends. Building in locations not served by public transit also hurts the environment and accelerates climate change. Our system of land use empowers each local government to decide how much housing of what type to build. Acting independently of neighboring cities and counties but the impacts of these local decisions effect everyone in the region, residents, employers and their elected officials. The capital region can't afford another 20 years of spall and worsening affordability.

DEWS: The Brookings Cafeteria Podcast is the product of an amazing team of colleagues starting with audio engineer, Gaston Reboredo and producer Chris McKenna. You'll find the director of the Brookings Institution Press has many of our book interviews and Lisette Baylor and Eric Abalihin provide design and web support. Finally, my thanks to Camilo Ramirez and Emily Horne for their guidance and support. The Brookings Cafeteria is brought to you by the Brookings Podcast Network which also produces Dollar and Sense, The Current and our events podcasts. Email your questions and comments to me at [bcp@brookings.edu](mailto:bcp@brookings.edu). If you have a question for a scholar including audio file and they'll play it and the answer on the air. Follow us on Twitter at policy podcasts. You can listen to the Brookings Cafeteria in all the usual places. Visit us online at Brookings.edu. Until next time, I'm Fred Dews.