

## TRANSCRIPT

### Environmental Insights

Guest: Paul Joskow

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Paul Joskow: So, there's a lot of stuff going on, but I think we're suffering, especially in the U.S., from the lack of a really coherent set of policies to which the entire country is committed.

Rob Stavins: Welcome to [Environmental Insights](#), a podcast from the [Harvard Environmental Economics Program](#). I'm your host, Rob Stavins, a professor here at the [Harvard Kennedy School](#) and director of our Environmental Economics Program. Today, we're very fortunate to have with us, [Paul Joskow](#), the Elizabeth and James Killian Professor of Economics emeritus at [MIT](#), where in the past, he chaired the Department of Economics and directed the [MIT Center for Energy and Environmental Policy Research](#). Paul's research and teaching have been in multiple areas, including among others, industrial organization, energy and environmental economics, and regulatory policy. He's a distinguished fellow of the [American Economic Association](#), a fellow of the [Econometric Society](#) and the [American Academy of Arts and Sciences](#) and a member of the [Council on Foreign Relations](#). And I'm very pleased to add to that that Paul is also an associate scholar of the [Harvard Environmental Economics Program](#). In addition to all of this, he took a leave of absence from MIT, and served for 10 years as President and CEO of the [Alfred P. Sloan Foundation](#) in New York City. Paul, welcome.

Paul Joskow: Thank you, Rob. It's great to be here.

Rob Stavins: So, before we talk about your current thinking on energy and environment and perhaps climate change policy, I'd like to go back to how you came to be where you are and where you've been, and our listeners find this interesting, and when I say go back, I do mean go way back. So where did you grow up?

Paul Joskow: I grew up in New York City. I went to New York City public schools for elementary school, junior high, and high school.

Rob Stavins: And then for college, you went off to Ithaca, New York. Is that right?

Paul Joskow: I went up to Cornell. I was attracted there by Alfred Kahn, who was a family friend.

Rob Stavins: And so, given that you were attracted by Alfred Kahn, then you were in the economics department, and you did your bachelor's degree in economics?

Paul Joskow: Actually, I started in the engineering school for one semester and then I didn't like it very much, and I switched over and became an economics major, and Fred Kahn was my advisor.

Rob Stavins: My recollection is that probably some years after that, I was doing a master's degree before I did my PhD at Harvard, I did a master's degree at Cornell and I believe, and it was during probably it was during the Carter Administration, or maybe it was subsequent to that, but in any event, no, the Reagan Administration, Fred Kahn was then down in Washington leading the effort to deregulate the airlines. Isn't that right?

Paul Joskow: Yes. He was chairman of the Civil Aeronautics Board and pushed forward with deregulating prices and entry.

Rob Stavins: And I mentioned it because of the fact that that caused a lot of unhappiness among Cornell faculty, because the wonderful Ithaca airport that previously had nonstop flights several times a day to Washington D.C. They disappeared. And in fact nowadays, if you want to go to Cornell, you fly to Syracuse, New York and then find your way from there.

Paul Joskow: Well, we had Mohawk which flew to New York and Washington, I believe. The last time I tried to go to Ithaca, there was nothing. I flew to Syracuse.

Rob Stavins: No, that's right. That's the way it is now, for sure. So, you did your BA in economics after moving over from engineering and then graduate school.

Paul Joskow: Yes. I went to Yale for my PhD right after I graduated in 1968, and I completed my PhD at Yale in 1972.

Rob Stavins: And your dissertation was [on] behavioral theory of public utility regulation, is that right?

Paul Joskow: Yes. It was. It focused on the political economy of public utility regulation and the behavior of regulatory agencies and their interactions with various interest groups, including of course the firms they regulated.

Rob Stavins: Oh, interesting. And who was your committee?

Paul Joskow: I had two primary thesis advisors. Alvin Klevorick, who is still there. He's in the economics department and in the law school, and Dick Nelson, who was at Yale at that point and eventually went to Columbia and he worked primarily on evolutionary economics with Sid Winter, but he gave a very interesting graduate IO course, which was quite different from the industrial organization courses offered most other places.

Rob Stavins: So, you receive your PhD from Yale, and then what was your first job out of graduate school?

Paul Joskow: I was lucky when I went on the job market, I guess in late 1971 and early 1972. I had a lot of offers and I found MIT to be the most interesting and the most friendly and supportive place that I visited. So, I chose to go to MIT.

Rob Stavins: And obviously it fit well because, other than sabbatical leaves, you spent your whole career there, haven't you?

Paul Joskow: My entire career has been at MIT except for a few leaves.

Rob Stavins: So, let me turn to another important aspect of your professional life, an extended leave of absence for 10 years, to the Sloan Foundation. So why and how did you go there, and what was the experience like after being in academia for years?

Paul Joskow: Well, it was an interesting decision, I guess, and it came about by accident. I was reading *Science Magazine* and there was an ad for a new President and CEO of the Sloan foundation. And I'd done some work with the Sloan foundation over time, and I went up to see Bob Solow, who was on the Sloan Foundation's Board of Trustees, and I said, "Is this for real? Or are you just putting this ad in because you have to put ads in all over the place?" He said, "No, no, we haven't, we haven't chosen anyone. I'll send in your resume if you want." So I said, "Yeah, send it in. Let's see what happens." And push came to shove, I was interviewed several times and they offered me the job. And then I decided, gee, if I'm going to ever do anything different, I just turned 60, this is the time to do it. The Sloan Foundation's a historically very academic foundation, supports a lot of academic research, university research, and I decided to give it a try.

Rob Stavins: So, was it a difficult transition in any way or was it just unambiguously positive on all dimensions?

Paul Joskow: I would say that at first it was shocking because I wasn't sure exactly what I was supposed to do. And I'd never run an organization with all those responsibilities before, not only for the people and the grants, but we had an two billion dollar endowment that had to be managed properly. So it took me a while to get to know everyone, to get my feet firmly on the ground and to decide what if any new programs we would implement. And over the next year, 18 months, I closed a number of existing programs and then started a number of programs, including programs in economics and a program in energy and the environment.

Rob Stavins: And I assume you enjoyed life in New York City?

Paul Joskow: You know, I grew up in New York. New York has, for my view, pluses and minuses. There's a lot to do.

Rob Stavins: Yeah.

Paul Joskow: Which is nice. But yeah, it's a big urban city that has its own issues associated with crime and noise and sometimes dirt. But yeah, it's an exciting place to be. We actually kept our house in Brookline, and we came back for a few days every month and MIT had an office for me. So, I stayed in touch with MIT during that period of time as well.

Rob Stavins: Oh, that's great. Now your successor is not an economist. He's from the natural science world. What about your predecessors? What was sort of the typical background of your predecessors as President and CEO of Sloan?

Paul Joskow: Well, first of all, Sloan, Alfred P Sloan was the President from the time the foundation was created in the mid-1930s until he died in the early 1960s.

Rob Stavins: Oh, I didn't know that.

Paul Joskow: So, he ran it, basically. My immediate predecessor was Ralph Gomery, who had been the chief scientist at IBM. And he had that position for, I think, 18 and a half years. And then there were maybe two or three or four people in between Sloan and Ralph. There was someone from Princeton, a professor from Princeton, whose name is escaping me now, who was the President and a couple of other academics.

Rob Stavins: So consistently the President and CEO for quite a time now has been an academic.

Paul Joskow: Yes. I would say, except for Sloan himself, they've all been academics. I include Ralph Gomery an academic in the sense that he supervised a large portfolio of technical basic research.

Rob Stavins: So, let's turn to regulatory economics. I mean, there have been tremendous changes, certainly in the world of regulatory policy, since you were doing your work at Yale and your PhD research. Can you comment on the most prominent changes or trends? Not so much in regulatory economics initially, but in regulatory policy?

Paul Joskow: Well, I think certainly in the sectors that interest me most, which are electric power and other energy sectors, oil and natural gas, the big change that has taken place in the last 20 or 25 years has been restructuring these industries so that we could rely more on competition and less on regulation. It started with the natural gas industry and the oil industry, and then during the 1980s and 1990s, and ultimately around 2000, it resulted in restructuring and the creation of competitive wholesale electricity markets and retail competition in many US states and in Europe and in other countries.

Rob Stavins: Now, I assume that there were a variety of factors that brought about those changes in regulatory policy, in those different sectors. Is there sort of an overall

factor across all the different sectors that brought about the demand and then the actual implementation of these regulatory reforms?

Paul Joskow: I don't think there was a common thread. It was more a time series profile. So the first industries to be deregulated, by deregulated I mean the government stops controlling prices and stops restricting entry, was the airlines, the trucks, and the railroads. And there'd actually been quite a long academic literature and policy discussions about those industries going back into the 1970s, certainly. After those industries were restructured and deregulated, some policymakers start to turn to others, and one they turned to was the electric power sector, which was the largest sector that was still subject to traditional regulation, an industry structure where there was extensive vertical integration. And I think it was people in the Reagan Administration said, well, why don't we just deregulate that industry too? And my colleague Dick Schmalensee and I ended up writing a book which started as a report for the government called "[Markets for Power](#)" explaining what kinds of restructuring had to be accomplished to create truly competitive wholesale electricity markets and what the alternative options might be.

Paul Joskow: I think we published that book in 1983 and there wasn't too much interest at that particular time. I think what stimulated a lot of interest actually was the Public Utility Regulatory Policy Act, PURPA, which began being implemented at about that time early in the 1980s, and it allowed for the first time independent power producers to come into the market under restricted terms and conditions. And PURPA I think ended up being sort of a can opener that gradually opened more and more the opportunities for competitors to come into the market. I think as well, the privatization and restructuring in the UK of the electric power industry, which occurred during the 1990s, was a model that influenced a number of state regulators here, especially the state regulators in California.

Rob Stavins: So, a lot of what you've described, the changes in regulation, began really, it sounds like, in the Reagan Administration. Is there an identifiable pattern since then? In other words, is it during Republican administrations that we see more such initiatives? And is then there pushback the other direction during Democratic administrations? Or is it not identifiable on partisan terms?

Paul Joskow: I think the reality is that airlines and interstate trucking and rail freight were done under the Carter Administration. And at least airlines was supported by Ted Kennedy, Mr. Justice Breyer, who is now a Supreme Court Justice, served as the staff leader for a study of airline regulation and deregulation in the 1970s, brought down there by Kennedy. So I wouldn't say that it was a particularly a Republican initiated activity. There was pretty broad agreement, at least in those three sectors that the 1930s regulatory institutions really didn't make much sense. They were leading to higher prices and higher costs, and that deregulating them made a lot of public policy sense.

Rob Stavins: So, these have been bipartisan initiatives. If we were talking about environment rather than regulatory policy, I would observe the same going back decades ago, that they were bipartisan initiatives. But now in this era of extreme political polarization, particularly around climate change, it's very partisan. Has the political polarization also infected Washington debates on regulatory policy more broadly, or has that not happened?

Paul Joskow: Well, I think it's certainly become more partisan, and it's particularly partisan with regard to climate change policies, and that has had a significant effect on the ways in which the electric power sector in the U.S. is adapting to climate change and implementing policies to mitigate climate change. And because of partisanship, there's a lot of difference between the blue states and the red states.

Rob Stavins: Yes.

Paul Joskow: Which didn't really exist in the past.

Rob Stavins: So turning-

Paul Joskow: Let me note, as you know, I was involved with the creation and implementation of the cap-and-trade system for sulfur dioxide emissions by electric power companies. I was on the acid rain advisory committee, and it was completely nonpartisan.

Rob Stavins: Oh, absolutely.

Paul Joskow: And there were differences of opinion, but they weren't partisan differences of opinion.

Rob Stavins: Right. No, the proposal for the SO<sub>2</sub> allowance trading system for everything that became the Clean Air Act amendments in 1990, came out of the George H.W. Bush White House, sent to an initially resistant Democratic Congress, as I recall. So, let's turn to today somewhat because you were mentioning climate change policy. In terms of energy policy even more broadly, what's your assessment of the current US administrations' policy initiatives? It's only been a year that we've had this administration in place, but is there anything you could say about that?

Paul Joskow: Well, I think the administration has its heart in the right place in the sense that we need to adopt policies that will mitigate, reduce, and eventually eliminate greenhouse gas emissions. They've adopted policies which I would consider to be largely non-market-based policies. They've resisted pricing carbon emissions. And I think that significantly complicates moving forward in an efficient way. The absence of a national policy makes it even worse because rather than having a coherent US policy, we have states that have adopted their own

policies and states that have resisted any policies and that's become kind of a mess in my view.

Rob Stavins: I mean, essentially the blue states, in particular the west coast, the northeast, and to some degree the upper Midwest are the ones that have put in place, climate policies of one kind or another. And then typically the red states have not, isn't that the pattern?

Paul Joskow: That's exactly the patterns. If you look on the map, it's Vermont, Massachusetts, Connecticut, New York, New Jersey, Maryland, Virginia; if you go west it's Illinois, then California, maybe Oregon, but those are the blue states that have always been quite activist on environmental issues. And other states, especially states with a lot of coal, are resisting climate policy.

Rob Stavins: Yeah. I mean, if we look at a map of the various states painted red or blue, geographically it's a relatively small share of the land mass that would be painted blue as Democratic, but if we look at it in terms of population or more importantly, in terms of gross domestic product and CO2 emissions tightly linked with that, it's actually a very substantial, it's more than a majority of the country.

Paul Joskow: Yes, that's true. And there are states on the margins that have, and reluctantly like Arizona and a few other states adopting measures to reduce carbon emissions. So, I think it's more than a majority. I focus primarily on the electric power sector and that's what I'm most knowledgeable about, and in a way that's where we've made the most progress, but that's very important because much of the rest of the strategy is first to clean up the electricity sector, to make it net zero, whatever exactly that means, and then to use clean electricity in other sectors to electrify those sectors.

Rob Stavins: Exactly.

Paul Joskow: So they be reduced by fossil fuels and then in transportation to use some mix of electric vehicles and alternative fuels to decarbonize that sector. So in a way, if you think of there being a first step, it is decarbonizing the electric power sector, and that's proceeding slowly.

Rob Stavins: Yeah. But it's been in the United States and in other parts of the world, the low hanging fruit, lower costs available, particularly in the U.S. because of natural gas. I mean, with the decrease in CO2 emissions from the electricity sector because of the massive shift that's taken place because of hydraulic fracturing from coal to natural gas in some parts of the country, the transportation sector is now the number one emitting sector in the country, not the electricity sector.

Paul Joskow: Right. They're pretty close on average.

Rob Stavins: Yeah.

Paul Joskow: The electricity sector's at least been moving in the right direction since 2005. You'll probably see reports, if they're not already out, that CO2 emissions increased between 2020 and 2021 in the electric power sector and in the transportation sector. However, remember 2020 was a year and we had a very significant economic contraction.

Rob Stavins: Right.

Paul Joskow: And demand for electricity and oil and gas declined as well. It's not just natural gas. I mean, I've done some work on fracking. I mean natural gas replacing coal was a big deal. Of course, there are those who are concerned that the methane emissions, at least partially and maybe fully compensate for those CO2 reductions, but it's also been the expansion of wind and solar generation which has been growing very quickly in part because the costs have come way down for those facilities, in part because of state policies, and in part because of federal policies, tax incentives and other incentives. I did a back of the envelope calculation about a year ago, and I think it came out to be about two thirds natural gas and the rest wind and solar, and I bet it's, if we look at 2021, I bet it's going to be closer to 50-50.

Rob Stavins: And you make another interesting point, namely that if we're to look at the life cycle of natural gas, then the difference in greenhouse gas radiative forcing between natural gas and coal is not as dramatic as it appears at first blush in terms of the CO2 emissions that are involved when those two fuels are burned.

Paul Joskow: Right. But as you know, though, methane is a much more potent greenhouse gas over let's say a 20-year period than a CO2.

Rob Stavins: By far.

Paul Joskow: One has to consider methane leaks as well.

Rob Stavins: Yes.

Paul Joskow: Actually, when I was at the Sloan Foundation, we ended up supporting quite a bit of research that the Environmental Defense Fund was leading on measuring methane leaks from the wellhead to the burner tip.

Rob Stavins: And that's been a big challenge is measuring methane releases.

Paul Joskow: Yes. There're all kinds of different ways of doing it, from the ground, from the air, they're now going to use satellites to measure methane emissions.

Rob Stavins: Yeah. Absolutely. So, in regard to global climate change policy, looking around the world, or limited to the United States, whichever you prefer, would you put yourself in the optimist or the pessimist camp in terms of current and future progress that's likely to be made?



Paul Joskow: So, I guess I'm in the somewhere between. I mean, I'm pessimistic about the US adopting a coherent greenhouse gas mitigation policy over the next few years. I'm more confident of the Europeans doing this and perhaps even China mitigating its emissions. On the other hand, I think there are market forces at work that are going to help. I'll just mention a couple, first I've already mentioned the declining costs of wind and solar. I think that's important. Even with no constraints, at least work we've done at MIT suggests you get quite a bit of, in the long run, diffusion of wind and solar into the system just on straight economic grounds. There's a lot of R-and-D going on on other technologies and electricity that do not produce CO<sub>2</sub> emissions. There's interest in small nuclear plants, and there's interest in alternative fuel cycles, the Allam cycle, which basically uses CO<sub>2</sub> to drive a turbine and then sequesters it. There's work going on in carbon capture and sequestration. So, there's a lot of stuff going on, but I think we're suffering, especially in the U.S., from the lack of a really coherent set of policies to which the entire country is committed.

Rob Stavins: So, you're a technological optimist and a policy pessimist.

Paul Joskow: Yes, I guess that's the case.

Rob Stavins: And so, let me turn, put aside the technology and the policy, there's one other set of changes that have been taking place that have been really quite dramatic, and that is youth movements of climate activism, most prominently in the United States and Europe in 2019, somewhat in hiatus because of the pandemic in 2020. But then they came to the fore again in Glasgow during the annual Conference of the Parties. Greta Thunberg, but not just her, much more broadly young people seemed to be much more agitated and activist on climate policies than previous generations, surely. What's your reaction to these youth movements of climate activism?

Paul Joskow: Well, look, I think it's great that young people have recognized climate change is a threat to the globe, to our way of life, and that they have kept their concerns bubbling in the policy arena. One of the ways those concerns are being articulated now, aside from marching on Parliament and so on is the private.... Companies like Google and Microsoft and Walmart even, and others have made decarbonization commitments and they're out there supporting investments in wind and solar and energy efficiency. And I think that reflects in part the views of their employees, but also of their customers.

Rob Stavins: Now, one question I wonder about, and I'm interested in your opinion, is whether what we're seeing is a cohort effect, in which case as these people get older, rather than demonstrating in the streets, they'll be inside the rooms where the decisions are made, or whether it's an age effect and as they get older, they will become more conservative and won't be so activist. Do you have any sense or what's your guess of which it is?

Paul Joskow: No, I think it's the former. I think as that generation becomes older, has decision making positions in government and industry, I think they will have an

increasing impact on public policy. I suppose there's always this old view that when you're really young, you're a leftist. And by the time you're really old, you're very conservative, but I think the general view that they're concerned, I don't think that's going to disappear at all, but they don't have really the reigns on power at the moment.

Rob Stavins: But that's an optimistic note on which to bring this discussion to a conclusion. So, thank you very much, Paul, for taking time to join us today.

Paul Joskow: You're welcome, Rob, nice to chat with you.

Rob Stavins: Our guest today has been [Paul Joskow](#), the Elizabeth and James Killian Professor of Economics emeritus at [MIT](#) and formerly the President and CEO of the [Alfred P. Sloan Foundation](#). Please join us for the next episode of [Environmental Insights: Conversations on Policy and Practice](#) from the [Harvard Environmental Economics Program](#). I'm your host, [Rob Stavins](#). Thanks for listening.

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