Conversations with Bill Kristol

Guest: James Manzi, Software Entrepreneur
Senior Fellow, Manhattan Institute

Taped May 7, 2019

Table of Contents

I: Global Warming and Climate Change 0:15 – 42:57

KRISTOL: Welcome to CONVERSATIONS. I'm Bill Kristol. Very pleased to be joined today by Jim Manzi, once again. Our third conversation, I guess, which is on diverse topics, which reflects your diverse expertise and knowledge, or at least your –

MANZI: Or lack of. [Laughter]

KRISTOL: No, no. Well, I wasn't going to even say – But you genuinely do have a – We did a discussion on your excellent book, which I do really recommend, *Uncontrolled*, on experiments in public, the application of the experimental method to public policies. Is that a fair way of saying it?

MANZI: Exactly.

KRISTOL: We did a Conversation on artificial intelligence, the field you're now in, as a businessman and tech entrepreneur.

But you've written a fair amount about climate change, or global warming as we used to call it in the old days, and I thought it would be great to have a conversation where you just explain to people like me who don't understand the science, and don't know what to think, maybe not what to think about it, but at least *how* to think about it. So, incidentally, why is it now climate change and not global warming?

MANZI: Well, I think there were probably a lot of rhetorical reasons for that in an attempt to kind of control the debate by controlling language. I think that the fundamental underlying phenomenon is actually global warming, which is you're adding energy to the system and that raises temperatures. I think the manifestation of it is not always necessarily purely temperature rising, but instability in climate. And I think that's the rationale for using that term in debate so that you can't basically dismiss it every time temperature doesn't rise on a particular day.

KRISTOL: So we're okay with the term climate change?

MANZI: Yeah, either way's fine, as far as I'm concerned.

KRISTOL: It's legit as far as that goes. So I guess my very amateur reaction to it is, on the one end there are "hair on fire" people. "The world's going to end in 12 years." They seem to be lacking a little credibility

because they said the world was going to end 12 years ago, and 12 years – . So maybe they're a little too alarmist.

On the other hand, there is a certain strain, we'll say on the right, I guess, where it's all kind of just dismissed and either non-existant or nothing to worry about. So how does one begin to think about this? What's happening really, and then we'll go through some of the implications of what's happening.

MANZI: Sure. Well, I guess the simplest way I would try and reconcile how to sail between Scylla and Charybdis that you've just described is, I think the productive discussion about climate change is one about quantities, rather than one that operates at a rhetorical plane of, "is the world going to end?" "Is this a hoax?" et cetera.

And it's ultimately most useful to think about the numbers because that's what should, in my view, drive rational action in this case. And as you said, probably the right way to start is with the science. Like just to begin with, when we talk about climate change or global warming, what's happening? So kind of the couple minute description of that, which I think is a good starting point is this: So a greenhouse gas like carbon dioxide or methane is defined as a greenhouse gas because the following thing is true. If I take a molecule of CO_2 and I hit it with shortwave radiation, so this would be like visible light from the sun. So it's high energy, shortwave radiation. It just passes right through.

If I hit it with longwave radiation, like infrared radiation, which is lower energy so there's long waves, what happens is, under normal conditions, if it hits that CO_2 molecule, it goes in, it shakes the molecule a little bit, and it shoots out in some random direction. And that's called infrared redirection, right?

So if you think about that fact, and then you think about the earth receiving light from the sun, the fundamental process is imagine the earth without, for the moment, CO_2 in the atmosphere. I have sunlight coming in from the sun, a bunch of it comes in, it hits the ground, you know, water, trees, whatever. Some of it just bounces off and goes out into space. Other of that energy is absorbed and it does work. So like on a hot summer day when you touch the sidewalk, it's hot. That was energy from the sun that is performing work, which is heating up the cement. And the energy that goes into the earth, it's like the opposite of the roach motel, right? Anything that checks in has to check back out, eventually. So when that radiation comes back out, because it's done work heating things up, when it comes out it's lost energy, so some of it's gone from shortwave to longwave radiation. So if there's no CO_2 in the atmosphere in this little thought experiment, no big deal. It just all goes back out into space.

If I now stick CO_2 into the atmosphere, what happens is on the inbound side, no change, right? Because it's high energy radiation, passes right through. But now that infrared radiation that comes back out from the earth, some of it's going to hit a CO_2 molecule, right? And it's going to shake it a little bit, and it's going to bounce some direction. Maybe to the side, maybe back down, maybe up. Since there's a bunch of CO_2, it's going to then hit another molecule, bounce in some random direction. And it's kind of like a pinball in a pinball machine, right? It's like hitting the bumpers and it's vibrating them, and eventually it gets out into space, but it takes a while, right?

So what happens is, if I add CO_2, or greenhouse gas to the atmosphere, at any moment in time there's more energy contained in the system called the atmosphere plus the earth. And under non-pathological conditions, if I add energy to a vessel, it heats up. So that's what's happening, right? That's the underlying reality of what's going on.

KRISTOL: And modern economies add CO_2 to the atmosphere?

MANZI: Yes.

KRISTOL: Not much question about that.

MANZI: That's exactly right. And so those are all kind of just, as much as we can know, non-trivial facts about the physical universe. We know all that to be true. So global warming is not this made up thing. Like, it is definitely the case that as you add CO_2, *ceteris paribus*, you're going to raise temperature.

KRISTOL: And it has gone up for decades, or a couple of centuries. We're pretty confident of that?

MANZI: Temperature has definitely risen, or as much as we can measure things. Temperature has risen since what's called the pre-industrial period, so certainly since the mid nineteenth century temperature has risen. Causally ascribing how much of that is due to the increase in greenhouse gasses is a tricky question I think, and is subject to debate. But it is a fact that temperatures have risen.

KRISTOL: Because there were cycles before, right? There were many – before industrial age. So it's not crazy to say maybe this is to some degree simply a cyclical thing, not an industrialization thing.

MANZI: Yeah, if you think about the book I wrote, *Uncontrolled*, which is not about global warming, but it was about the inability without experiments to reliably understand causal mechanisms, it applies here as well. I think that the least persuasive argument for quantifying the effect of greenhouse gasses on temperature is analyzing the historical record, because so many things we don't understand are going on.

KRISTOL: And there was appreciable warming before mass industrialization. I mean, I think if I'm not mistaken, there's a story that the Thames froze in, I don't know, the sixteen century. Isn't there some sort of historical event connected to that?

MANZI: If you look back –

KRISTOL: By the eighteenth, or early nineteenth century, which is still pre-industrialization basically, people thought, well that's crazy. The Thames never freezes anymore.

MANZI: That's right. So if you look back even within recorded history, if you go back in England a hundred, couple hundred years, you have all the stories of the Christmas carols, and you know, stories from that period where they talk about a lot more snow than you see now, right? Called the Little Ice Age sometimes.

If you go back even further in Europe in the medieval period, there's something called the Medieval Warm Period in which temperatures were not totally incomparable to what you see now. In the Roman Empire, they produced wine in what is now Great Britain, right? In fact, there's this very interesting historical argument that you can track the expansion and contraction of the Roman Empire with where the line is where you could grow grapes and make wine, and not.

So there definitely in a lot of variation over time. But I want to be specific about what I'm saying which is, one thing, which is, it is difficult over the last 100 years, in my view, to reliably measure the causal impact of greenhouse gasses on temperature versus all the other effects. What I'm not saying is that therefore, we can conclude it didn't have that effect. It's a very difficult thing to measure from all the noise involved.

KRISTOL: But the science suggests that it could reasonably be having that effect, or –

MANZI: That's correct.

KRISTOL: Would, *ceteris paribus*, be having some effect?

MANZI: That we know for sure. The latter statement we know for sure, yeah.

KRISTOL: And so I guess then the question is both how much of an effect, and how much do we have to worry about it?

MANZI: Right. So if you start with a super simplified, stylized picture of the Earth in which there are no oceans and mountains and clouds, there's just a solid sphere. And you say if you think about this effect I described of radiation coming in and going out, and infrared redirection trapping energy, there's a crucial scaling parameter, which is an engineering term for a number which as you move it up and down will really affect the overall debate, called climate sensitivity, which is an important number to keep in mind, which is defined roughly as the long term temperature change that should result from doubling atmospheric concentration of CO_2, right?

So if you have this ultra-simplified picture of the earth with none of the complexities I described, climate sensitivity is about one degree centigrade. So doubling CO_2 concentration should roughly increase global temperatures by one degree.

Now of course, the real world is much more complicated than that, and when you have clouds and oceans and ice cover etcetera, it affects this process. And one thing that can happen is you can get what are called positive feedbacks. So I said that energy, solar energy comes in, hits the earth, some of it bounces off, and some is absorbed and does work, and can be then redshifted, or create more infrared radiation.

But when it bounces off, no problem, right? Because it hasn't done any work. It just goes back out into space. And so one of the best reflective surfaces is ice. So think about like, on a night after it's snowed, you look outside and even with the moonlight things are bright. You go out in the morning and it's icy, and you just have to wear sunglasses. Glare, that's because you're getting so much radiation bouncing off the ice. So what can happen is temperature rises, polar icecap shrinks a little bit. Since ice is so good at reflecting stuff, I'm no longer reflecting as much. More energy's being absorbed, more is being redshifted, heating gets worse, makes ice shrink, and that becomes a self-supporting effect, right? And that's a positive feedback.

There are similar negative feedbacks, which if chemistry changes in the ocean, and changes in plant cover, etcetera, that tend to buffer the effects. The consensus estimate for a long time of what is the net effect, the true climate sensitivity in the real world, not the stylized world, is more like three degrees centigrade rather than one degree centigrade.

KRISTOL: Because of this positive feedback?

MANZI: Because of all of these complexities. Let's put it that way.

KRISTOL: So that's three degrees per doubling?

MANZI: Yes. Exactly. And an interesting point therefore is that all of these complexities and feedbacks dominate the prediction, which is actually why it's difficult to be extremely precise about climate sensitivity. Which is, as I'll get to, in one of the many ironies in this debate is – in fact leads to the strongest arguments to taking action against climate change. It's actually the uncertainties we have, not the certainty that we're headed for Manhattan being an underwater theme park.

KRISTOL: Yeah, because it's the sort of tipping point problems of these –

MANZI: That's right.

KRISTOL: Positive feedbacks, or whatever you want to call them, self-reinforcing. I guess there are many –

MANZI: That's right. And just, we're uncertain about really how bad the problem is going to be. And as I'll get to, if you assume that the problem is exactly at the midpoint of scientific predictions, it doesn't really

justify a lot of what people are arguing for. It's much more akin to an insurance policy for what if the effects are much worse than we expect them to be.

KRISTOL: And how much is CO_2 increasing? I mean, so we're – you said doubling would lead to one degree without the feedbacks and maybe three degrees centigrade with. And so what is the rate at which we are increasing?

MANZI: Very crudely something like a doubling over this century, right? So conveniently, you can kind of take that sensitivity and use it as a rough estimate for how much in the current century you think we'll get – how much temperature increase you should see in the current century. Stated extremely roughly.

KRISTOL: So that's essentially going backwards, or going forwards?

MANZI: Going forwards.

KRISTOL: Going forwards. And that assumes kind of current production. I mean, use of fossil fuels, and all that kind of stuff, or –

MANZI: Basically, yes. So the best body that integrates most of the scientific and technical knowledge and economic knowledge around this is the United Nations body called the Intergovernmental Panel on Climate Change, or IPCC. They intelligently do not create what's called a business-as-usual, or BAU forecast. They lay out a bunch of scenarios and do not attempt to assign probabilities to them. But if you look at kind of the middle of those range of scenarios, roughly speaking that's what you'd see. And they roughly represent what would happen in the absence of highly directed efforts to mitigate climate change.

KRISTOL: And the CO_2 emissions has been going up over the last, I don't know, 50, 100 years?

MANZI: Yes. It's accelerating.

KRISTOL: Accelerating. Going up and accelerating.

MANZI: That's exactly right.

KRISTOL: Because, presumably China and India coming online and that's –

MANZI: Most recently, that's been the big driver. In the last, you know, few years essentially all, materially speaking, *all* the growth in greenhouse gasses emissions is coming from the Asian economies coming on – the currently developing economies coming online and industrializing, and you know, building coal plants.

KRISTOL: So, CO_2 going up, the climate getting warmer seems to – correlation not causation, but maybe part Asian, or in any case does coincide. Those are just kind of just facts. And I guess one obvious question is well, lots of things change in life, why worry about it?

MANZI: Right.

KRISTOL: I mean, with you know, Florida's warmer than DC, and if there's a little more Florida in the world and a little less Boston. I mean, they'll be some adjustments, but you know, is this really such a big deal?

MANZI: Right. So I think that the fundamental reasons –

KRISTOL: I mean, this is different I guess from – Pollution, it seems to me, which you know, I'm old enough to remember when it was all just about, not just about, but you know, filthy water, and filthy air. There you could see from a, you know, quality of life point of view, why you don't want to be having clouds of pollution in LA, or a river in Cleveland that's, you know, filthy, is not preferable to having clean

air and clean water. But this is different really, I mean, in the current moment it's not clear, is it? I mean, that anyone is suffering in terms of health, or –

MANZI: There are arguments about that right now. I think it's very hard to draw the causal link literally in 2019. I think the fundamental reason why it's not just, “well it's a little more like Florida and a little less like Vermont,” is we’ve built all kinds of infrastructure that assumed the current distribution of sea levels, temperatures, etcetera, and it will be incredibly expensive and damaging to have the physical reality that led to those infrastructure investment change.

And to be less academic about I, you know, if I'm working in a rice paddy in Bangladesh, which is near sea level, that could be really pretty devastating if sea levels rise, to give a practical example of this.

KRISTOL: If the Sahara spreads, and there's les arable land. Presumably there's more arable land somewhere else.

MANZI: That’s right, and so there are a lot of attempts to analyze that, but even if that were true that we’re just swapping out X hectares for X hectares that are now becoming you know, arable, I've built all this infrastructure to grow food here and not there, and it's still going to be very expensive.

KRISTOL: So it’d be worth spending something to avoid the expensive retrofitting all that – refitting all that infrastructure it sounds.

MANZI: Potentially, yes. I think that is the question, right.

KRISTOL: Could be, yeah.

MANZI: And so when I say it's a question of quantities, one important quantity is if you told me that we knew global temperatures would rise, you know, 20 degrees centigrade in the next foreseeable period of time, it would certainly be worth spending an enormous amount of money in doing almost anything to prevent that. If you told me it was going to be one tenth of one degree centigrade, it just wouldn’t be worth doing anything.

You then get to the question of, okay. At a given amount of warming, how do I figure out what I would invest to avoid or ameliorate it, and how would I structure that investment? And that, to me, I believe is the relevant, kind of productive discussion.

KRISTOL: And it seems to be two aspects of this. Correct me obviously if I'm wrong, which is, one is assuming kind of average or you know – assuming the average projection –

MANZI: Expected value.

KRISTOL: – Yeah, expected value of warming. How much is it worth spending, and so forth. And then the other question, which is really more the – that’s more of a I don’t know, practical business decision, we’ll say. And you'd have to factor in all kinds of indirect health costs and all that as well, not just, you know, infrastructure.

But the other is the sort of insurance question of how possible is it that we – it is 20 degrees. Not literally 20 degrees, but 5 degrees as opposed to 3 and it isn’t – and that – shouldn’t one be very alarmed about that? Even if it's a – well, we probably would be very alarmed if it's a 25 percent chance. It might be quite alarmed if it's a 10 percent chance, and you might be – if it's a one percent chance, or point one percent chance, you might say, you know, that’s not worth massive expenditures. So I guess those are both questions, right? I mean –

MANZI: I agree. So I would break it into three kinds of forecasts of decreasing certainty, or decreasing specificity. The first would be what’s the expected value? What, if the most likely case comes to fruition, what would the implications of that be?

Second, if I think about having handicapped the odds – Okay, so I think that the odds of 6 degrees of warming are you know, 4 percent, and the odds of 5 degrees or more are 17 percent, whatever. And I basically say, okay. Under each of those scenarios, what are the costs to me, and kind of take the expected value, average them together on an odds-weighted basis, what do I think the cost would be?

And then I think there's a third kind of question to ask, which is really about truly unquantifiable uncertainty, what an economist would call Knightian uncertainty. And I think it makes sense to proceed from one to the other.

So if you think about the expected amount of warming, in most mid-range scenarios, the expected amount of warming according to the IPCC, which produces every like five to seven years what's called an assessment report, where they try and pull together all the best available knowledge on this thing, create this very large set of documents broken up into working groups. If you look at the most recent assessment report, you know, it's maybe three degrees or so centigrade of warming by the end of this century versus where we are now. And there are alternative scenarios, etcetera. But if you look at mid-range scenarios, it's around three degrees centigrade.

In that same assessment report, they estimate the economic costs of that as a reduction in income on the order of three or four percent, right? So in other words, but for the damage created by that warming, if global economic income is X, it's now going to be point – be conservative, call it .95X.

Now in those scenarios, the reason why we had so much warming is the world economy was exploding and growing very rapidly as it has been. So actually the average person at the end of the century, without that damage from global warming would be like 6.7 times richer than the average person today. So like, .95 times 6.7 is like, 6.5, right? So the average person will be condemned to be 6.5 times as rich as someone is today in 2019 versus 6.7 times as rich.

And so at that point, you're kind of like, okay. I'll come back to how to, I think, address that. But you are really very far from, the Al Gore apocalyptic, you know, tidal waves overcoming the West Coast of the United States.

Then, you know, you have to say, not being idiots, the climate models and economic models say yeah, but of course we don't know that we're going to get exactly the expected effect. We handicap our probability distribution, right?

So when you do that, the center of that probability distribution looks kind of like what I described, but there are some odds that it could be a lot worse. And so probably the most well-know, and most fully developed modeling group around this question of, what are really the odds-adjusted costs of this, and what could we do to intervene is the Nordhaus Group at Yale.

And so it was William Nordhaus was a professor at Yale, produced a modeling framework called DICE, which is used to analyze this. And his conclusions, I think are pretty similar to a lot of those who've really studied it carefully.

And so what you go through is, okay. I'm going to estimate the future costs of this on an odds-adjusted basis. And then, he sort of said, what could I do that is economically efficient to avoid these future costs, right? And so the tradeoff you're always making if you're doing what's called mitigating, which means producing less CO_2, is "I am giving up some income today" because of saying, in cartoon terms, "I'm not going to build this coal-fired power plant," which presumably I was only doing because it was generating economic output in excess of its investment costs. I'm not going to do that, but I'm getting a good thing out of that in return for losing the net income I would have created: In the future I'm not going to have all this damage from global warming. And so I'm trading off a reduction in welfare today for a gain in welfare down the road.

And so in these models, they project out, you know, 250 years and say, what's it worth, and what is the optimal way to do this? And so what they always come up with is some plan which is about carbon rationing, which usually that means a carbon tax, or it's called a cap and trade scheme, or pure regulation. And the economically efficient way to do this is a carbon tax.

And when Nordhaus goes through that whole process, the last time I went through these outcomes, and they're constantly updating them. Here's some interesting facts. It basically argues that we should have, economically, we should have a carbon tax to reduce the use of carbon that net-net will create economic benefit. That carbon tax is enough to eliminate 25 percent of emissions that are going to happen in the future.

KRISTOL: In the U.S. or in the world?

MANZI: In the world. So this is a global scheme.

KRISTOL: So this tax has to be global. We'll come back to that.

MANZI: We'll come back to the practicalities of it, right?

KRISTOL: Because it's an international question of –

MANZI: Even in the theoretical, in the modeling on a computer case, right – one interesting point is what that's basically saying is you're still going to let 75 percent of the damage happen, right? Because net-net, it's to your advantage to do that on an economic basis.

Second thing is, the total value to the world, the net value to the world of this carbon tax is about 0.2 percent of present value of income, right? Now, 0.2 percent of present value of the world's income is a big number. It's trillions of dollars, right? So it's a program which, in theory, is going to net me $3 trillion. Me being emperor of the world, right? Because you're now talking about the entire world. So that's kind of in the completely theoretical case.

And my view about that – thinking about that as a practical person, is like, it's just like fakakta scheme to like have a global carbon tax that you're going to execute for 250 years, right? So first of all, you have negotiate the deal. So when you look at the, say the Waxman-Markey bill in the United States, which was around 10 years ago we tried to put in place, or there was a law created to put in place a system like this for the U.S. There were so many side deals that had to be created that even the most honest advocates agreed that there were so many carve-outs, that you were actually not going to reduce emissions for many, many years, if ever.

So you have to make a deal that, the Politburo of China, and Vladimir Putin, etcetera, they're all going to agree to, right? So are you going to have to give away more than 0.2 percent of future income to get that? Probably. Then they have to really do it, right? And they have to do it in like the year 2200, they have to still be doing it, right?

So my view is that, as a practical person, there is kind of – as an observer of human nature, there is not a realistic plan available that is going to create net economic benefit through mitigation, even in the odds-adjusted case.

Then I think you get to, yes, but what about the true unknowns? Like, beyond that probability distribution, what – it's possible, and it's not possible like the moon could be made of green cheese. It's a non-crazy possibility that there is some catastrophic event that occurs when you reach some threshold value that we don't yet understand.

KRISTOL: But before we get to that, which I think is yeah – So it, in the first two cases, which is sort of the average case, or the reasonable odds-adjusted case, what you're really saying in terms of policy – if some senator says, well, what should I do – is not much? Or you know, adjust some of the, you know,

street levels in Miami Beach so it doesn't get swamped? And let technology catch up with this. I mean, what's the actual policy implication of what you said about the impossibility, or the very great difficulty of reducing carbon emissions enough to really affect things?

MANZI: I think the bumper sticker version, I can describe it in more detail is, "technology rather than taxes." So I think that you would want two things, right?

One is I would want to invest now in long, baseline research for, "break glass in case of emergency" technologies that I would need if we turn out to have a horrific outcome way beyond any probability distribution we see now. And that is a non-trivial amount of money, but it's trivial compared to a global carbon tax.

The second thing I would do is the following – and all of these depend to some extent on the thing we're going to get to, which is thinking about emergency cases.

The second thing I would do is, the world is on a long term path of energy de-carbonization, like de-linking energy from carbon production. If you look way back, you know, I have a house with a fireplace, it's very atmospheric to burn wood, but that's actually how we generated power for a long time. And if you look at the amount of wood you have to burn to support a person at a medieval, or post medieval level, it's an enormous amount of carbon you're releasing, right? It's very carbon intensive. Coal was actually a huge step forward.

Then from coal, you get to gasoline and other liquid fuels, and to natural gas etcetera. They are all less carbon intensive. And now we're at alternative energy sources: nuclear, solar, wind, etcetera, that are dramatically less, let's put it that way. They're not totally carbon-free, for lots of complicated reasons, but they're dramatically less carbon intensive.

I think that the U.S. Department of Energy labs are kind of adrift without a mission, and I would actually take one of the labs and give it the mission of: drive the true, full cycle energy cost for a solar panel below that of coal. And I'd give, you know, alternative energy: build true, low-cost, modularized nuclear power, which even with intelligent regulation, could drive that cost below coal. I'd be doing those things. That's the stuff I'd be doing.

KRISTOL: So from a public policy point of view, you might remove any current foolish incentives for high-carbon energy, to the degree we have such subsidies and incentives, and maybe create some incentives for lower carbon producing forms of energy. I mean, or just let the market work?

MANZI: That's a separate question, and I think requires a lot more detailed knowledge of those regulations than I have, because this whole argument that we are subsidizing carbon based energy – yes we are, but we're also taxing and imposing costs on it. I don't know enough to understand the scale at which – what our net subsidies and imposed costs look like.

KRISTOL: But it wouldn't be crazy to spend public resources on pushing towards less carbon producing energy sources from your point of view?

MANZI: In my view, not at all.

KRISTOL: As a practical matter.

MANZI: Yes. And there are a lot of reasons why I think that would be useful beyond its effects on carbon emissions, greenhouse gasses emissions, which is, I think it would have huge spill-on effects in the broader economy. I think that we are investing huge amounts of money in really kind of undirected – aimless is a better way to put it, research centers in the federal government. I think giving them a mission will motivate far better behavior and create all kinds of benefits to the economy around it.

KRISTOL: Okay, so now let's get to the tail here, because what you're saying is that in the most likely scenarios you don't see great urgency. A lot of it gets taken care of by economic growth and technology presumably.

MANZI: That's right.

KRISTOL: You'll have to do some jiggling, presumably in particular areas and so forth. But not a "hair on fire" situation –

MANZI: No.

KRISTOL: And not even in fact one that justifies much of a carbon tax, or –

MANZI: Any carbon tax, in my view. I mean, we have taxes on carbon producing fuels already for various reasons that are way past what could be justified in my view, economically for greenhouse gas emissions reasons. We're doing it for other reasons.

KRISTOL: Why is the carbon tax such a popular kind of default then for, you know, I'd say sort of responsible conservatives who are trying to say "we're not just idiots here," but you know, "why don't we just switch out you know the income tax, or payroll tax, or something for a carbon tax." I mean, because it doesn't sound like actually the substantive argument is terribly strong.

MANZI: Right. You'd have to ask them because I don't see a rational case for it.

KRISTOL: You don't see it. You're not –

MANZI: No, at all.

KRISTOL: It doesn't take care of the extreme case on the one hand, and it doesn't help the economy. It doesn't makes sense as a tax policy matter in particular on the other, right?

MANZI: Not at all in my view. And the whole idea of we're going to trade it out for a reduction in some other tax, to me is a real sucker bet because creating or eliminating a *class* of taxation is very difficult. Raising or lowering rates is really easy, and I think Thatcher fell into this trap in the UK when she introduced a whole new class of taxes in return for a reduction in rates, which as soon as the new government came in, guess what? They kept the VAT like tax, and increased the other tax rates back to where they were.

KRISTOL: Okay, so we're now down to the extreme case, so to speak.

MANZI: Right. So I think that, as I said, there is a rational caution that we're messing around with a system upon which all life depends that we don't totally understand. And it is clear that we are creating significant change to it. And so there is a risk that we are going to create some unforeseen disaster. It is literally beyond the – if you look at the charts in the IPCC report, and you say – they actually published back in the details: Here's the probability we estimate warming at different levels. You're talking about values that aren't even shown on the charts, right? Massive amounts of warming, or effects of given amounts of warming that no one fully anticipates. That's a rational fear.

KRISTOL: I'm just curious. Which of those two fears do you think is more – I mean, is it the warming can accelerate more, or we're underestimating certain *effects* of warming, you know.

MANZI: I don't know. It could be either one –

KRISTOL: The ice cap melts and there's flooding.

MANZI: Exactly. Like a famous thing is you get ice cap melting, which either stops or reverses the warming current that runs up and down the East Coast of North America, right, which would create enormous problems. I don't know enough –

KRISTOL: Either of those.

MANZI: Either of those, and I don't know that anybody knows. Because we're inherently, remember, were talking here about things that are outside the forecasts that are being made by consensus science, right?

So I think that one, you have to recognize that as a real worry. But two, you can't get lost in the hothouse world of a single issue advocate. In other words, you have to say, that is a risk. There are other such catastrophic risks in front of us, right? And you can break them up into categories.

There are natural world risks, right? So I believe that the current estimate, consensus estimate for the probability of a planet-killing asteroid hitting the earth at the scale of the one that killed off all the non-avian dinosaurs is about one 1 in 10,000 per century, right? SO there is a 0.01 percent chance that we're going to have an asteroid that's going to basically wipe out most life on earth. By the way, it would also stop all global warming [laughter] because the way it does it is it throws all this dust up in the air which acts as a screen.

There are you know, man-made disasters, right? We are, in the developing world, there's a crazy use of last-ditch antibiotics all the time in frontline use, and we're creating bugs that we just – we're losing the race against lots of bugs of having antibiotics that work. So what happens if you have a mutated version of a bug that expands and you know, is able to kill realistically hundreds of millions or billions of people? What if a government weaponizes them, and uses them? What if China does that?

What if China develops effective missile defense and suddenly begins to launch nukes, right? What if India and Pakistan begin a regional nuclear war? You can go on and on and on, and none of which are crazy risk, all of which are way below one percent is my guess in the next century, but who knows? You can't quantify it.

KRISTOL: Use of nuclear weapons just strikes me as, incidentally, not necessarily below one percent, you know.

MANZI: Fair enough.

I could make a list of, without getting to ridiculous things, I could make a list of a dozen risks like this – you could probably make more – that I think are of – we're talking about unquantifiable risks, you can't say, is the percentage probability higher or lower – but are of intuitively comparable probability to what we're talking about here. And the severity is, if anything, much worse.

And so I think you have to say, humanity is very likely, over the next 100 to 200 years, because that's the kind of time frame people are talking about here, right? Like the hubris of, "we're going to plan through tax policy in 2019 to affect what warming is in the year 2180." Fair enough, maybe you have to do it. But on that kind of time scale, humanity is going to face enormous challenges. We just don't know what they're going to be, right?

So I think the correct grand strategy facing that, to get kind of grandiose about it, is you want to maximize optionality. And I think the raw material for options are money and technology. So you want to be as wealthy as you can, and have as much – wealth here, really when you get past the currency, really means what kind of human capacity, in quantity and quality, do I have in excess of what is required for subsistence, right? I want maximum wealth and technology because that will give me options to deal with these issues as they arise.

And you know, you can end up focusing on this one risk, and say, “this is the one existential risk that we need to orient the entire world economy around and take all these costs against.” And I think that really is not a sensible way to think about it at all.

KRISTOL: Now in the nuclear area, I mean we’ve done a lot of things over 50 years, just routine policy things: a lot of alliances with countries; procedures for permits for nuclear plants and for selling technology for nuclear plants overseas, to try to minimize to some degree the risk of a nuclear war, things getting out of control. But I guess what you're saying in this area – and that seemed sensible, and even though maybe without all those things there still wouldn’t have been a nuclear exchange, but the cost isn’t that great, and it seems prudent.

But it sounds like actually in *this* area, there's less that can be done of that, in sort of that scale, kind of routine policy. Well, I guess accelerating clean energy, what you're talking about –

MANZI: Exactly, and it's almost a mirror image, because what you're trying to do is – there you're trying to prevent bad actors from having options. Here we’re trying to give ourselves more options in the future. And I think fundamentally, that is driven by wealth and technology. You don’t want to slow down economic growth to any appreciable degree because that is going to be central for dealing with this problem and any other problem.

You know, and there's a reason why, and it's not just it's in a low lying area, that Bangladesh is always the example of a country that’s going to be incredibly affected by global warming if any sea levels rise. Part of it is, its low-lying, you know, it's near the equator, etcetera. But part of it is it just doesn’t have the same wealth and technology that we do. With enough wealth and technology, I mean, Holland’s pretty low-lying, but somehow manages to be a wealthy successful society. Obviously, it's a different challenge, but they're dealing with the issue of high sea levels.

KRISTOL: Yeah. Technology can take care of a lot of problems of that – unless they just get spiraling out of control.

MANZI: Exactly. And by the way, as I was saying before, this is one of the many potential disaster problems that might arise. You know, it's liquid optionality for being able to deal with whatever problems arise.

KRISTOL: That one particular problem seems to me - and I was thinking about this in the nuclear context – is there we have a foreign policy that tries to prevent certain things from happening, allies. But in the global warming context, I mean, it's a global problem. I mean, it's very unclear what one nation can do I guess. I mean –

MANZI: Well, let me tell you what the United States has done, which in my view has had, and I think an objectively looking at the evidence. In the last 10 plus years, the most successful policy, the most successful empirical results on the ground in reducing emissions in any large wealthy country have been in the United States. Ironically, right?

KRISTOL: Empirically, that’s just the case. We have gone up less than other countries.

MANZI: That’s right. Our intensity has dropped. We’re actually emitting less, right, than we were.

KRISTOL: Just relatively but so to speak, absolutely.

MANZI: Exactly. And so the – what's happened is if you use 2005, which is often used as a benchmark year, we basically reduced emissions more than any other country. And the reason we’ve done it has nothing to do with the guys in nice suits doing meetings, acting like King Canute and thinking like, well, we’ve signed an agreement on a piece of paper that says we agree to reduce these emissions.

It's like in the most recent, from several years ago, *Die Hard* movie, right? So the computer nerd's with Bruce Willis, the action hero, and the computer nerd kid says to Bruce Willis, "Well, what's the plan?" And Bruce Willis says, "We're going to go beat up the bad guys and save the girl." And the computer nerd says, "No, I meant like, what's the plan to do that?" [Laughter.]

It's kind of like, you can say I'm going to reduce emissions amount, but it doesn't really do anything, right? The only way you do it is you consume less, or you have better technology. Those are your choices.

So what's happened in the United States in a way that nobody in power anticipated, virtually nobody in power anticipated, in that if anything, policy cut against, was basically fracking. And so, which I'm using as a shorthand for a whole bunch of technologies that have been introduced that even in say 2008, no one predicted. The Department of Energy, everyone was predicating the United States was going to continue to import more oil, and you know, production had peaked and so on. Fast forward 10 years. The United States, I think a couple months ago became the world's largest oil producer. Among the many other incredibly positive benefits of this, which you know, we could list, you know, in terms of adding to GDP, creating incredibly high wage jobs for non-college educated workers, reducing the trade deficit etcetera, etcetera.

KRISTOL: Reducing our dependence on –

MANZI: On an unstable supply chain that originates in the most unstable region on earth, right?

In addition to all of those things, it's actually reduced emissions dramatically, and the way it's done it is it's caused a net shift from coal to natural gas, which has much lower carbon intensity, and therefore, we've reduced emissions. There have been other factors, including by the way, increased regulation. But the biggest single contributor to this has been fracking.

And so if you think about the framework in which that happened, it was literally contrary to all the signals that were coming out of Washington, and all the policy coming out of Washington. But the American system of innovation, which is: highly free-markets; individual property rights. Because when you look at the way oil fields are owned and controlled everywhere but the United States, they are controlled in large swaths, regulated that way, etcetera. You have much more well-defined property rights, and mineral right ownership in the United States. That, in combination with this highly entrepreneurial oil field economy, in combination by the way, with important government investments in technology over decades.

Like one part of the government investment in the technology that mattered was actually the stuff that created Silicon Valley, right? Because you have this DOD investment in information technology, which has been crucial to what's happened. But you also have specific investments that were pretty derided at the time in the Carter era and before in the Department of Energy, around specific pieces of technology that ended up getting deployed here. The government role here was not like, "we're going to set this policy and direct through taxes and what you're going to do with it." It didn't work. What actually worked was free-markets, property rights, and an entrepreneurial economy that you allow to function, and government investments technology. Like it's job really is to protect property rights, to protect the market and then to invest in technology.

KRISTOL: And so we've actually – so we're contributing less than we used to.

MANZI: Yes. Exactly. The EPA, last time I looked, the EPA projected that, they only project out to the middle of the century, they U.S. will literally *never* emit as much per year as it did in 2005. We will never emit as much as we did in 2005.

KRISTOL: I suppose it wouldn't be crazy to say as a matter of foreign policy, how do we help, encourage, pressure other countries to move in this direction? But I suppose the answer is going to end up being make them richer more entrepreneurial and –

MANZI: I can't see any other answer.

And I also think that, you know, really if you look at where emission growth is happening, it's happening where people, as you described earlier, they're moving up into the industrial middle class. It's China, India, kind of the Eurasian heartland. And this idea that we're going to, you know – it's just not September 1945 anymore. I mean like, the United States is not going to direct how China and India develop. They're going to develop the way they develop. On the margin, maybe we can have some effect, but it's hard to see that we're going to do that.

II: Technology not Taxation 42:57– 1:11:36

KRISTOL: So I guess I – trying to put the question this way. How much are we really saying, you know, let the markets work, let's have an entrepreneurial, technologically innovative society, let's encourage others to have that. And it seems like the fracking examples suggest that it sort of Hayekian way, I guess you'd say that, in an unplanned way, the fracking example suggests that in a kind of unplanned way, you get some very positive benefits that no one really thought much about.

But you also mentioned the government investment as helping here as well. And I guess what's the balance there, do you think?

MANZI: Right. Well, I mean, I think that if you think about the role of government in driving innovation broadly, which as is one subset, what we're talking about here. I think if you look back at American history it has been a very successful society in doing innovation. And I think there has been a consistent theme from the period of the Founding until certainly pretty recently about how that's worked.

And I think the first thing is the baseline policy, government policy on innovation has been to have no policy, which I think is a wise thing, which is to basically create a market and enforce property rights etcetera, and allow self-interested actors to interact via the market to drive things forward.

But, there have been important overlays. You know, if you go all the way back to Hamilton's *Report on Manufactures*, right, and you read the debates that were happening in the 1790's about this, it's like, when you get past the language, it's like reading a debate in 2019. And they were very sophisticated, the way they thought about it.

And Hamilton's fundamental argument was the high-tech of that era was manufacturing. And that Britain's strategy was to keep the former colonies as agricultural exporters and to control the high ground of manufacturing in Britain. And we said, no. We should basically create tariff barriers, and we should subsidize these industries to get them spun-up. And there are all these important reasons for that, and the arguments against it were really about what we would call today public choice and sectional interest etcetera.

And that policy is the one that, as nations have industrialized from the United States to Germany to China, that's basically what they've followed, right? And the United States did that, and then had a series of investments in new technology that began with things like the Armory System, right, in which the United States government invested in what became repetitive manufacturing, as is often the case driven by defense needs.

The Congress made this visionary investment in, I think the 1830's, a telegraph line from Washington to Baltimore. It invested in canals. In the late 19th century, particularly when you had, in the post-Civil War and Civil War era, where you had the Southern states were out of the Congress, so the Republicans and the northern advanced parts of the country had total control. You had the creation of what became the Center for Disease Control, you know, public health authorities, all of which created incredible investments in biology and medicine, etcetera. And you had this continuing all the way through the World War II and post-World War II period.

And I think that the theme for how that's worked productively is, the government first of all has a base policy of no policy, to repeat what I said earlier. But, it invests in visionary technology that can form the basis for, you know, high growth industries. And it encourages the creation of a highly entrepreneurial economy in which incumbents are constantly being – companies are constantly being threatened and overcome.

So that's a kind of step way back and think about innovation policy. I think that what we see in fracking as an example, is just one example among many of how that works productively, and I think that ought to be the basic approach the government takes.

KRISTOL: So you can call the Hamiltonian approach I suppose. That's an interesting point.

This gets a little beyond climate change, but there's kind of, let's call it protectionism, or mercantilism, for the sake of technological advancement and innovation, and this mercantilism, protectionism for the sake of protecting old and declining industries against competition. And I guess somehow in our – often in our current debate, I'm not even sure, when economists – I'm not sure economists make that distinction fully because they're for free-trade, so what's the issue here, right? You know, and comparative advantage and all that, but that's an interesting broader point. You should write that up in your next – [Laughter]

No, because I think the Hamiltonian thing, I think a lot of conservatives, free-market types get a little conflicted on it. They sort of think that, "yeah, Hamilton's sort of onto something here. It does seem like it's good to have – " Just being, "No government incentives for anything" seems a little crazy, on the one hand. On the other hand, "we're against, you know, government picking winners and losers. And we're for free-trade and all that." And so I think making that distinction between saving a declining industry because you're scared of competition, and fostering a system that promotes innovation would be important actually.

MANZI: Yeah, I agree. And obviously what, as you know better than I, what happened historically is the Republicans became the party of tariffs, and they kept the tariffs in place *way* past what Hamilton imagined. [Laughter]. And it is tricky to say do you think the government can actually do this for growth industries and not be captured, etcetera.

But look, I mean my take on this is the idea that we want free-trade for the purposes of free-trade is pointless. Like I want us to win, right? And so I want to work backwards from what are the sort of policies that leads the U.S. to be in a situation where we're the society with, you know, wealthy people doing interesting things, who are highly educated, and, you know, economic leaders. And you know, I'd work backwards to that goal. Not backwards from a theory about why trade has to be unburdened.

KRISTOL: And I suppose that's not just a national interest, but an international interest, because ultimately Silicon Valley produces you know, positive goods for the rest of world, too, right? So that in a certain sense, simply letting sort of – not having government encourage or set the conditions for innovation anywhere, it's not clear that actually leads to a world where there's more innovation 20, or 40, or 60 years from now.

MANZI: Yeah. I think that we're way beyond climate change now. I think that the history of the U.S., which is generally up until the current era at least, has been very successful, has been one in which policies are put in place that are, in general, good for the whole world, but disproportionally good for the United States. And the way I'd put what you were just saying is, I think a world in which an Anglo-American country is the largest economy is a world in which the world's better off.

KRISTOL: Yeah, and where a lot of the innovation comes from here, and maybe we can help control some of it from getting in the hands of people who won't use it for good purposes and so forth in terms of China, I suppose, you know.

MANZI: Yeah. That's possible, but at current course and speed I don't think we're going to be in that situation.

KRISTOL: No. No.

Nuclear energy. Let me just ask you about that for a bit because that's always a kind of a part of the debate here. Is that one of those things like fracking that with a certain amount of government investment and research could really be helpful in reducing emissions and without any great cost in terms of other damage?

MANZI: Yeah. The last clause in the sentence is the crucial one. And people who know a lot more about it than I do say that that's true, and I believe them, and it is certainly a component of our energy mix. It's hard to believe that it would not be wise to invest R&D money into figuring out how to create essentially nuclear energy units that are manufactured, rather than custom built each time, which should allow you to drive down unit cost, but also drive up safety and make it easier to regulate it at a more feasible cost.

KRISTOL: That's interesting.

MANZI: But I'm quoting people who know more about it.

KRISTOL: Yeah. One thing I was just thinking as we were talking – I mean, how this in terms of traditional, let's call it an environmentalism – maybe one reason people are not thinking in the way maybe they should be based on this conversation about climate change, and things going forward, is in traditional environmentalism seems to me, back to Teddy Roosevelt and all those people that were trying to preserve, preservationists, conservationist I guess, right, conserve certain natural beauties and wonders, and open spaces, which strikes me as reasonable. And that's good that we have these national parks, but that is you know, a defensive way of thinking or acting, right? That's preserving something that has existed, guarding it against industrialization, commercialization, exploitation – it's just denigration in terms of you know, strip mining some beautiful area near the Grand Canyon or whatever.

And so I think that is where once – but it seems to me that's been sort of transposed in a certain sense to thinking about climate change. We need to conserve, you know, protect against this thing by preserving the status quo, as opposed to saying, no. This is not a case where you can do that. You can have 10,000 acres that are not spoiled by human, but you can't have a global economy like that. Therefore, the solution is less "conservation" and more "innovation" and you know, accepting that something is happening and obviously monitoring it but being ready to deal with it in the eventuality that it gets out of control.

I'm trying to think what the right analogy is in the past. I guess it's the dikes in Holland as opposed to the national park out in the West.

MANZI: I think it's an excellent analogy, because what we're confronting is that if you want to have 7 billion, maybe 10 billion people on earth with the standard of living above that of a medieval peasant, the earth plus atmosphere becomes, to some extent, not to exaggerate, but to some extent, an engineered system rather than one we just happen to live in.

KRISTOL: So like the Netherlands or –

KRISTOL: So we've been sort of talking about the globe, let's talk about, I don't know, Miami Beach or you know, some particular place, or the Arctic for that matter. I mean, how much can we do? How much should we be worrying about these more particular environmental challenges that might be caused by warming, even if net-net it's not going to destroy the globe, or even reduce global GDP that much?

MANZI: Well, I think that you know, you can think about a mutually exhaustive, comprehensibly exclusive segmentation of ways you deal with this into: mitigation, which is like just emit less stuff at the beginning. Which subsets in various ways we've been talking about. Another thing is adaptation, which is dikes in Holland as an example.

Another thing is we actually can counteract effects potentially. So if you think about what I was talking about earlier, “break glass in case of emergency” technologies, there are things you can do. For example, when Mt. Pinatubo erupted a number of years ago, you actually saw global temperatures stop their increase for several years. And the reason was it shot a bunch of particulate matter into the upper atmosphere which acts as kind of like a screen. So you could, if things suddenly were getting out control, there are all kinds of technology proposals for using balloons, aircraft, or just kind of jets that are sort of like an artificial volcano to shoot material up into the upper atmosphere, which for sure can work.

The flip side is like, what could possibly go wrong? Like a giant artificial volcano [laughter] shooting, you know, sulfurous material up into the upper atmosphere! So you only really want to use those, I think, like if there's really an emergency, right? And it's like every other, you know, it's like a last-ditch medical procedure. You have it there in case you need it.

You obviously don’t want to ever get close to using it, but I think it's actually worth investing in researching and building them so that we know we have them.

But you're, I think, talking about this middle category, which is adapting to some degree of climate change. And you know, I think, dikes in Holland is a perfect example. And sometimes it is literal physical infrastructure like barriers etcetera. Because people always imagine sea level – envision sea level rise as being an issue. Sure you might do that.

There are all kinds of simpler things that you can do depending on what the effects are. One of the things people have talked about actually is you paint the tops of buildings white, right? So you increase reflectivity, which is actually going to reduce the net effect rather than deal with an extremely localized phenomenon.

The other thing is we’re going to have more storms, which is one of the possible things that occur. You build back a little bit off the beach you know. You don’t build houses right up on the beach. So like very simple things you do, like stop ensuring people to build houses right over the water. And you know, it's kind of local building regulations are a key element of what I would think of as adaption in addition to the more cinematic thing of building seawalls and dikes and so on.

KRISTOL: I think the “last-ditch medical procedures” is actually not a bad analogy. We’re willing to spend quite a lot as a country, and we should presumably on various last-ditch so to speak, you know, quite lot to save people in distress and, you know. But right, we don’t use them unless we need to use them.

MANZI: Yeah, that’s right.

KRISTOL: And we have them in reserve, and then if we’re in a war, God forbid, we have to use suddenly all kinds of advanced stuff on the battlefield, and that’s very expensive but very much worth it. But we don’t otherwise, you know. So it does require some government action, some collective action let's say since no one in the private sector is going to quite have an incentive to do that, I suppose.

MANZI: That’s right, exactly right. And I think that that is one strand of activity.

The other is, as I said, I think that it would be a very good idea for the U.S. federal government and Department of Energy labs to really give each of them a mission. And you know, I think that technical organizations, which I spend a lot of my time trying to lead, when they really perform well they always have a mission. And their mission is neither so grandiose as to inspire cynicism, nor so prosaic as to be not inspiring, right?

And I think if you took, I’m randomly picking names here, you took the Sandia lab, which is a very advanced Department of Energy lab, and you said, “Look. You have a mission, like in the next 10 years we want you to figure out how to get an actual solar cell on a full-cycle basis to be cheaper than coal.” You know, I think that would be an incredibly positive thing to do. Partially because it’d be great to keep

pushing down the cost of a solar cell, and it'd be great to have the U.S. be a more dominant player vis-a-vis China in that industry, and so on.

But partially, you'd create all this spin-off technology. You'd create a natural magnet for the right kind of people to get involved in that. So you'd create a magnet for immigration into the U.S. of people who are focused on that, or incredibly high, very smart people who are able to add a lot to the country.

And I think if you took each of the DOE labs, or several of them, and you assign them this task, and they were competing with one another in effect, I think that'd be a great thing to do.

And I think even if, as in the moon landing, like getting to the moon and back in and of itself per say, didn't create a lot of economic benefits, iots effect on the broader society, its effect on the standing of United States, and its effect on the spin-off technologies it created were tremendous.

KRISTOL: Yes, that's interesting. So I think you're saying both that on the advanced technology side, and the kind of you know, worrying about extreme case side, there is quite a lot for government to do, in a limited targeted way. But then actually all the stuff, well 98 percent of the stuff we're talking about, carbon tax, reducing emissions, Paris Accord, is all –

MANZI: It's sound and light. It's a sound and light show.

KRISTOL: Yeah, and it is kind of amazing just using the numbers you've provided here, just on the scale even. The amount of effort that's going into stuff that even by the proponents own account, doesn't appreciably change anything. I mean, that is kind of astonishing I guess, you know. It's one thing to say that – and there are the policy areas where people have disagreements, but at least if they're policies worked as intended, which people like us might be doubtful about, you know, it would actually help people out, presumably.

I mean, in this case even if it worked as they say it would work, it sounds to me like what you're saying is – I mean, even Al Gore or John Kerry don't have arguments that if we do X, Y and Z with carbon tax, or clean energy, or restrictions on people's cooling their housees to be below 75 degrees, or whatever they want, I mean. None of that would really make much difference. Is that right? Am I exaggerating?

MANZI: People biking to work in Portland is just not going to do anything, right? And I think that what you end up happening when you get into those advocates plans is – so I described William Nordhaus', you know kind of, here is the amount you'd invest, which is, it'd be trillions of dollars of net investment, right? Presumably to create a benefit. That would still leave some risk. So then you end up with Al Gore's plan that he proposed a while ago, which would raise taxes even higher, but would still leave some risk.

So then you have James Hansen, who is a widely known advocate, who's a scientist, who's plan goes even further, right? And you're chasing an endlessly receding horizon of zero risk at greater and greater and greater and greater expected cost.

I think that the reason, or a big reason why this debate is happening this way, ultimately is the – there's a role that the Right has had to play in this, which is you know, it's been observed since Hayek, and probably way before that – he wrote an essay, famous, called, *Why I'm Not a Conservative*, and he said, my chief objections is the conservative instinct when confronted with facts that lead to a policy they disagree with is to contest the facts. I'm paraphrasing. Rather than contesting that the fact really implies this policy conclusion, right? This is a perfect example of that, and so I think that those with the biggest megaphones on the Right have just kind of acted like – really been pretty irresponsible about basically saying, you know, my brother-in-law's friend who is the weatherman in Altoona, says this is a bunch of nonsense, and just completely ignored and denied facts.

What that's meant is that the people opposing them on the left haven't actually had to engage in the real kind of practical debate about what I think ought to be the question the right is asking, which is, "okay, I

understand your policy proposal. What does it cost us and what does it get us?" Like, that's the question that should be asked.

KRISTOL: So wouldn't Nordhaus or Al Gore for that matter, who's not unintelligent, I mean, would he acknowledge that it only gets what you say it gets? I mean, I guess what would their obvious – it seems to be such a lay-down kind of trump card to play against them that we're going to do all this stuff and it'll cost X trillion, or X plus Y trillion, whatever. It's just not going to change the actual warming much.

MANZI: Right. Without wanting to speak for someone – just quoting the documents he produced – I think what Nordhaus would say is, no. I've done the analysis and what this shows is this creates a net positive benefit of $3 trillion.

And I think what I would say is, what I said to you, which is under the assumptions of this model, that's correct. I mean, I assume you did your arithmetic right. The relationship between your model and the actual world we live in is the challenge, right?

KRISTOL: But even if it does create that net benefit, it seems to me all he's saying is net-net, he can think of some clever policies that trade off in a positive direction. He's still not really slowing down the growth much of CO_2 in the atmosphere, right? I mean, that's what's sort of astonishing about it I guess, you know.

MANZI: Right. Certainly at any – what is believed to be any politically feasible tax rates – even if you applied it globally, which is in my view, a pipe dream, would still lead to what some advocates would say is a dangerous amount of warming. Two degrees centrigrade warming is used often as a threshold that says beyond that it can be a real problem. I don't think anyone, any serious policy advocate believes we are going to have less than two degrees centigrade of warming by the end of the century.

And so they would say, "yes. You're right. My policies are moving in the right direction," I assume, "they're moving in the right direction. They will create a platform for further change." As people realize guys like me are completely wrong about you actually have to trade off you know, economic growth, and "it turns out you got a free pony because you can do all this stuff. But actually people will be smart and just because you strap weights to their legs it's not really going to slow them down, so train harder. That in fact that creates a platform for further reduction, and further reduction, and isn't that better than doing nothing, which will lead to disaster." I think would be the response.

KRISTOL: And to fracking they would say, well that's just a one-off fluke thing. It doesn't tell you much about the future, I guess.

MANZI: I don't know. I think that there is an emerging set of advocates who I think are really pretty rational, who don't agree with me about everything at all, but would maybe not say that. Like Breakthrough Institute and other guys who are very pro-nuclear for example, who I think are confronting the arguments, at least that I'm describing.

KRISTOL: So let me conclude with that, on the politics of it. I mean, do you think we're going to have a healthier and more productive public debate about this over the next decade than we have? I guess, would you agree that it's been a pretty unproductive debate over the last decade or two? I mean, that sort of –

MANZI: I guess here are my takes on that. I was really writing about this, and doing a lot of research, you know, almost ten years ago, up until maybe six, seven years ago. In preparing for this conversation I went back and looked at stuff, and it was a time capsule. I mean, nothing had changed. The debate was still the same debate. And it's easy to get you know, cynical about that, and I don't think it's likely to change.

However, when the Obama Administration came to power, there were two big priorities, you remember they had. One was healthcare and one was climate change. And climate change never – the climate

change legislation, Waxman-Markey, et cetera, never became law. And I think when push really came to shove, and it was time to vote, not to write things in the *New Republic* or *National Review*, I do think the fundamental argument became like, “you want me to pay what?” And like, “what's going to happen?” And I think in a crude, rough, democratic way, I actually think the system worked reasonably well in evaluating and rejecting something which from the point of view of citizens in the United States, I think had costs ten to twenty it's benefits.

So the intellectual debate is pretty unsatisfying. I think that you know, James Madison, you know, wins another $17,807, everybody else zero kind of result because I think the Congress ultimately acted pretty rationally. So that’s what gives me hope.

KRISTOL: And maybe on the international side, I would say the tearing up – well not tearing up – withdrawing from the Paris Accord, which was done with great hoopla by the Trump Administration, I don’t know that it made any difference at all in anyone’s policies. And maybe that’s also a sign that this is sort of – you know, that when people look back in two – Is anyone really goanna say in 2021 if a Democrat wins the presidency that the most urgent thing is to get back into these meaningless accords, when in fact our emissions have been going down for the last, you know, five, six years, and everyone else who were still signatory to the accords been going up.

I mean, I'm exaggerating probably, but maybe I'm not. I think that’s a true statement, what I just said. I mean, so –

MANZI: Yup. I think that, as someone who follows the current political debates much less closely than you do, I think, the Green New Deal argument is a perfect example of using this as a brand cover for all kinds of other changes. So I think it will be used to the extent it's viewed as brand cover. It's hard to imagine that you really could build an electoral coalition around what we’re really talking about here, about climate changes as a central plank. But you know a lot more about politics.

KRISTOL: I know, it's an interesting question. I mean, is the Green New Deal – which is the cover for which? I guess is the way I’d put it. Is the “new deal” the cover for selling a “green” agenda to sort of working-class, middle-class Americans who have fond memories, maybe correctly, maybe slightly misremembering but, of the New Deal, which is a more traditional, you know, obviously pro-employment, pro whatever, you know, labor kind of agenda. Or is the “green” sort of slapped on to sell a bunch of upper-middle-class environmentalists on what's basically a traditional, like it or not, but traditional kind of big government, you know, Keynesian, you know, etcetera agenda. It's kind of an interesting question, I guess.

MANZI: I agree, and I think that you know, historically the builders of great coalitions always reconciled previously competing interests, right? I mean the New Deal was the Farmer-Labor coalition, right, which reconciled the competing interests that have been at each other’s throats for decades. And I think it's probably an attempt to do both, right, is to basically unify them that way.

Again, I'm not a political analyst, but it seems extremely unlikely that that’s going to happen because when you just think about it on a self-interest basis, it's so hard to find the group of people who actually are advantaged by any of it. The anti climate-change tax increases. It's just very difficult to say who are the U.S. citizens in appreciable numbers who are actually better off rather than worse off because of this.

KRISTOL: I come back to your earlier point too. I think just from a political point of view, if one could say to people, look. We’re going to have a little pain in store, but we are going to reduce carbon in the atmosphere by, I’m totally making this up, by 20 percent. It's going to be huge. It's going to be a turning point in the last 250 years. It puts us on a path to sustainability. It's really a thing, you know, it's a big moment. And that’s one thing, and then maybe people do say, okay. I’ll have to forgo some income here the next few decades and it's worth it.

If you're really telling them the rate of increase, to which we only contribute whatever, 20, 25 percent of the world, and we're going to reduce that rate of increase by X percent of the 25 percent, and so we're looking at – how do you even sell that politically?

MANZI: You can't. So you alluded to Waxman-Markey, which was the bill that attempted to do this 10 years ago, by every estimate that I saw, if you assumed it worked exactly as intended, and you gave it, you just gave it – every intended outcome all occurred, it would have lowered temperature by the end of the century by 0.1 degrees centigrade.

And then the argument becomes, when that's pointed out, people are you know, because it's not like you're quoting the Heritage Foundation I mean, right? I mean, it's like every responsible climate model says the same, rough thing. Then it becomes well, we're leading by example, to which my response is, like, I have a regular poker game and you're invited. Because like if the argument is like, here's what we're going to do, we're going to give away our negotiating leverage so that the nice gentlemen who run China are just going to say, "oh, well you're a good guy so I'm going to agree to this thing which costs me a lot of money." It's crazy.

KRISTOL: Even if they did the equivalent, incidentally, what would they –

MANZI: I don't know. It's a good question.

KRISTOL: You're still not even reducing – you know, you're still slowing growth rather than reducing –

MANZI: That's definite. Oh, I think that's for sure.

KRISTOL: So it's sort of a you know – and then if that's the case, why not just, you know, take the growth and get the innovation, right?

MANZI: Exactly. Exactly right.

KRISTOL: Interesting. Well, we'll have to reconvene in –

MANZI: Okay, good.

KRISTOL: I don't know when exactly we'll know more about this, but in 2021 it would be interesting, especially if a Democrat wins the presidency to see, in the real world, you know, your account of the first two years of Obama, I mean, how much of that gets replicated? How much do we have a, let's call it a more traditional New Deal-like healthcare, economic redistribution, working, you know, helping labor versus capital agenda? How much do we have a climate change agenda, because they are in tension with one another.

MANZI: My bet would be strongly on the former, not the later. For what it's worth.

KRISTOL: Well, we'll convene in early 2021 and see if we're in the – Thank you. This has been, for me, extremely instructive. So Jim Manzi, thank you for joining me today.

And thank you for joining us on CONVERSATIONS.

[END]