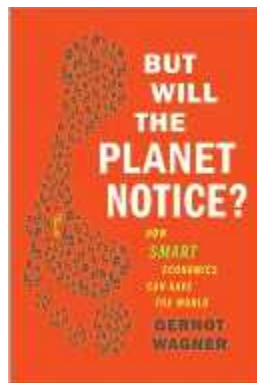




But Will the Planet Notice?: How Smart Economics Can Save the World

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Introduction

JOANNE MYERS: Good afternoon. I'm Joanne Myers, director of Public Affairs Programs, and on behalf of the Carnegie Council I'd like to thank you all for joining us.

Our speaker, Gernot Wagner, is an economist at the [Environmental Defense Fund](#). His focus is on applying economically sound climate policy for both the United States and internationally. He is a graduate of both Harvard and Stanford and now teaches at Columbia.

He is here today to discuss his book, [But Will the Planet Notice?: How Smart Economics Can Save the World](#). In it he questions many of the sacredly held environmental movement's propositions for saving the planet. What he posits may seem counterintuitive, but by the end of this discussion I think you will find that what he has to say makes a great deal of sense.

There are millions of Americans—and you just may be among them—whose vision of an eco-sensitive life embraces a series of choices about what individuals can do to save the planet. And you, like these men and women, may drive less, recycle more, and regularly buy products that claim to be earth-friendly, everything from organic beeswax lipstick, to light bulbs, to Toyota Priuses.

While their choices, and yours, probably include equal part concern for the earth—as well as making a statement about what one believes in—it is arguable that while helping to define the current environmental movement, they and you may not necessarily have been helpful to the cause.

Critics question the notion that we can avert global warming solely by buying so-called earth-friendly products. For example, they emphasize that while choosing more fuel-efficient cars is not bad, a far greater effect may be felt when fuel efficiency standards are raised for all of the industry.

In *But Will the Planet Notice?*, our guest this afternoon emphasizes this point by arguing that "no degree of personal environmental awareness alone will avert the global warming chaos humanity now faces."

With perhaps as little as a decade left for planet-saving action, our speaker points out that it is going to take the combined actions of several billion people to make a difference. Thus, the question is: How do we get a critical mass of action that will save the earth?

Gernot acknowledges that, at this late date, only an immediate, economic-driven redirection of market forces will make this happen. As he says, "Scientists can tell us how bad it will get, activists can make us pay attention to the ensuring instabilities, but it is only the economists that can help to navigate and take us out of this morass and save the planet. In the end, it is up to us to take personal responsibility for our world." We can do so, he says, by "demanding an economically sound solution that guides us with market forces in the right direction."

Please join me in welcoming an economist whose views just might make a difference.

Gernot Wagner, thank you for joining us today.

Remarks

GERNOT WAGNER: Thank you, Joanne. Thank you for this opportunity.

In the next 20 minutes or so I'd like to make three points. One, climate science is clear; the globe is, in fact, warming. Given that the science is clear, the second point is that there is often this amazing disconnect between what we know is the case when we look at the science, and what we, the most committed among us—and I would count myself as one of them—as environmentalists, what we are doing or willing to do in response. And, three, the only solution for this, or almost any other environmental problem at this scale is, in fact, to listen to the economics.

Just quickly to address the issue of science—I am not a natural scientist; I'm a social scientist. But just to give you a sense of what we are facing here:

Imagine an ice skater participating in the Winter Olympics every four years. Whenever a spinning ice skater wants to speed up, she pulls her arms close to her axis. When she wants to slow down, she stretches out her arms. The exact same thing right now is happening with the planet.

That's the situation we are in at this point. Ice is melting at the poles, and water is redistributing at the equator. And we can, in fact, measure its effects. The effects occur in fractions of a second, but days are, in fact, getting longer because of global warming. That's the situation we are in at this point.

This is not sometime in the distant future; it is happening right now. This is not about models showing that this will happen or could happen. There are satellite measurements right now telling us that this is, in fact, the case, that the polar icecaps are melting. So yes, this is happening, it's happening at a measurable rate, and it is happening at an accelerating pace.

Now, I am not saying that we know everything about this problem, that the science is settled. There are plenty of uncertainties. But that, of course, is exactly the issue here. There are all these [black swans](#), ten-foot women, unknown unknowns here, that make it even more difficult to address this problem sensibly if we wait much longer.

So looking at this and looking at this reality, the question then is: What are we doing in response? What are we as environmentalists, and as a society, prepared to do?

There is this amazing disconnect now between the effects of slowing down the planet's rotational speed, and what we are in fact doing. So the most committed of us environmentalists—I am one of them—we recycle, we bike to work (I don't have a driver's license even; actually, most Manhattanites probably don't own cars), we avoid out-of-season grapes, we carry home locally grown apples in organic canvas bags, and do all the right things. We try to do the right thing.

Now, unfortunately, it just doesn't add up to enough. You can try to be a no-impact man, but in fact you will have no impact on the planet.

Now, that's an extremely uncomfortable message to send. But it's logical, if you look at the basic numbers. Just indulge me for a second here.

You start with 300 million Americans, with 20 tons of carbon dioxide emissions per American, on average. Let's just say you go down to zero from 20—not that it's possible, really. But let's just say you decrease your emissions to nearly zero. The average for all Americans is still 20 tons of CO₂. Three hundred million Americans—300,000 drops in the average five-gallon bucket. Your impact would be less than a drop in the bucket.

Now, of course, that's the extreme example. Individual action, individual sacrifice, won't make a difference here. We clearly need to do more.

So, we can create a movement. We create an army of [no-impact men](#), an army of recyclers here. We don't just recycle; we tell our neighbors and kids to recycle.

Now, this is now a bit more difficult to knock down as a straw man here. But still, if you actually run the numbers, it simply doesn't add up to enough.

So, let's say we all recycle, all 300 million of us, or all seven billion of us. First of all, a few billion of us on the globe don't have anything to recycle in the first place. So if you start at 20 tons on average and go down to 19, it's as easy to do as taking a staycation. [Hurricane Irene](#) nixed my plans to go to Austria for a vacation this year; my carbon budget just decreased by about a ton of CO₂ for this year.

Now, if you had two tons, going down to one isn't just a lot more difficult; frankly, given current technologies, it is essentially impossible to do. So there are about three or four billion people on the planet who have nowhere to go but up, in terms of their carbon emissions.

But let's stick with the recycling just for another second here. No surprise, it turns out that getting millions, or perhaps a billion, of us together to do the right thing still won't be enough.

I'm a Catholic. Let's look at the Catholic Church, the most successful social movement in history. A billion Catholics. And just for argument's sake, let's just say every Catholic followed the Pope's lead, and the Pope was prepared to basically go down to zero. All right, so you have a billion people reducing their emissions to zero. Well, yes, the planet would notice.

Now, unfortunately, that shows up essentially the same way a recession does—you get a big bump down in emissions, and after that one bump emissions increase again. So, in 2008, Lehman took a nosedive, the world economy followed, and emissions clearly went down. But the overall upward trend still continued. And, if anything, after the recession, as we are growing our way out of this recession—or avoiding a double-dip recession, I guess—we are actually growing at an accelerating rate. Emissions are now increasing faster than they did before. Our current technology, the way we organize ourselves as a society, simply doesn't allow for major emissions reductions, or major changes to this trend.

So, yes, it takes even more than a billion people—not that that is ever possible—but a billion people to voluntarily do the right thing here.

Now, that's not exactly comfortable, or comforting, for that matter. The point, of course, is not that we shouldn't be doing these all these good things, recycling and so on. The point is that we should be doing much, much more of that. We all need to do these things.

That is, I guess, the key point here. The real bummer, from the point of view of the science or the economics, is that even if we all did this, even if we all went all-out here and did the right thing—a billion environmentalists recycling, doing all the right things—the planet would still be toast.

So why bother? I work for an environmental group. Why? Why recycle? Why do we do all these things?

Well, on one level, because it makes us feel good. It's the right thing to do, even the ethical thing to do. We ought to be doing these things.

Psychologists call it action bias. You are facing these dramatic consequences; you want to do something personally, anything.

Now, unfortunately, there is also a fairly well-documented psychological phenomenon here called the [single-action bias](#). You do one thing and then you move on. You refuse the plastic bag at the checkout counter and then you walk your groceries back to the car. Or, even worse, you carry this organic canvas bag onto a plane. This phenomenon tends to result in a phenomenal mass delusion.

A month, shortly after President [Obama](#) got elected, significantly more Democrats thought that the environment was getting better than only a year before then, as if this single act of voting for Obama made all the difference.

The only way to make a difference here, the only way to make the planet notice, is to make doing the right thing in the self-interest of everyone involved. It's doing good by doing well in the clearest sense of the word here.

Now, this statement, of course, is precisely why as an economist it is often tough to be in polite company, and when you're in polite company it's tough to be invited back. But the bottom line is this: It is self-interest, not self-sacrifice, that makes the difference here.

Let's look at an example again, back to recycling, the *bête noir* of the environmental movement: plastic bags. We all know that we should be bringing canvas bags to the store and refusing the plastic bag at the checkout counter, or at least get the paper one, if anything. But of course, sometimes we just forget.

Now, it turns out there's a pretty simple way to make people not forget. Ireland [introduced a so-called Plas Tax in 2002](#). So if you go to a store in Dublin, you now pay 22 euro cents per plastic bag. It's tiny. It shouldn't make a difference. You purchase your weekly groceries, you spend 100 euros; those 22 cents shouldn't figure into your calculation. Well, it turns out they do. Plastic bag use in Ireland decreased by about 90 percent. That's about a billion bags per year.

Starting last year, 2010, Washington, D.C., has been charging five cents for disposable bags, both paper and plastic. And guess what? [Initial results show that plastic and paper bag use decreases once again.](#)

It's a tiny, tiny policy change, a huge shift in outcomes here. And it's not the five cents that makes a difference in the case of Washington; it's the principle that counts here. Suddenly, not receiving the free bag at the register is the new normal. Consumer behavior, of course, changed as a result.

Now, of course we are talking about plastic bags here. A billion of them clearly makes a difference. But it's still far from something like global warming.

Now, let's go a step bigger here, from 20 cents to about \$20. That's the damage, on average, that every ton of carbon dioxide pollution, CO₂, causes right now—not in the distant future, right now—to ecosystems, economies, health, human lives. It is droughts, floods, and other disruptions essentially that figure into this calculation.

The average American emits around 20 tons of CO₂; \$20 X \$20 equals \$400 of damage per American per year—not in the future, right now. That, by the way, is a conservative estimate. By some accounts, the actual damage costs about \$100 or above per ton, so now we are talking \$2,000 per American per year right now. But still, let's stick to the \$20 here, \$400 per person per year—and yes, damage right now, not damage in the distant future.

So who pays this 20 bucks? Who actually pays that? Well, we all do. We pay as a society. I take this flight from JFK [John F. Kennedy airport, New York] to Austria to see my parents. I don't pay for the 20 bucks. It's everybody paying fractions of a penny, but still. And everybody else's flight does exactly the same thing.

Now, what you could do, of course—and what some people do—is voluntarily chip in a few dollars. It turns out that you could go to [TerraPass](#) or a whole number of other websites and basically pay someone else to plant a tree or cover a methane pit on your behalf. It's not that those are bad things, right? We should be planting trees; we should be covering methane pits. I'm not saying these are bad things per se. It's all good.

But none of these voluntary efforts motivate anyone to fly less. Why else would some airlines even offer that on their websites? First you pay for the ticket, and then they offer you to spend another 20 bucks voluntarily to offset your carbon emissions. It's not that they want to basically make you fly less or make you feel bad about flying. If anything, they want you to feel good about flying and want you to do more of it.

The airlines quite consciously use these voluntary offsets to target green-conscious consumers, environmentalists, in this marketing. I can't prove that for a fact, but I am pretty sure that that checkout option to pay for the voluntary emissions probably even changes by zip code. If you live in Brooklyn, Boulder, or Berkeley, you get that option; if you live elsewhere, you may not actually see this. It's a marketing ploy.

Now, one effect of this is that people may actually fly more. It makes you feel better about flying so you do more of it. That's a problem, to put it mildly.

But it's not as big a problem as the second effect here, which is airlines by themselves don't have any incentive whatsoever to fly more fuel-efficient planes, to change their routes, or to do anything else along these lines. They may paint their tail wings green or put a tree in their annual report, but that's about it. Nothing that could really make a difference.

Now, it turns out that airlines, of course, do do energy-efficient things. The oil price goes up, and as a result the actual time between takeoff and landing—not necessarily the time on your ticket, but the actual time between takeoff and landing—increases, because flying planes more slowly saves fuel. As the oil price goes up, airlines make this calculation and figure: Well, it makes business sense to fly slower and save money on fuel.

Now that, of course, is self-interest. This is not self-sacrifice on the part of airlines. They are not making any money as it is. But this is self-interest. And that's okay. The game we have set up for them is, in fact, to do this. It's capitalism essentially, right? You do things better, more cheaply, or more beautifully than the next guy. And you make a buck or two as a result.

Just to reemphasize this point to the vegetarian, non-driving environmentalist living on an NGO's [non-governmental organization] salary, it's okay to make money. What's not okay is if the playing field isn't level.

If every ton of CO₂ causes \$20 worth of damage, and the cost to you or me as the polluter is zero, everyone else pays that cost. It may even be subsidized as a polluter. But everybody else faces the cost.

Every ton of coal and every barrel of oil causes more environmental damage than it adds value to GDP—Gross

Domestic Product. That's far from a level playing field right here.

When I fly across the country or fly to Vienna to see my parents, the same thing happens: I don't pay for my own pollution; everybody else does.

Benefits are privatized; costs are socialized. And this is what's happening, of course, at a massive, massive scale.

I can't quite leave it at this. The first rule of speech-making is, "Thou shalt not end on a downer." So let me try at least to turn things around here a little bit.

As we saw with the plastic bag example in Ireland, we have the tools at our disposal. We can do the right thing, and we can cause massive change with tiny, relatively small policy changes. In the case of plastic bags, it was the Plas Tax, 20 cents a bag, and bag use went down 90 percent, a billion bags.

Now, that's a pretty hopeful story right here, of course, and we can use the exact same idea, the exact same policy change, to really make a difference.

Leveling the playing field—pricing or limiting pollution to such an extent that we don't have massive implicit and explicit subsidies for polluters—that is really the task at hand here.

Remember [acid rain](#)? Well, I don't actually; I wasn't around back then; I wasn't conscious, at least, at the time. But of course it was this enormous problem in the 1970s and the 1980s. It was kids getting asthma, forests dying, stone sculptures literally melting in the rain.

Now, the [1990 Clean Air Act Amendments](#) were passed and decreased sulfur dioxide pollution, which causes acid rain, by over 50 percent, all the while letting companies and businesses decide how to innovate themselves out of this problem. As a result, benefits of this particular legislation exceeded costs and exceeded investments, at a ratio of around 30:1.

That actually turns out to be a pretty general pattern here. The 1970 Clean Air Act, going all the way back 40 years, once again the ratio of benefits-to-costs are about 30:1—\$1 invested, \$30 of benefits as a result.

Now, most of these benefits, by the way, are human-health related. This isn't about birds feeling better about themselves—that's nice too, that's all good. But this is about human beings, about fewer people getting sick and dying as a result of this legislation.

Of course, that translates into real economic benefits as well. The 1970 Clean Air Act, enacted 40 years ago, had the impact of increasing GDP in 2010 by about 1.5 percent. It turns out not poisoning our children makes for more productive workers later on, and GDP goes up as a result. We might even use a moral equivalent of arguing against child labor by saying that keeping kids in school makes for more productive workers later on.

Even if this is a fairly limited argument, it works. The 1970 Clean Air Act increases GDP by 1.5 percent 40 years later.

Now, once again, we have right now an incredible policy opportunity with global warming—and yes, I'm saying opportunity. The problem, of course, is even bigger than what we faced in the 1950s and 1960s that led to the Clean Air Act and the [Clean Water Act](#), and all the other dozen or so laws that [Richard Nixon](#) signed into law in the 1970s.

We also, of course, have much smarter policy tools available to us. This is no longer the [1970 Clean Air Act strategy](#). This is much, much closer to the [1990 Clean Air Act strategy](#) and much, much closer to something like Plas Taxes and flexible policy tools to actually meet the goal here.

So the Europeans, for example—when I pull out my Austrian passport, I can feel pretty proud of myself here—we have a limit on carbon emissions and a flexible way of achieving the results, the [emissions trading](#) system, [cap and trade](#), which essentially sets an upper limit on pollution and leaves it up to companies to decide how to achieve the results.

Starting next year, January 1, 2012, the European system will also include airlines, flights within Europe and to and from Europe. So now it's no longer voluntarily up to us to pay for the ticket and then go to TerraPass and offset our emissions. You can feel pretty good about flying in Europe at that point, because in your flight cost, the socialized cost up to a point will actually be included in the ticket price.

Now, it turns out it's a small fee—it's about \$2 a flight—which probably makes very little difference in terms of how you look at the current cost and decide whether or not to fly. But still, it's a start.

Last week the [California Air Resources Board passed the final rule to put a cap-and-trade system in place for California](#), by some measures the eighth- or ninth-largest economy on the planet.

You can look at countries from Mexico to China. They are all looking at tools very similar to this as an approach to solve the problem of carbon emissions. India has a coal tax. China, [as part of its twelfth five-year plan, is piloting cap-and-trade systems](#) throughout the country.

There is clearly lots of momentum now on the state level, as well as on the country level. Of course, the real policy shift—the real momentum here—is what's missing at this point in Washington, D.C.

Change, of course, is in fact possible. Again, here is a very recent example. [This month Australia passed a carbon tax](#). Australia, being the most emissions-intensive industrialized country on the planet, passed a comprehensive carbon tax to decrease its own emissions.

It's always the same idea. This is not about voluntarily doing the right thing—asking anyone to do the right thing, for that matter—it's about making polluters pay for their pollution. It's a fairly simple concept; but still, that is the goal, that must be the goal here.

So let's recap very quickly.

Point 1: the science is clear. I'm happy to debate with anyone outside afterwards. But really, the science on this is as clear as it could possibly be, with something like 98 percent of climate scientists agreeing with the basic premise of global warming. And at this point, it is happening at a rate that is literally slowing down the rotational speed of the planet. And it is happening at this very moment.

Point 2: Absolutely keep recycling, keep refusing out-of-season grapes, and carry home your local apples in an organic cotton/canvas bag, ideally produced locally, of course, too.

Do all these things. But only do these things if you are painfully aware of the single-action bias, if you are painfully aware of the fact that we need to do more than just that one thing.

Only then can we be proud to tell someone, for instance, "Hey, I don't have a license, I can feel good about myself."

And lastly, of course, **Point 3:** Study up on your economics. Realize that we can't have a free market if we are socializing costs on a massive scale.

In the end it's not just about changing light bulbs; it is about changing laws. This is the only way to make the planet truly notice.

Questions and Answers

QUESTION: Tyler Beebe.

What are the implications of the rotational speed of the planet being speeded up or slowed down? Is it going to really impact us significantly?

GERNOT WAGNER: At this point it is, in fact, happening by fractions of a second. This is sort of in pico-seconds. So would you and I know that this is happening? No. I don't need to change my watch.

QUESTIONER: What are the long-term implications of a change in the rotational speed?

GERNOT WAGNER: Essentially, what this really shows is that right now we are messing with something that is about as fundamental to the way the universe has organized itself as it can possibly be.

There are no direct implications for you and me, personally, right now. But it clearly shows that this isn't a phenomenon out in the distant future.

And it's also something that, frankly, I wouldn't know how counteract this. But if we have a runaway effect here—which I'm not saying is happening, but if it does happen at an accelerating rate—what will we do in response to this? We don't know, right? Increase the mass on the poles? Add a couple of tons of lead here and

there on the poles, to make sure that we are counteracting this? We simply wouldn't know how to respond to this.

Now, of course, this is just one example. The actual effects adding up to the \$20 of damage happening right now, such as extreme weather events—there are all these other effects that we can actually quantify and can put a dollar value on. This tells us that this is a problem right here and right now.

QUESTION: Allen Young.

I imagine that everybody here agrees with what you say. You appreciate you're preaching to the converted. But the fact is that there are significant elements in the American political system who take exception to, number one, the science and, number two, what you are proposing in terms of social action. What do we do about those people? How do we persuade them to subscribe to what you have so eloquently set out today?

GERNOT WAGNER: That's, in fact, my day job. I'm under no illusion that I'm out of a job anytime soon. This isn't a problem that is going to be solved overnight.

There are two parts to this. On the one hand, essentially the key point coming out of all of this, is that we ought to be pulling the highest policy level possible. Just because we can't get a bill passed in D.C. certainly doesn't mean that we should retreat and basically recycle more—that is, the ones who are convinced, the ones who all know that this is a problem.

We need to have policy change here, for starters on the state level and regional level. California is a prime example here; or, for that matter, New England, which also has a regional cap-and-trade system in place already. So energy policy in this country in fact is made on the state level. As much as [Solyndra](#) and DOE (Department of Energy) figures into this picture, true energy policy happens on the state level. So there is clear potential here, no matter what happens in Washington.

Now, we can even go down further, down to the city level—bike paths in New York City. This is not about a couple of us taking the hit in biking despite everything else happening; this is about Mayor Bloomberg quite consciously making a decision and saying, "We need policy change here to motivate New Yorkers to make a difference."

Now, that's one result. This is sort of the "What can we do now?"

On a national level, clearly what ought to happen is essentially to call your congressman or congresswoman—not just yours, presumably the one representing New York, but the ones representing other states in the Union, other districts, that are not quite as convinced. And make sure that this is, in fact, a topic that is on the political agenda, for example, going in to the next presidential election, which it isn't on right now.

It wasn't on the political agenda last time around either, by the way, because back then it was both [Obama](#) and [McCain](#) basically saying the same thing. They were both for comprehensive climate policy in this country, cap-and-trade. So it wasn't an issue back then. It clearly ought to be an issue this time around, and going forward.

Now, how do you make that become an issue? That's a money question. There is the EDF [Environmental Defense Fund]; we have 600,000 members or so in this country. So, yes, there is a bit of a movement already. But clearly, we need to go much, much beyond that.

That, in fact, is often where economists enter the picture, at least. I'm an economist working for an environmental group. My day job, in a sense, is figuring out the costs and benefits of environmental legislation. Then you come up with numbers, like those of the benefits of the Clean Air Act Amendments of 1990 exceeding costs by 30:1.

Then, you can dive even more deeply into this. Say if you are worried about the budget deficit in particular, you can come up with the fact that the Clean Air Act Amendments, or the Clean Air Act in general—the EPA [Environmental Protection Agency] rules currently on the docket—would lead to decreases in the cost of [Medicare](#) and [Medicaid](#), to the tune of billions of dollars. So, even if you are just talking dollars and cents here, this is the right thing to do.

QUESTION: Susan Ball.

If we were to clean up all our carbon emissions and solve all these problems, what is your guess the climate situation would be in the future? Would we all of a sudden stop having global warming? Would we all of a sudden have no change, or what would happen?

GERNOT WAGNER: This is the hypothetical now, right? If we decreased our emissions to zero right now—not actually clean up the pollution that is already in the atmosphere, but decrease emissions to zero—it turns out that the analogy here is sort of the bathtub analogy. What we would be doing is turning off the spigot. But the water level is still too high.

And, yes, it will decrease eventually, over decades and centuries. But in fact, right now we have locked in global warming to the tune of around two or three or four degrees Centigrade by the end of this century, with the pollution already in the atmosphere.

So yes, decreasing emissions to zero—or by 80 percent by 2050—for example, would get us a long way there. It still doesn't avoid diverse consequences, however.

So, in the end, when you look at the approach to global warming, there really needs to be a portfolio approach. That portfolio does in fact include:

- Mitigation—decreasing emissions, decreasing emissions to zero, ideally.
- Adaptation—coping with what is already happening.
- I guess the third one there is suffering. So for us we buy a second air conditioner—or, I don't have an air conditioner at all; I just sweat more because I'm the good environmentalist, of course—but you buy a second air conditioner, and you solve the problem for yourself. Right now a vast majority of people on this planet don't have air conditioners to begin with. So for them the approach to coping with the problem is simply suffer through the consequences.
- And then, the fourth aspect of this is this little-known, or little-spoken-about, idea of [geoengineering](#). You need to do something, or you could be in a situation where you have to do something, to avert the worst consequences, and to basically directly tinker with the atmosphere, with the way the planet heats itself up. That's the direct approach here. That is, frankly, something environmentalists tend not to touch.

We probably should be at least talking about it and looking at policy regimes that focus on rules and regulations that try to regulate what is going on here. But, at the very least, we need to be aware that most serious climate scientists looking at this problem have basically moved on and are now trying to figure out ways to shoot sulfur into the stratosphere to cool the planet that way.

QUESTION: William Verdone.

You mentioned the 1970s. Some of us in the audience remember a [gas crisis](#) back then, and if your license plate ended in an even number or an odd number, you got gas on a Tuesday or a Thursday. It went on and on. We always said then, "Oh, let's wean ourselves off energy and dependence." Of course the automotive industry responded by making SUVs and the Hummer.

GERNOT WAGNER: Yup.

QUESTIONER: It's amazing.

What's your take on hybrid technology and wind and solar, being mindful that the ozone hole is expanding over the Antarctic, which explains maybe why Australia is as aggressive as they are?

GERNOT WAGNER: A disclaimer: Of course, I wasn't around back in the 1970s, or at least I wasn't speaking English at that time.

You go back to Richard Nixon, basically. He was the [first one to talk about the need for energy independence](#). Back then we imported around a third of our oil. Every president since has spoken about exactly that issue, and by now we import about two-thirds of our oil. So presidential rhetoric in this case clearly didn't solve the problem here.

Now, it turns out that particular solution you identified—basically rationing gas, letting them buy it on every other day—is clearly the wrong approach here too. This is what I probably would call a sort of economic approach, but a very dumb economic solution, to this problem.

A contemporary example of this: Mexico City tried to limit emissions from car exhaust. There was a lottery, and based on the last digit on your license plate, you had to leave your car at home one day a week.

Well, guess what? Initially, the short-term reaction was that people drove less, certainly. The long-term reaction was people kept old cars around for longer. Whoever could afford it bought their old clunkers—"dash for clunkers," rather than "cash for clunkers," I like to call it—and emissions actually went up as a result.

This is exactly the kind of policy you don't want to have. And gas rationing, of course, is a prime example of a policy approach that simply doesn't work.

Now, what would work?

First of all, talking about energy independence won't work. If anything, that's not the right policy goal to begin with. We probably want interdependence. We don't want to be dependent on a particular region of the globe, to be sure. But we don't want to be independent either—that's the North Korean approach, and that clearly doesn't work.

So what does work is to focus on what do you really care about in the end, which in this case is emissions. You put a cap on emissions, a price on carbon pollution, and you achieve these results quite naturally, in a sense. And yes, now we do see hybrid vehicles and electric vehicles, suddenly not just coming on the market, but actually being profitable or paying for themselves. Not immediately—they aren't quite as cheap yet.

As for the [Chevy Volt](#), General Motors can't meet demand at this point. This is the exact inverse problem of what we had in the 1990s, when we had electric vehicles but no one wanted them. Now you have these gigantic fleet management companies, Hertz and the like, trying to buy electric vehicles, and they can't because we can't actually keep up with demand here.

So yes, clearly, change is happening here. But it has to be driven by smart policy, not the rationing kind that we tried in the 1970s, and that Mexico City has been trying fairly recently.

QUESTION: Josh Hurni.

While you are talking about smart policy, could you maybe touch on the [REDD](#) policy around the greenhouse gases in the forests, paying people essentially not to cut down those forests? Would that be an example of a smart policy? How has that played out?

GERNOT WAGNER: REDD stands for Reducing Emissions from Deforestation and Forest Degradation. Don't ask me who came up with this acronym. It actually turned out to be an idea that some of my colleagues created a decade or so ago, so I can't take personal credit for it. But it was an idea that originated as part of trying to apply smart economics to the problem of deforestation in this case.

Yes, this is in fact an example of an idea for reducing carbon emissions. So you don't tell people not to cut down the forest; you make it in their interest not to cut down the forest. Using this system basically pays forest owners and forest managers not to cut down the forest; because having the forest stand sequesters carbon, removes carbon from the atmosphere, and provides a valuable service, to the tune of basically \$20 per ton of CO₂ right now.

So yes, this is a prime example of a policy that could potentially make a huge difference, and already does make a huge difference. The Norwegians, for example, have been paying about a billion dollars— oil money, but still a billion dollars—into a fund to reduce deforestation in Brazil and Indonesia. It is already having some [first measurable effects](#).

QUESTION: I've always had trouble envisioning how much CO₂ weighs. In other words, you said that each individual is responsible for 20 tons. Twenty tons is 40,000 pounds. Could you explain to me how 40,000 pounds of CO₂ emanates from, or is caused, by the average world citizen? It just seems like too much. How are you measuring this stuff?

GERNOT WAGNER: This is where you would call in a natural scientist to try to explain this.

But just as an example, every ton of coal produces more than two tons of CO₂ emissions. That's just to give you a sense.

QUESTIONER: How are you weighing the emissions? Why do they weigh so much compared to their source?

GERNOT WAGNER: Now here is where we really need a natural scientist. But this is the process of combining carbon with oxygen to create CO₂. This is the most simplistic way I can explain it. Tons may well be the wrong analogy here, if you're looking at volumes, in the sense that amount rather than weight is what really matters.

To bring this down to the personal level, a cross-country flight from JFK to SFO, New York to San Francisco, emits around half a ton of CO₂ emissions per passenger. The flight from here to Vienna, to Europe, emits about one ton of CO₂ emissions per passenger. That gives you a sense of the order of magnitude involved here.

QUESTIONER: It doesn't clarify it for me, but I'll ask somebody else sometime.

GERNOT WAGNER: Any natural scientists here?

QUESTIONER: I wasn't good at chemistry. Maybe that's my problem.

JOANNE MYERS: Can somebody clarify that?

QUESTION: I don't know if this answers your question, but are you familiar with Carbon 350?

GERNOT WAGNER: There is this organization out there, 350.org. I think that's what you are referring to. Their stated policy goal is essentially to bring the concentration of CO₂ emissions in the atmosphere down to 350 parts per million.

Now, that's about the most wonkish name for a group that you could possibly come up with. It takes some explaining to figure out what the name stands for.

Pre-industrial levels of CO₂ in the atmosphere were at around 260 ppm (parts per million). By now we are already much beyond the 350. So now we are looking at the bathtub analogy again, water standing in the tub, concentration in the atmosphere.

I realize it doesn't bring it back down to the personal level to show what this really means. But ask Google.

QUESTION: I'm Joshua Huff [phonetic].

I'm really glad that you are coming at us from the economic perspective, because that's kind of where I come from as well. My interest right now is developing countries and economics. I know that people like [Jeffrey Sachs](#), for instance, are trying to do [green architecture](#), and there are all sorts of ways that developing countries can skip the steps and not face some of the systemic issues that, for instance, America faces.

So my question is: Since you're on the economic side, do you find ways that developing countries can maybe skip some of the steps and focus on green technology from the get-go to make a difference? Or do we need to focus mostly the top five or ten countries that do all the emissions?

GERNOT WAGNER: This is basically the question when you talk about the three or four billion people on the planet who have nowhere to go but up, in terms of their emissions. The green growth mantra, the green growth idea, is the only possible way out of this.

Now, there are some fairly hopeful messages built into this. On the one hand, India has a [coal tax](#), China is [pioneering cap-and-trade systems](#) for sulfur and carbon dioxide. So they are already basically tinkering with the right policy tools, which of course is the hopeful message there.

But, secondly, this is in fact the technology-adaption story. Look at something like cell phones. In sub-Saharan Africa, the [cell phone penetration in Kenya](#)—a relatively rich African country—is enormous. It is basically infinitely more than the landline penetration because there are no landlines in many of these places. So you are basically jumping right to satellite phones, or cell phones at least, jumping over these technologies that we have had to tinker with, and that have frankly locked us into a development path that is extremely difficult to get out of.

So if you have thousands of miles of roads, there is a clear interest in looking to individual traffic or something that would use these roads as a solution to dependence on foreign oil. So the policy solution is basically electric vehicles. It's still a car. It's a much, much better car, but it's still a car, right? Whereas if you want to get from Beijing to Shanghai, the best, smartest, cheapest way is to hop on a train.

So yes, jumping over these technology steps is the solution, the only solution, for many of these development problems, where development, economic growth, and environmental concerns now go hand in hand.

JOANNE MYERS: I invite you all to continue the conversation. Thanking you very much for starting it.

GERNOT WAGNER: Thank you.

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