The Future Is Calling Us to Greatness

with Michael Dowd + 56 Experts

Saving the Grandchildren of All Species

with **James Hansen**

Big ideas from this session:

- Why a rising fee on carbon (with full dividend) is so urgent and important
- Why a million people have watched his TED talk "Why I must speak out about climate change"
- How an Iowa farm-boy became a leading NASA scientist and then an unlikely modern-day prophet

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Michael: Jim, thank you so much for being part of this conversation series, *The Future is Calling Us to Greatness.*

James: Sure. I am happy to. Do you just want me to talk?

Michael: No, what I'll do is I'll ask you questions. In fact, one that I've been asking my guests at the start is in case there are people in these series that aren't that familiar with your work, if you could just summarize your story, how you got to where you are, what you are best known for and what you are most passionate about.

James: Just a little bit about where I come from. Of course, I am from Iowa. I was raised lucky to grow up during the 1950s, when everything was getting better and I was lucky to be in Iowa frankly, because I then ended up at the University of Iowa and that was a time when young people could work their way through college.

It's a lot harder now and I was lucky because what was happening at the University of Iowa, right after Sputnik, in the basement of the physics building, Professor Van Allen was building instruments which flew on the first United States satellite and discovered the radiation belts around the planet and I was really lucky because he was such a nice man.

It's ridiculous when I look back at it because I was actually afraid of him.

Michael: Really?

James: Yeah. I never took a class under him. I carefully avoided that. I didn't want him to know how ignorant I was, but then, when I was a senior, my astronomy professor, to keep me and Andy Laces, hoped that we would stay for graduate school and so he persuaded us to take the PhD qualifying exams, which are usually taken after a couple of years of graduate study.

I not only passed the exam but I got a pretty high score. Van Allen noticed me. It wouldn't have happened. A student should never do that. You should sit in the front row and not the back row and you should talk to the professor, not be afraid of him, but I lucked out anyway.

He then told me about data about Venus, microwave observations of Venus that showed either Venus was very hot or it had an ionosphere and he wanted to know which one. So, I took up that problem for my PhD research.

I started on Venus and ended up on the earth when I realized it was a more interesting planet, more important because we could see the composition of the atmosphere was changing before our eyes. We would like to know what the implications are for people and other life on the planet.

Now, I would like to actually go to the end. Let me go back because there is such an enormous misunderstanding of what the implications are of climate change, of human made climate change and what needs to be done to deal with it, to minimize human made climate change and preserve the remarkable planet that we live on.

When I was in NASA, my bosses always warned me, "Just talk about the science," that is the job of scientists and I guess I ignored them but the point is that scientists are actually trained to connect the dots, to be objective and we are dealing with complex problems which have different aspects and for us not to say what the implications are I think is a huge mistake.

Michael: I agree.

James: In particular, economics is a science also, maybe the dismal science but you can connect the dots all the way to the energy implications and the economic implications and when you do that you realize that it's actually a painful solution to take the actions that are needed to [indiscernible 05:36] our addiction to fossil fuels.

In fact, the economy is more efficient if the prices are honest. Subsidize something, then you make the economy less efficient, and so we should make fossil fuels pay their true cost to society and that would require adding a substantial fee to the cost of fossil fuels because of their health impact of air pollution and water pollution, and the climate impact, which is already beginning to exist and potentially, will be much more in the future if we don't phase down fossil fuel use.

The scientist is not dealing with abstract theories. Physics and science is just a way of representing reality, so you have to look at reality and you have to make your theories or interpretations consistent with the data, and when you get more data you can adjust your theory and make it more comprehensive.

For example, if we want to phase down carbon emissions, phase down fossil fuel use or at least the emissions from the fossil fuel use, then we need to add enough fee to their price.

Michael: I wanted to share that this is one of the places where I am most grateful for what you have been focusing that almost every presentation and everything that I read that you've written, you keep coming back to the necessity of the one systemic action it seems most important, which is putting a fair price on carbon.

The way you like to talk about it, the revenue neutral carbon fee and dividend, and until we do that, until we marshal the power of the market to help us all move in the right direction by integrating true cost.

I love the way Bob Inglis says it. He says, "I favor a conservative approach that doesn't increase the size of government and marshals the power of the market. Here it is in a nutshell, put all the costs and the all the fuels, and then eliminate all the subsidies, and then watch the free enterprise system solve the current energy problem."

I just think that that notion of bringing true cost is so vital, so I am actually really grateful that you did start with that rather than add that at the end of our conversation.

James: Yes, I do think it's important to start with it because there is such a long story to get there.

Michael: I've been promoting Citizens' Climate Lobby.

James: Yes. I also have been promoting Citizens' Climate Lobby and I am really pleased that they have seen the light in the sense that they really need to keep the concept pure.

What I find now with both Liberals and Conservatives is they are beginning to understand this but they don't want to give up their favorite targets. For example, Barbara Boxer introduced a fee and dividend bill but she wants 40 percent of the money for the government and that spoils it because then rather than most people getting more in their dividend and they pay increased prices, most people will not. They will be paying more via increased prices than they get in their dividend.

Therefore, they are not going to favor continued rising of that fee and that is really necessary if we are going to phase over to clean energies. The price needs to continue to rise.

Michael: Yes, exactly.

James: The Conservatives, on the other hand, they say, "That's right. It should be revenue neutral, we don't want the government to get bigger. So let's reduce these specific taxes that we don't like." When you look at what they are doing is making the rich people richer and middle class and low income people get poorer because they reduce those taxes that limit their economic gains.

So what we really have to do is go to the public and that's what we are trying to do with Citizens' Climate Lobby but still a number of people that have been reached, relative to the number who are reached when they turn on the Super Bowl and they see the energy advertisements we've got a tough job to compete against this kind of advertisements that the fossil fuel industry can put out there.

Michael: This is where the moral – one of the things that you've focused or that you've at least mentioned many times that I myself do, given the fact that I am constantly preaching in churches all over North America, is the moral side of this that until religious leaders step up, of all different denominations and religions, but until we step up and say that the primary moral responsibility is ensuring a healthy future.

If anything deserves to be counted as evil in a modern world, if that word has any meaning whatsoever, it's got to apply to those who are personally benefiting in a way that they know is destructive of the future. The whole concept of [indiscernible 11:55].

James: Yes. I've worked with religious leaders. I am less happy with the way that's going because they hear this message and they even understand they need to go tell Congress that this is really important, it's a moral issue and they need to do something but as understanding as these leaders of Citizens' Climate Lobby that you can't just do anything.

You can't just tell them to do something. You can't let Congress just to make up their own mind. Unfortunately, the lobbyists [inaudible 12:44] and the construction of any government policies, but it is helpful nevertheless to keep emphasizing that it's also a moral issue.

The main point is that it's not economically painful to solve the problem and we just have to get the public to understand that.

There was another point I wanted to make and my --

Michael: Intergenerational justice?

James: The other point I wanted to make was the business community is not really the enemy, nor is capitalism. In fact, we need the market and the economic system to work efficiently because for the sake of the planet and all the life on the planet, we are going to have to solve the global poverty problem.

Unless we do that, we can't solve the population problem, but we see that those nations that have become relatively wealthy the fertility rate has declined to approximately the replenishment level or even less than it. It's the nations still in poverty that have the exploding populations and so we need to harness good economics.

I've met with many of the people that I call the captains of industry, including the CEOs of utilities and other business leaders, and they are not basically bad people. You can find instances where for example in the past, Exxon Mobile was paying for the changing of school text books to make it appear that we didn't understand the climate problem and it was exaggerated and such things, but that's really the exception I think in the business community.

Basically, the point is that their job is to make money, so the CEO of utility will tell me and tell anybody that if the government will put a rising price on carbon, we can solve the problem but as long as the fossil fuels are allowed to be the cheapest energy, then it's their job to make money for their stockholders and they will keep using them.

So, I don't think the business community is really the enemy. As I said, there are few exceptions but we have to make the system work and it can work but boy, now let me get to the intergenerational thing because what I can see, given my long life starting back in the 1940 and growing up during an era of rising expectations, we just expected we going to be better off than our parents were and the opportunities were there for us.

Now, what we are doing, what we've done by making our nation less prosperous and by spending their money by putting the nation in debt and by making our nation less competitive is we put our children in a difficult position but we can solve that.

In this country, we have still the opportunity and the ability to be leaders in innovation. We do have a freedom which really is great for spurring original thinking and innovation. We just have to take advantage of that.

I am a political independent because I see the problems that we are getting from both extremes of the political spectrum. I tend to agree with conservatives that we don't need huge government and I was in the government for decades and I can see that it's not always the best place to be doing innovations.

Michael: Yeah, exactly.

James: You don't want the constraints of the civil service system. So, if we do take advantage of the potential capabilities that we have but without [inaudible 18:35] that rises gradually over time and stop subsidizing, the government should stop making choices about technologies. Let the marketplace make those decisions because we do need energy.

We need plentiful, affordable energy and that's why we are burning fossil fuels but we need to find clear energy, and so we need an approach to do that and that's what I think a carbon fee and dividend approach would allow us to do.

Michael: I agree. This is one of the last conversations. When I began these interviews back in March, I think John Michael Greer was my first interviewee and I thought it was originally going to be 20 to 25 interviews and it just kept growing the number of people who had inspiring and empowering things to share on this topic.

There is so much at stake and I literally have been brought to tears many times in these conversations. There is many different approaches, there is no one answer and one of the things that I've been touched, moved and inspired by is the variety of ways into seeing this as an issue that's really calling us to our greatness. That's why the title of this series, *The Future is Calling Us to Greatness* and that we need many different approaches to that.

I am curious Jim, you've done such important scientific work and really been at the forefront there, and been a major spokesperson on this for decades. What is it that keeps you inspired to be in action? What is it that allows you to wake up on a day by day or week by week basis that motivates you to do this work?

James: It is first of all realization of what's at stake. This is the only planet that we know of that's got life on it and the life is absolutely remarkable. With my grandchildren, I've focused on an insect, the Monarch butterfly because it is such an incredible species.

I didn't have any idea that I might be introducing them to a species that has the potential now of going extinct, the Eastern Monarch, but I think actually that's another story. I think it is possible to get the Monarch to recover, if we could just get rid of the chemical, the defoliant that is causing the biggest problem.

The point is also that a solution is so painless, relatively painless that we just have to try to make that story clear. It is easy to keep going, realizing both what's at stake and the fact that it's not a hopeless problem. However, if we delay much longer, then we will lock in a lot of negative consequences, so it has a high degree of urgency.

It is very easy to keep involved. I would like to start tending my orchard and I am enjoying outdoor life but I can't do that.

Michael: Jim, this would be a good place. I would love to ask you to share just a little bit about some of the basic science. Deniers are still saying, "This is the sun," or this sort of thing, so if you could just say a little bit about how we know that this isn't the sun and I love the analogy that you've used in your TED talk.

By the way, anybody watching this or listening to this conversation, I highly recommend Jim's TED talk. It is just called Why I Am Going to Speak Out About Planet Change. It's got nearly a million views, so I highly recommend that, but if you could share just a little bit about the science, without going into too much details.

James: The basic science is really simple. It's the fact that as we add gases like carbon dioxide to the atmosphere, gases that absorb infra-red radiation, the thermal radiation, the wavelengths, the energy that's created by the heat from a body at the temperature of the earth.

Those wavelengths are absorbed by these gases. So, if you add more gases to the atmosphere, it's like putting a blanket on the planet, so it keeps that heat radiation in the planet, in the atmosphere and at the surface. It creates a temporary planetary energy imbalance where there is less energy going out than there is coming in from the sun.

If you've got more energy coming in than going out, then the planet is going to get warmer. It takes time because the ocean has a lot of heat capacity. It is four kilometers deep, so it takes a long for it to warm up, but we can measure now that the planet is out of balance because we can measure the rate at which the ocean temperature is changing, and what we find is that it is getting warmer internally to the ocean.

So it allows us to quantify quite accurately how far the planet is out of balance and that in turn tells us that there is more warming in the pipeline, even if we don't change the atmospheric composition further. There is going to be additional warming.

The planet has warmed up already by about one and a half degrees Fahrenheit and there is about another degree that's in the pipeline without any further changes of atmospheric composition, and that is clear from this quantification of the planet's energy imbalance.

Of course, there are other factors that do affect the climate, including the sun, which is a variable star but we've made measurements during the past several years when the sun went through so called solar minimum and the measuring is brightness of the sun, and we saw that its brightness does vary.

It went down to a minimum but even during that minimum, there was more energy coming in from the sun than going out from the planet, so it shows that this greenhouse effect that causes this energy imbalance is much larger than the effect of the variable sun.

Michael: You've used an analogy of Hiroshima bomb. Share that, please.

James: We've measured now that the planet is out of balance by at least six tenths of a watt per meter square. That sounds pretty small. It's about the amount of energy that comes from a tiny Christmas tree bulb, over every square meter of the earth's surface but the total amount of energy over the planet is equivalent to the amount of energy in 400,000 Hiroshima atomic bombs per day, every day of the year.

More than 90 percent of that energy is going into the ocean, so it's making the ocean warmer and also the other five to ten percent, a lot of it is melting ice. Greenland and Antarctica are getting smaller and some of the energy that's coming in is the cause of that.

This is creating potential future problem for young people because the warming ocean melts the tons of ice that come out from Antarctica and Greenland, the ice shelves we call them and as those ice shelves melt, it allows the ice sheets, the large blocks of ice on the continents to discharge ice to the ocean much more rapidly, the icebergs that come out from the ice sheets.

That's going to raise sea level. Right now, it's going up at a rate of just over one foot per century but that's twice as large as what it was last century and there is the danger that if those ice shelves melt further, we could get a sea level rise of several meters and that would mean all coastal cities would be dysfunctional and the economic implications of that would just be incredible because a large fraction of global cities are on the coast lines.

Michael: When you realize that it's not like the warming is going to stop or the seas are going to stop expanding by the year 2100, we often see that figure. A friend of mine who wrote a book on specifically the seas, John Englander talks about the fact that if a virus wiped out humanity and all of humanity died out in the next 48 hours, the oceans would most likely continue to rise for the next 1,000 years.

That means we are going to have to do serious work at the shores of the world no matter what, this is a calling now. This is a major life work for our species.

James: Yeah, but what we have to do is restore the planet's energy balance. The first order, that's basically the requirement to stop the global warming and if we do that, we can minimize sea level change. We may even want to slightly make the planet have a negative energy balance.

If we want to make it balanced, what we would have to do with carbon dioxide is reduce it to about 350 ppm. The other gases stay the same that they are now. So, that's how Bill McKibben came up with his name for his organization, 350.org, because that should be the approximate target we should be aiming for but CO_2 is already above 400 ppm.

If we stopped burning fossil fuels, it would decrease. So it is still possible to solve the problem but the longer we keep burning fossil fuels, the harder it is to solve it.

Michael: One of the interviews that really inspired me in this series was Paul Gilding who wrote the book *The Great Disruption* and he and Jorgen Randers and others have talked about that they believe that at some point, hopefully not in too distant future, the dam of the Nile will break and the entire world will be mobilized, Brazil, the United States, China, India, the European Union, like we were at the beginning of World War II.

He hopes and he has begun to articulate with others this one degree Celsius war plan. Even two degree Celsius should be considered unacceptable. I know you were one of the people that he spoke of that. He gave some deep concerns as David Roberts did in his TEDx talk. Anything you would like to say about that?

James: I agree with him that we do really need to aim for a smaller global warming than two degrees. Two degrees maintained for long would be a disaster but I think that targets, there is a certain danger in emphasizing targets. It is useful to measure how things are changing and know what we need to do with atmospheric composition but the truth is what the science tells us is that we have to reduce emissions as rapidly as practical.

If you say the target is two degrees or some carbon emissions, the problem is that then you start thinking about how I can still burn stuff. Actually, we are over-shooting. So in that case, we better just focus on finding the fastest way we can to phase down emissions, and clearly the need is to have a rising fee on carbon emissions.

In fact, Citizens' Climate Lobby commissioned to study by a well-thought of economic group REMI, which is Regional Economic Models Incorporated, and they showed that with a moderately rising carbon fee, $10/ton going up $10/ton of CO_2 each year, after ten years it would reduce US emissions 33 percent and after 20 years, about 50 percent.

It's actually possible to rapidly phase down emissions but only if you make the cost, the price of the fossil fuels honest.

Michael: Exactly. You've certainly convinced me of that and that's why I find myself evangelizing all over North America is recommending citizens, Climate Lobby is saying that of all the little individual things that we can and should be doing, the single most important thing is

this rising fee on carbon, integrating true cost and getting the dividend back to people so that we are all incentivized to support this over the course of years and decades.

Is there anything else Jim? I want to begin winding this down. I know you are busy, anything else that you would like to share in terms of what you see as most important in addition to that?

James: Yes, and again, I think the scientists have potential to look at the overall problem and there are a lot of well-meaning people who say, "Let's solve this by putting a cap on our emissions." That sounds like it should be equivalent, however if you want to have a system that works globally, it's just not practical to do it by caps, because you have to get each country to agree to have some cap.

When you realize that United States has burned far more than its fair share, then there is no way that India or China is going to accept a small cap. However, if instead you let the economics dictate the actions, then it will be realized that those countries that move most rapidly will actually be best off economically.

They will move to clean energies quickest and be able to sell their technology to other countries, so anyway, you need some mechanism to enforce a global agreement and you just can't do it by begging 180 countries to each have caps.

We tried that with the Kyoto Protocol and it didn't work, emissions actually accelerated but if you have a carbon fee or a carbon tax, then the countries that agree to have that, and it really requires only the G2, China and United States, agree to have a carbon fee, then they can enforce border duties, collect border duties from countries that don't have an equivalent fee, and that would be a huge incentive for the other countries to have their own carbon fees so they can collect the money themselves rather than have us collect it at our borders.

Michael: That's great. Jim, one of the questions that my wife Connie Barlow who is a science writer and now a climate hawk and evolutionary educator, she has been asking me to ask all of my guests and it's sort of off the wall. I purposely don't let folks know about it ahead of time, because I have been some wonderful and surprising responses.

That is quite simply if you had the opportunity to invite to a dinner party any three people in human history or perhaps where it's all four of you together, or a one on one, where you have a beer, a glass of wine, go for a hike or whatever with any three people in human history, who would those three people be and why would you choose them?

James: It can include current people?

Michael: Yes, it can.

James: I would choose the leaders of China and the US and I suppose I better pick a European, probably it would have to be Angela Merkel.

Michael: That's great. That's such an obvious answer and it's amazing to hear it. You are my 50th of 53 interviews and that's the first time somebody said that, and it occurs to me so obvious.

Jim, obviously I also want to recommend your book. I thought two years ago, Connie and I had our climate change come to Jesus moment where it went from the back burner to the front burner in a major way when we watched David Roberts' TEDx talk, Climate Change is Simple.

That afternoon, I bought your book *Storms of my Grandchildren* and half a dozen others, and yours was the first one that I read. I actually listened to it first on audio and then read it, so I highly recommend anybody watching or listening to this, James Hansen's book, *Storms of my Grandchildren*: *The Truth About the Coming Climate Catastrophe and Our Last Chance to Save Humanity.*

Any other resources? I know one of the ones I wanted to also recommend is your Updating the Climate Science. If you just put James Hansen Updating the Climate Science in Google you will get there. Any other resources that you would particularly recommend?

James: My Columbia University webpage, which is Columbia.edu/~jeh1. I forget what you call that wiggle.

Michael: I know I use that before my signature when I write things but if you just put James Hansen, Columbia, you will get there on Google. I've done that.

Jim, thank you so much for your work for so long. Thanks for taking the time to be part of this conversation series. I think we will actually be featuring this as the first or second in the series of airing them on Thanksgiving Week, I believe it is. Anyway, blessings on your work, blessings on your family and I look forward to meeting you in person at some point.

James: Okay. Thanks very much and I am sorry I was so difficult to get a hold of.

Michael: No, this is great. It worked out fine.

James: I am trying to finish a paper which is so overdue and I am not to do anything until it is finished but it's just…

Michael: To your credit, that's what you kept telling me. You kept saying, "I've got this paper I want to finish."

James: Yeah. My old friend Jim Pollock who is no longer with us told me, "When you want to finish your paper, multiply it time pi, or the three." Actually, I am afraid it's a little longer than that. Anyway, it's good to talk to you.

Michael: Same here. Bye-bye.

James: Bye-bye.