



## Weekend Energy Listening: Wind Power with Paul Gipe

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The [World Wind Energy Conference](#) is just around the corner and happens to be in my home town. I was flipping through the conference program and noticed a familiar name pop up quite a lot: [Paul Gipe](#). He's written a number of books on wind power and most recently has become involved in feed-in tariffs for wind power in North America. I spoke to him a while ago about how the industry has developed.

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### Transcript

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Ben : I have spoken a lot on the show about wind power and how it is growing by leaps and bounds. Records for wind power installations are breaking every year now, so worldwide the wind power sector grew by 43% last year. US growth was a little under, Canada's growth was a little over. Interestingly, India is coming on strong now. They just overtook Denmark for fourth spot in terms of total installed capacity, but nobody can really match Denmark in terms of wind power per capita. Joining me to talk about wind power from California is Paul Gipe. So, thank you so much for coming on the show, Paul.

Paul Gipe: Yeah, thank you Ben.

Ben : Just as a quick biography, Paul has been around the wind power industry since the 1970s and he has written a number of books and articles, which everybody can find on his website [wind works.org](#). He was named Person of the Year in 1988 by the American Wind Energy Association. He was given pioneer status by the World Renewable Energy Congress. Paul, actually you were first described to me as the guy that David Suzuki goes to for wind power answers, so I just have this vision of David Suzuki having you on speed dial, calling you up in the middle of the night to talk about things like capacity factors. Does that ever happen?

Paul Gipe: I wish that was true, but no. David and I do talk and we do discuss this issue, but there are lots of wind power experts in the world and I have my own take on how renewable energy is being developed or should be developed.

Ben : For today, I am especially interested in, since you have all this experience, I am especially interested in getting some type of historical background of how wind power has been developed since the 1970s up until now. I know that Denmark back then had the state-of-the-art technology and the industry is going through record high oil prices all the way through record low oil prices and now we are again approaching record high oil prices. So, could you walk us through the developments of the wind power sector?

Paul Gipe: Well, the development of wind energy has often been connected to the availability, not just the price of oil and when oil has become abundant and very low cost it has set back wind power development a number of times. Wind generation of electricity really began in Denmark around the turn of the century where wind turbines were being developed to produce the direct current for charging batteries at the villages that had not received central station electricity in Denmark and during the war years, the First World War when oil supplies were cut off by the British blockade of Jutland, the Danes again turned to wind power and also as they are entering World War II when the German war machine needed oil, it was consuming all the oil available in the continent. The Danes again turned to wind power for generation of electricity in the villages of the Jutland Peninsula and then in the 1950s and 1960s, we saw a real bloom in the development of wind technology in Germany, in England, and in Denmark and with the abundant supply coming from the big giant, super giant, fields of Saudi Arabia that the bloom was taken off the flowering of wind energy at that period and that technology then lapsed for a number of years, but what was key was during the 1950s, for a decade, for 10 years there was a wind turbine operating commercially, but it is successfully producing electricity for over 10 years using a technology that today we would think is very crude, but contains the fundamental elements of what we call the Danish Wind Turbine Design and it is those fundamental elements that have brought us to the state of where wind energy is today and why it has become so successful. So, following the 1950s, the next great boom in wind energy development took place in early 1980s in California, from 1981 through 1985, before this next great collapse in the price of oil and the rise of Thatcherism and Reaganism killed renewable energy industry in the Anglophone world. Key happened. At that time, of course, California was the world center of renewable energy development, not just wind, but primarily wind, and that was...

Ben : That was in the 1980s? The early 1980s when California...

Paul Gipe: Yeah, early 1980s, yes. That is why I am in California; it is because I followed the wind to California and work in Tehachapi, which is still to this day one of the largest concentrations of wind turbines in the world. Tehachapi produces almost 2 terawatt hours a year or two billion terawatt hours a year, electricity from about 3500 wind turbines, so it is still a center of wind energy development to this day.

Ben : So, that was around the US oil crisis, the early 1980s?

Paul Gipe: That is correct, right, following the Iranian revolution in 1979 when there were gas lines and so on. It was really in response to a law that was passed in 1978 here in United States called the National Energy Act, which had a number of very important provisions. Key one was that you were allowed to build an alternative source of energy and sell that electricity to the grid, to the network. Now, in a typical American fashion, we made a major mistake in the law and we did not define the price that you would be paid. We only defined the mechanism to determine the price and of course we as Americans have a real affinity for attorneys and it has basically been in the hands of attorneys for over 20 years, but at the time we were able to succeed in getting a price, standard offer contract in California that enabled the boom of wind energy in California in the early 1980s and that is why the Danes became so successful, it is in part because they sold thousands of wind turbines to California.

Ben : So, that guaranteed price that was in terms of dollars per kilowatt or cents for kilowatt hour

Paul Gipe: Correct. It was a fixed price for a number of years and then after those number of years, you still had a contract to sell your electricity, but the price fell to whatever was considered as the prevailing rate, but it guaranteed a fixed price for the first 10 years, which is necessary to pay for the capital cost of installing renewable energy. Solar and wind are very capital intensive technology. You got to pay for all the machinery.

Ben : Of course, since then the price of wind has fallen dramatically, of wind power.

Paul Gipe: The technology has advanced. It has made great strides, but these have been incremental improvement. There is no radical change of wind energy. It is still basically the same kind of windmill that we had in early 1980s. It looked pretty much the same. They typically had three blades that spin around a horizontal axis and are upwind to the tower. This is much, much bigger. We have gained economy as a scale and as a result of that the cost of energy that is produced by the wind turbines has fallen dramatically.

Ben : It must have been a pretty exciting time way back in the early 1980s when California was buying all of these wind turbines from Denmark. What about later on when the price of oil hit all time lows? How did the industry survive through that?

Paul Gipe: Well, first of all, I mean it was absolutely a terrific time to be in renewable energy. The old timers who are still around remember that period particularly with wind energy here in California. It was the Wild West. A number of books written about the period that talked about this are the Gold Rush, the Wind Rush at California. It was an amazing time and of course it did collapse. I am not sure that we could say that we did survive that period. We did survive. There are a number of us who still work in the field whether it is solar energy or biomass or in my case wind energy and we have continued to do that, but the renewable energy industry was set back, well it has set back to a decade. It was set back 20 years. It did take 20 years to recover that momentum that we had in early 1980s, but in the meantime the technology has greatly improved. We have developed the technology and we can attribute today the success of where we are is because unlike here in North America, the Europeans did not abandon the desire for renewable energy. They took a different approach and said we are going to need this technology, we are going to need renewable energy and they maintained a program for the development of renewable energy over these intervening two decades. Even though the price of oil collapsed, they maintained a program. They may not have been as dramatic as what we had in California, but they were as important, if not now looking back on it more important, because they built a different kind of industry and that different kind of industry gives us more possibilities, more ways to use renewable energy than the very nearly focused form that was developed in California and that gives me hope.

Ben : So, they basically built an industry that was not based on the price of oil.

Paul Gipe: Exactly. They built an industry that was based on the desire, a political desire, a sociable desire, to have renewable energy that was independent of the volatility in the price of fossil fuels, specifically oil. Denmark, for example, weaned itself off of oil. They began using more, say, Polish coal and also natural gas from its fields in the North Sea, but at the same time it made a national commitment to develop renewable energy for the direct benefit of its people, for the direct use by its people. They created the program at the request of farmers, renewable energy advocates, and community groups that they wanted to use renewable energy. They wanted to participate. They wanted to be a part of what we now called the Renewable Energy Revolution and that is different in what was done in California. It gives us a different model for how to develop renewable energy. It gives us another choice for ways in which we can develop renewable energy. We are hoping that this model will develop in Canada, in Ontario, for example, with what

Ben : Okay. Something that really surprised me when I read it on your website is that almost 5% of Denmark's population owns a piece of a wind farm. That is amazing to me. Why is that?

Paul Gipe: Well, there are a number of reasons and actually books have been written about this, about the sociological phenomena that Danes are very community oriented. They are very cooperatively oriented. A lot of their big national businesses are cooperative, milk, dairy, cookies, pork, I mean pigs, and they are a powerful force in the cooperative movement in the world and this is in part a result of a philosophical movement, a religious movement, in the mid-19th century. Denmark did not have a violent revolution like we had in United States from Britain or the French Revolution. The Danes went through an agrarian reform that was based on enlightenment of its people, education and training of its people, to bring them up out of the mud, raise them up out of all the mud, through education, self-education, in small groups and this eventually led to the cooperative movement in Denmark. So, when the people there began looking at wind energy, even though their electric utilities are cooperative in a legal sense, the people said we do not want these guys doing developing wind energy because basically they have not done anything, we have asked them for years, but what do they do? They want to go build a nuclear power plant. We do not want a nuclear power plant. We want wind energy. So, we want to do this and the government in Denmark is responsive to that and said okay, we will provide a mechanism that will allow groups of people together or farmers to set up wind turbines and make money doing it, sell the electricity into the grid, and so wind power exist today in the world because of farmers and community groups in Denmark.

Ben : There is obviously a link between owning lands and putting up a wind farm, but North America has a ton of land and not that many wind farms.

Paul Gipe: Well, let me just say that they can be done in North America, this form of development that we saw in Denmark and we see now in Germany for the last 15 years, the same form of development in Germany. In North America, we will have both forms. We will have the traditional electric utility whether it is electricity to front or either of the back or OPG or Scottish power building wind farms, large central station power plants or private wind power companies like Vision Quest out of Alberta. They will be building wind farms. We have that kind of development in North America because we are blessed with so much land area, but we do have similar settlement patterns in Southern Ontario, like in Ontario, and in places in the Midwest United States where there are lots of farmers, lots of individual land holdings where the Danish model or the German model can be applied and I think that we are just at the beginning of a movement for this kind of development. There is a great interest among farmers and rural land owners in Quebec now and in Manitoba to do the same thing that Ontario is on the verge of doing.

Ben : The Department of Energy just published their 2006 Energy Outlook and they think that their best bet is that wind will only contribute 1% of the US's primary energy needs by 2030. I mean that is nothing.

Paul Gipe: Are you talking about the US Department of Energy?

Ben : Yeah, yeah. Sorry, the US Department of Energy.

Paul Gipe: Oh, we still have a US Department of Energy? Oh, I have not taken anything from the US Department of Energy seriously since Ronald Reagan, I am sorry. They are still there, are they?

Ben : Yeah, they also said 88% of the increase will come from coal power.

Paul Gipe: Well, all I have to remind your Canadian listeners is who is the president of the United States and who runs our administrative structure in the United States does not tolerate any dissent or any opposing points of view and once you understand that, you will dismiss any statement from the US Department of Energy as simply self-serving.

Ben : Okay. So, will the wind power growth continue to be at around 40% per year do you think?

Paul Gipe: Worldwide.

Ben : Worldwide.

Paul Gipe: Absolutely, yeah. All the signs are pointing to not just rapid growth of wind energy, but rapid growth of all forms of renewable energy. If you look at solar photovoltaic, solar cells for the generation of electricity, the growth is dramatic, if not more dramatic, than wind energy. If you look at what has happened in Germany... Let us take Canada, for example, let us say Canada has about 600 to 700 megawatts of wind power and wind power is much more cost effective than solar photovoltaic because of the nature of the technology. Germany has twice the amount of solar cells installed on people's roofs, that is, homeowners, farmers, and businesses in Germany as all of the wind turbines in all of Canada. That are just solar cells and this has all just happened in the last three or four years, so the growth in solar photovoltaic is very dramatic and if we can get the prices right in Canada, we will see growth of solar cells, too. I mean the Premier of Ontario, Dalton McGuinty, would like to see solar panels on people's homes in Ontario. He said that to David Suzuki and myself and we are going to take him at his word and try and make sure that happens.

Ben : What are your thoughts for things like offshore wind farms in North America? I mean the Cape Wind Project is having a lot of problems lately. Well, they have had a lot of problems since they have started, since they have proposed the Cape Wind Project. Do you think offshore will be a big player?

Paul Gipe: No, we do not need offshore in North America. Sure, we should not exclude offshore where offshore makes sense, we should not exclude it. Offshore Toronto, for example, certainly should not exclude it. Offshore Rochester, New York, offshore Detroit should not exclude, offshore Kingston should not exclude that, offshore of Queens University certainly should not exclude that, but we are land rich in North America and it is simply a lot easier to put the wind turbines on land and offshore. I have argued for many years, they are on record in my books and in my articles that offshore is not a panacea for what ails wind energy. The big issue with wind energy is will the people accept it? Will the public accept it? Some will, some will not, of course, unlike nuclear power, which can be shoved down people's throat by some central decision making by some government whether it is in Toronto or Washington, DC. Wind energy has to be accepted by the people who live nearby and if it is not we will not do it and the early push for going offshore was the belief that going offshore was a panacea. They are out at sea, they cannot see them, nobody is going to care. Of course, that was bogus at the very beginning and you see in the Cape Wind case of course it is bogus because you do not want Canadians and the mansions there they do not want to look at windmills. Even if they cannot see them, they know they are out there and well I mean would you want to go to [20:45 unintelligible] if you think there is a windmill offshore. Of course, you would, but maybe the Canadians do not want to live with it. Those kinds of people have a lot of political influence.

Ben : Is that the biggest threat right now, NIMBism or not in my backyard-ism?

Paul Gipe: For wind energy, absolutely, absolutely. As I say, wind energy has to be acceptable to the people. It has to be done in an environmentally acceptable manner; otherwise, we should not do it. I mean that is the reason that I am an advocate of renewable energy, of wind energy in particular, is that it is preferable to other forms of energy development such as nuclear power or

burning coal and it is only acceptable if wind energy is in fact environmentally superior, so you got to do a good job.

Ben : What about the intermittency of wind power? Is that not a big problem?

Paul Gipe: No, it is not a serious issue. It is often raised. Intuitively, we know that the wind does not blow all the time and when you look out at the wind turbines whether it is that one single turbine at the Pickering plant, did you ever notice how in Ontario you always have a token turbine by your nuclear plant? Some days it does not turn and some days it might turn kind of lazily while producing a lot of electricity, but when you have thousands of wind turbines scattered over a country the size of Canada or a province the size of Ontario, those wind turbines begin to balance out each other and study after study for the last 30 years, say, yes this is a technical issue and yes it has technical solutions and we just had another study, a study on a study, a study that in the Anglophone world evaluated 200 previous studies on intermittency of renewable not just wind but wind and solar and so on and I am sure they only looked at the English language studies, have not looked at the Germans or the French studies, and they said, yeah okay it is a technical problem, but everywhere it has been done, people just get on with the job and so as I say on my website and in one of my books, this has been beaten to death. I thought we put this question to bed 20 years ago. It is basically a red herring. It is a technical issue where people, for example, at Queens University engineers, that is why we train engineers to deal with these kinds of questions and it can be dealt with.

Ben : Actually, my next question is, are we going to start seeing any neat ways of storing wind energy?

Paul Gipe: Well, first of all, we do not need to store wind energy. One of message is you do not need storage because you already have storage in any large integrated electric utility system whether it is in Ontario or New York State or Denmark or Germany, you already have a lot of storage. Now, in the case of Ontario, you do not have a lot of hydro storage, you have a little bit, you do not have a lot because you are mostly run-off-the-river plants, they are not large reservoirs like you have in Quebec, but also you have fossil fuels and if you are offloading a generation of electricity, offloading fossil fuel generation, gas or coal, basically you are still storing that energy in the form of the fossil fuel that was not consumed and if, for example, if you have a hot water heater in your house and that hot water heater is still electric and you turn that electric heater on at night when the wind turbines are all generating electricity, you store new electricity in the form of heat and hot water, you can do the same thing at home. So, first of all, you do not need storage. Secondly, we did do a lot of storage already, it does exist. Third, okay, there are some technical things that might be of interest or looking like it could be of interest, compressed air storage.

Ben : Yeah.

Paul Gipe: Big project proposed for Iowa, which use several hundred megawatts of wind turbines on the order of all the wind turbines you have in Canada now, in Iowa, in connection with a pumped air storage project. Another interesting technical development, interesting to engineers, is new battery technologies. These are chemical batteries, not lead acid, but other process. In the long term, of course, electrolysis of water into hydrogen, very energy intensive, but in the long term that is a possibility of being able to store surplus wind energy in hydrogen and in the short term, plug in hybrids. Electric vehicles like the Prius, that is a hybrid gasoline-electric with additional battery packs, are being installed in a conversion company here in California. You plug your car in and you drive it at home, plug it in, the next day you go out, you have stored electricity in the batteries of the car, then you get over 100 miles of a gallon because you are not burning the gasoline and that electricity should come from... You are never going to have electric vehicles. That electricity has got to come from renewable.

Ben : Yeah. Yes.

Paul Gipe: It cannot come from coal.

Ben : Yeah. I just wanted to ask you quickly. This was a question that somebody else wanted me to ask you. Is there going to be any improvement on the technology? I know you said that the basic wind turbine design from the Danes does not really require that much improvement, but is anything on the horizon?

Paul Gipe: The technology, all renewable technologies, demands improvement. In fact, all human endeavors demand continual improvement. In the case of wind energy, we will continue to see and we will demand, it will be necessary to have continued incremental improvements in the technology, radical change in the way a wind turbine looks. No, I am an outspoken critic of ill fated, ill-conceived crackpot wind turbine inventions...

Ben : There has been a lot of talk about vertical axis wind turbines.

Paul Gipe: Well, particularly among Canadians, this is very interesting in my lectures in Canada and I do not do this here south of the border, but north of the border I always put in my presentations one slide that shows vertical axis wind turbines, particularly the turbine at Cap-Chat in the Gaspé, which some Canadians are quite proud of as an example of Canadian engineering. Of course, it has not worked for almost a decade. I would consider that an embarrassment myself and I put a big X through this wind turbine and I said, "This is not a wind turbine." It is a static sculpture. It is perfectly acceptable as a static sculpture if Canadians want to have this on their landscape. For me as an advocate of wind energy, my position is if the windmill does not work, get rid of it. Make most in beer cans out of... Okay, now having said that, Canadians have had an affinity for vertical axis wind turbines. Nothing wrong with that concept, the technology of vertical axis wind turbines can be made to work fairly efficiently in terms of the engineering term efficiently, but that technology has never been developed. It is the same level of technological development and economic development that we have of the conventional wind turbine looks like an airplane propeller and as a consequence I am an advocate of generating electricity with wind turbines. I am not just an advocate of building windmills. If we could have the electricity without the windmill that is the best world we could have. The state that we have today is if you want electricity from wind turbines, you are going to use conventional wind turbines that look like an airplane propeller. If engineers at Queens University or University of Toronto or at University of Windsor want to continue research in vertical axis wind turbines, that is fine, that is great, just do not spend much money on it because we need to spend the money on building the technology that produces electricity because Canada needs clean electricity. You do not get that from an R&D program. You only get that from installing real products that work.

Ben : All right. Well, thank you so much for coming on the show. Just before we end though, I just want to point out your latest book, Wind Power: Renewable Energy for Home, Farm and Business, and I have read through some of the reviews and it is the book to have on wind power.

Paul Gipe: Well, let me just mention, too, Ben, that the French language version, the Francophone version of the book will be available in June for any Francophone listeners, any listeners from Manitoba or Quebec, there will be a French language version of that book available in June.

Ben : Excellent. You can buy it on amazon.com, on that website.

Paul Gipe: Yes and I of course recommend that everybody buy it by the crate.

Ben : Okay, well thanks so much for coming on the show, Paul.

Paul Gipe: Thank you very much, Ben, and good luck with your podcast.

Ben : Thank you. Bye-bye.

Paul Gipe: Bye now.



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