

Offshore Wind Farms: Weighing the Benefits

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<http://forum-network.org/lecture/offshore-wind-farms-weighing-benefits>

-Our first speaker is Greg Watson, by the way all the bios are on the agenda, on the back side for some of the speakers and Greg Watson is described in the front. He's going to give our longest talk tonight of a 10-minute talk about Wind Energy in general and some issues about offshore siting and he'll introduce the notion of Cape Wind so you have some background for those who don't. And Greg is the Senior Adviser for Clean Energy Technology in the States Office of Environmental Affairs. And he's Vice President for Sustainable Development at the Mass Technology Collaborative, which is the state's economic development agency for renewable energy, so Greg. -Thank you Barbara. It's great to see all of you here. I'm going to set through those if I can. Let's begin. I'm talking—I'm going to try to put this in context to talk about obvious we're talking about wind energy, so we are talking about delivering of electricity. Electricity is an essential to modern life. Actually, it's the lifeblood of our economy and we talk a lot about oil. We talk a lot about what would happen if we were no longer, if we reach peak oil

in the implications of that. But in reality, electricity really is what drives our economy, not to the exclusion of oil, but if you don't have electricity, you're not going to be able to do a number of things most of which are on that circle around there including getting our electricity or oil here and pumping it and doing a lot other things. So, electricity is not an energy source in of itself, it's a carrier of electricity, to get that electricity generator required sources of energy. And this is a chart that gives us sense of where we get our electricity from in the region; this is in New England pie chart. As you can tell, and probably no surprise for most of you, the region, New England producers is very little of the energy it consumes to produce electricity, a little bit in terms of hydro. But for the most part, it is imported. As you can see a great deal of natural gas, coal and even oil is consumed. Not so much for electricity, although in Massachusetts in New England, we do use oil for some of our electricity generation more so than other parts of the country. There are implications for the sources of energy on both ends in terms of where it comes from and how we get that, and also then, in most cases combusted to create electricity. There are implications

in terms of their quality in that end and as most of us unfortunately see from the recent event out in Utah, there are implications for how we get a lot of our sources of energy of whether it's coal or oil or other sources. So we have to sort of keep that in mind. This is a rudimentary chart. I couldn't get a one in great detail of how Massachusetts sources of energy for producing electricity breaks down. We are precariously overly dependent upon natural gas. About 40% of our electricity is produced by natural gas which is the cleanest of the fossil fuels particularly when it's produced by combined cycle, gas turbines. But the fact that we're about 40% dependent upon that makes us already vulnerable. Vulnerable to some problems with supply but also price spikes. We depend in Massachusetts. When people tell you that we don't depend upon oil for electricity, it is not true, we do so in Massachusetts as we do coal about 8% percent. Renewable accounts for about 6%. And of the renewable, that's 6%, most of it comes from hydro. We have some from biomass. So, you can see a very small proportion right now, it comes from solar and wind one of the things we like to do as part of the executive office of Energy and Environmental Affairs of Massachusetts Renewable Energy Trust Fund is to expand the solar, wind and other renewable sections. This just kind of gives you sense of the distribution of where our energy facilities are in Massachusetts and you can see again, not going to great detail, but there are a number of natural gas or dirty dozen fossil fuel plants but this also has an overlay. You can see the hatch marks in both extremes of the state where some of our greatest

natural resources for producing indigenous sources of energy, at least indigenous resources, are primarily wind, and some of the most, what I guess people would consider the most pristine parts of our state. They are, you know, Berkshires along the mountain ridges and they are along the coast and off the coast of Massachusetts. Nature determines where renewable energy makes sense, not politics, and that's going to be something that we all need to keep in mind. The Renewable Energy Trust Fund was created when the state restructured its electric utility energy back in 1997, sensibly to open it up to competition and that was the first time most of us energy electricity for most part has been, I almost say it has been an invisible in terms of how its produced. It has been a natural monopoly for the most of the hundred year history. We had no say in who we got our electricity from and how that electricity was produced because the natural monopoly made those decisions. Opening it up to restructuring among other things is, now people will have the opportunity to make some choices. Those choices will be made on the basis of what most people, I think, characteristically would like to make their choices on. That is, what's the cheapest way or what's the cheapest form, what's the least expensive way. But it also means that we can now have an opportunity to say we can have some way of determining how the electricity is produced, the quality of electricity. And so the Renewable Energy Trust Fund was created as part of the restructuring so that we could make renewable energy more available. And we felt and rightfully saw that it needed a jump-start in order to create a level plain field with fossil fuels, which regards what everybody says.

You can talk about the subsidies, production tax credit for renewable, whatever subsidies you want to talk about for renewables and solar. But please when you do that, do not forget that all energy sources are subsidized and subsidized to a great extent. Some of them a little bit more dispersed and hidden, but they are all subsidized. We, at the Renewable Energy Trust Fund, we've taken a look at the full menu of options with regard to what's really available in terms of renewable energy for Massachusetts and tried to explore them all from solar, to fuel cells, to wind and from the very get goal increased efficiency and conservation. As a matter of fact, the governor has made a pledge to try to see what we can do to triple the amount of energy efficiency and conservation efforts we can employ here in Massachusetts, hopefully to the point where we don't have to create new power plants to meet the increased demand. Not to meet increased demand, but we would probably, still want to do this and we would. We absolutely want to create some new power plants to change the quality of our portfolio to introduce more renewables, more clean energy sources into our portfolio. So if we looked at all these sources, I said we look from conservation efficiency, solar, tide, wave and but as we look when it became increasingly attractive in terms of its technical, technological feasibility, but also its cost competitiveness. And again, what we wanted of all the technologies we're looking at, which ones can we produce and I'll get to this little bit on a commercial scale. But which ones also compare favorably

with the energy sources were already using that being again, coal, oil and natural gas as you can see onshore. Into some extent, it depends on the wind regime. It depends upon a number of things, but both onshore certainly onshore wind measures up very favorably with our conventional sources of coal, oil and gas. And one thing, you know again, when you start to think about when technology, the major cost are upfront in terms of the capital of cost of building it because once you get your facility built I mean the fuel is free from that point on. And it's not subject to the type of price swings. These are the components of them. We're going through a great detail, but again wind turbines have become increasingly sophisticated in terms of their taking advantage of aerodynamic technology so that they are becoming very efficient and very sophisticated machines. There's a lot more to them just the turbine obviously they have to be you know, again you've got everything from the turbine, the tower and the generators itself, to the transformer, substation where you have to adjust a voltage so that it meets the requirements of where it's actually going to eventually wind up in the transmissions lines, and eventually to the consumer, a very sophisticated and complicated systems. The reason I put this on, I've spend a number of years at New Alchemy Institute back when I was a hippie back in 1970s and 1980s and everybody then considered wind to be warm and fuzzy and, "Everybody, let's just put them wherever we want to." You know, we can do whatever we want too

with them because they are green. They are sophisticated, highly technical pieces or systems of equipment and you can't just sort to say let's put it here and let's move it here so that it accommodates our particular visual preferences perhaps because every move, every change you make has implications for cost and the effectiveness and efficiency of the energy source, it's just something to keep in mind. Another thing that has contributed to the cost effectiveness of wind turbines as a technology has improved and become more sophisticated. They have been able to increase in size so that you're getting more energy per turbine and actually more energy per pound of energy invested in creating these machines and that's what you have to start to thinking about these. How much material does it take to make this? How much energy will I get back in return and that's going to really affect your bottom line. Now, if you go from left to right here, the first one is a 50-kilowatt machine and then it's a 250. The IBEW turbine right on the expressway, it's in between there. It's a little right between the 50 and the 250. Hull I, that's one is 660-kilowatt machine, and next one is Hull II, and then the next to the last one is Cape Wind. So, it kind of give you an idea. Oops! I'm already running out of time, so that's where Cape Wind would sort of fit in to the scheme. Just to kind of give you an idea, solar is really effective. It's been around for a long time. This is the Brockton Brightfield on your left. It's a 425-kilowatt facility about three acres. This is the Mass Maritime Academy, 660-kilowatt turbine.

So you can kind of see what's required in terms of land use and space. Every technology has different requirements and different advantages and disadvantages. What we found is because of the size that the turbine increasingly and then the diameter, or the rotor diameter and all, that is becoming increasingly difficult to site wind turbines in Massachusetts or New England for that matter on land. We're densely populated, land values are very high, so what we did find though, and as a matter of fact would coincide with that realization is that the most abundant resource of wind is off the coast of Massachusetts. It's offshore. The water is sheer. There's very few obstructions, have very little turbulence and there's a great deal of wind energy there. As a matter of fact, the United States Department of Energy has determined that the you know, South Dakota has a great resource of wind but there aren't very many people that live in the Dakotas. The 28 Coastal States of United States consume 78% of its electricity. There's a 900,000 megawatts of potential wind energy off the coasts of United States. That's equal to the install capacity today and about 100,000 megawatts off the coast of Massachusetts. This is just what it gives you at New England. This is just to give us a real snapshot of the projects that are either operating or in the works today. Most of them are on land, a couple are offshore, which brings us to Cape Wind, the nation's first proposed offshore wind farm

is not the only one any longer.
Texas and others are now,
they are in the running 130
perhaps GE 3.6 megawatts
wind turbines generators
on Horseshoe Shoal
in Nantucket Sound.
I'm sure everybody
knows that by now.
The project would occupy roughly
about 24 square miles
but these would not be
24 restricted square miles.
That's the land surface
that water sheets would take up
but activity could take place
in between those because there's space
about a third to half-mile apart,
that would generate
about 454 megawatts of electricity,
but 170-megawatts on average
and it is currently under review
by the Minerals Management Service
US Department of Interior.
Thank you.
-Thank you very much. Thank you.
Well, we're going to hear
six different perspectives on Cape Wind
and we're going to have,
the first three will be in support
of the Cape Wind offshore proposal.
We are going to start with Jack Clark
who's going to talk about the perspective
that considers the effects on birds
and other wild life
in that Mass Audubon.
Their position is one of tentative support
based on currently available data.
Jack, thank you.
-Thank you, Barbara,
and thank you to museum
for inviting Mass Audubon here tonight,
to the forum, to talk about this.
And don't let Greg Watson kid you.
He's still a hippie.
He just cut his hair, put on a tie
and has infiltrated government
on behalf of Mother Earth,
so we appreciate that.
As Greg said, I think as we can see here,
this is an important issue
and its very prevalent in the media,
this issue of Cape Wind
as of you may have seen in the Daily Show

with John Stewart last night
where this project was so primarily
displayed with good humor.
And as Greg said,
this is the really the nation's
first offshore wind energy project
that's moved this far along
in the permitting process.
It's 130 turbines that rate
over 25 square nautical miles
in the center of Nantucket Sound
in federal waters.
But it also includes a platform
that will pull all the cables
from their turbines together
and for generating the electricity
and that goes and plugs in
to the land on Cape Cod.
And when completed,
it will provide about the equivalent
of 75% of the electricity
consumed on the Cape and Islands.
Now, the environmental review of Cape Wind,
will set the precedent
for all future offshore wind energy projects
in the United States.
And that's why it's so important
that we get it right.
For that reason, Mass Audubon
has taken a leadership role
and been very, very involved in this project
and analyzing it
for the last six years, and looking at
the potential environment impact
that the project may have
with particular attention on the birds
that live in Nantucket Sound
and migrate through Horseshoe Shoal.
Now we've done extensive review
of this project again
over the last six years.
We've worked with the permitting agencies
and we've talked about particular things
like comprehensive and rigorous monitoring
and mitigation measures
that might reduce the risk to birds
if the project is built.
And we've said that if the conditions
we have proposed regarding
minimization of the harm to the environment
and mitigation measures.
If these were adopted,
and some of the significant
remaining data gaps are filled

with the finding of no significant threat of the environmental resources of Nantucket Sound, then Mass Audubon would support the project, which is as we see at the largest, cleanest renewable energy project in the northeast. Now this challenge that would make to the Cape Wind applicant, state and federal agencies comes after six years of review as I said including three years of ornithological fieldwork. We've done an assessment and we've commented on the first graph environmental impact statement that was 4000 pages long. We've talked with scientists, ornithologists. We've read the literature, thousands, and thousands, and thousands of pages including the latest Department of the Interior, synthesis of worldwide studies, the final report which was issued yesterday. And we've traveled to Denmark during the 2005 bird migration season, to see offshore wind farms of that area that are located in similar habitat to some of the bird species we see. Now we expect to revise environmental statement later this summer or early fall and we hope some of the challenges we've made will be addressed in that. Now our technical review and assessment of the project is focused primarily on the project's impacts on birds and their habitat. We play a lot of strength, that's what we're known for at the Audubon Society. But the basis for our position is the project has no significant threat to the living resources of Nantucket Sound. That doesn't mean zero impact on all the resources because we recognized the production, the exploration production in consumption of the energy in any form, it always has some impact

on the environment, and our primary expertise is with bird life, so that where we have focused. And our position relies on the evaluation that we've done; evaluations by other organizations. So, we're looking for some significant data gaps to be filled. Some of them regarding long tailed ducks, migratory passerines, and roseate tern. We've gone ahead with funding from Interior Department from several agencies and gone ahead and done three years of onsite fieldwork ourselves and done the analysis. And we've determined that based on what we know, what we've seen, we don't see that this project will cost a significant adverse impact to bird life and marine life of Nantucket Sound. And we make this preliminary decision a whole disposition within the context of global warming of a planet that's heating up and that we have known documented detrimental effects to bird life already in the Nantucket Sound. And we feel that those impacts are much more severe than those that might happen as a result of this project. People to talk about that this project may be the industrialization of Nantucket Sound. However, you know what the weather was like today. If you went to Nantucket Sound today and looked out across the horizon, you would see an orange haze across that horizon. That's the industrialization of Nantucket Sound and that needs to be mitigated by renewable energy project such as this one. Our work continues, we don't have a final position but we'll be moving forward with it the next year. Thank you. -Thank you Jack. Next we'll hear again in favor of the proposal from Marty Aikens of the International Brotherhood

of Electrical Workers. Marty.
-Thanks Barbara.
Let me tell you how my day started.
I get in my car
and my window was open last night,
so I had to sit soaking wet in my suit.
I started the car,
looked down, say,
"Gees, I didn't get gas last night."
I drove down the street
and ran out of gas.
So today has been pretty interesting,
I ruined my shirt when I get to work,
stuck my pen in my pocket upside down
but I made it here.
I almost didn't even make it here really.
I got stuck in that traffic down there.
I left at 4:30. I could have walked here
twice from my union hall but anyway,
talk about burning fuel right.
We do have a turbine and I happened
to meet the proponents of this project.
They call me up and they said,
"Marty, I want to sit and meet with you."
And I was glad he did and I asked them,
"What he's done so far?
We're going back four years now."
And we told them our perspective was,
"You know, what we want to see
what the impact study says.
We really wanted to see
what the impact study says."
So we did look at the impact study
and we were very pleased
and then we jumped on board.
The final impact study as you know
will be coming out within
the next two weeks supposedly,
but that's supposed to be out
to six different times already
and it's not out yet.
So, as government moves,
so I guess as we moved.
But, we have to realize one thing.
We do have to make electricity
and what was said here today.
I mean just think of Boston
and our growth is at 4% right now
in the state for electricity use.
You have to build power someway.
You have to build power houses.
You're going to have to build power plants,
have it be nuclear.
Go down to Cape and see

the coal smog going around.
It's really sad and sickening
and that's part of the reason
that we jump behind this project
for clean imaging.
That's part of the reason
we built one ourselves.
As a matter of fact, in this morning,
what was a good thing that happened to me
is my electric bill came.
If someone wants to open this,
my electric bill is zero.
I have six kilowatts in my house
because I believe in renewable energy.
And annually, I have a zero electric bill
and solar does work,
renewable energy does work, and these
projects do work and they're clean.
These are things we have to do.
We're talking many jobs too.
People make a living, pay taxes.
I happen to represent 6000 families
in Eastern Massachusetts
that have to get paid every week
and survive and in this trade
is electrical work.
So I'm really excited
about renewable energy,
any way I can help a project
of renewable energy, any magnitude,
I will do that and we went as far
as to build in our own turbine right there
in southeast expressway
so people can come over and visit.
There's a little park there,
it's open seven days a week.
You can walk right in
even if it's closed on Sunday,
you want to come down at night.
You can walk down.
There's a little gate there.
You open it up, come on down,
sit down, have a sandwich at night.
Watch the turbine, there's lights on it.
You know this our future
and we got to realize.
We get to make electricity.
We're going to have to put it somewhere.
Now if I can put a thousand people
to work in this project and then have
50 families being fed
to make clean renewable energy,
what are they going to do everyday?
They're going to get up

and then going to go up and boat.
And then they're going to turbine
and maybe we place a few pots,
it kind of good business,
electricity and water don't mix
and electricity
and salt water really don't mix.
And those turbines
are going to have maintenance
and that's what our guys to do.
Powerhouse, we just built
two brand new powerhouses
right down in Weymouth and right over here
in Everett, gas fired.
I mean a lot cleaner than what was there
but these are the things we have to do.
We have to put them somewhere.
They're going to have to be somewhere.
So, if we're thinking
of a community tonight, I mean,
I was told by Ambrose that
there's probably going to be a turbine
from the state next to my house.
And I'll tell you, I was really excited and
I thought like it was my birthday really.
To think, I can take my grand kids
around the corner
and show them a magnitude
of a turbine that's really running
my whole city right there.
That how much that would do
to provide energy.
Of course, it's going to do
the water treatment plant.
But it's the same idea
and same amount of energy
that you're going to need.
Now you can show them that you can have
clean energy from natural resources
but better than that really
and people make a living in doing this.
You know, if anyone does
I was going to show a movie here
it's about 10 minutes long.
I have a video if anyone wants the video
I will make sure you get it.
My business is kind to be around here.
If anyone wants to take a tour down
and see some renewable energy at close,
we have solar down there
and we have wind
and we would be glad to do that
and I will be walking around tonight up
and drop my business card.

And if anyone wants to become
an electrician, see me also. Thanks.
-Thank you Marty.
And were going to hear
from Charles Kleekamp
so in terms of the clean energy
in light of the current air pollution
on the Cape
which you've heard a little bit about.
And Charles Kleekamp is the Vice President
of Clean Power Now. Chuck.
-Thank you very much.
The title of my talk tonight
is a little bit different.
It's called "Health, Wind
and the Beginning of the End
of Oil Generated Electricity"
and I will start with a quotation.
"Air pollution from power plants
is the single biggest environmental
health threat that we face today,"
said Thomas Reilly,
the previous
Attorney General of Massachusetts.
He was referring to the year 2000
landmark Harvard study
on health impacts of emission from
Salem Harbor and Brayton Point power plants.
This study is the basis for estimating
future impacts on the respiratory diseases,
premature deaths
and the associated health care cause.
Unfortunately, Reilly couldn't connect
the dots to emission reductions
due to the Cape Wind project
and the beneficial impact on health effects.
Health benefits from wind power
depend upon which type
of fossil fuel generators
are rolled back.
In New England,
oil fuel generators comprised 24%
of the total installed capacity.
One quarter of the total capacity
is from oil-generated plants
and 40% from Massachusetts.
And it is also a fact
that oil-generated electricity
is the most expensive of all sources
and one of the dirtiest,
burning 1% sulfur
content residual fuel oil.
Now knowing the efficiency
of generation plants and the price of oil,

one can calculate the fuel cost of result in electricity. Just five years ago, oil generation was competitive with other fossil and nuclear sources at about two cents per kilowatt hour. With ever increasing oil prices, due to the world instability and increasing demand, the fuel cost alone of oil generated electricity is now about seven cents per kilowatt hour. And that doesn't include the payroll and maintenance. Natural gas generation, 40% of New England's capacity is the next most expensive electricity and cost about five cents per kilowatt hour for fuel. Of course, the fuel cost for renewable sources like wind and hydro are zero and always will be. So, who gets put their generated power into the good system? Electricity dispatched under the New England Electric Grid is controlled by the Independent Systems Operator or ISO. And it's based on offers from power plant owners on a day ahead need, a bid stack is arranged from low bids to high bids for each hour of the day. And when the expected need or the load is reached, a clearing price is established. Simply put, bid offers above the clearing price are not dispatched those that are lower are. Incidentally, all power dispatched under the ISO rules are paid the same clearing price regardless of the offer, this is called a pay-on-peak scheme as opposed to a pay-on-bid scheme and that's a discussion topic for another time but an important one. This fuel cost structure means that zero fuel cost sources like wind will always be dispatched by ISO in New England by design and intent. And when farm owners like everyone else

will be paid the clearing price and that can vary from five cents per kilowatt hour at night to a dollar to a kilowatt hour in the hottest high demand days of summer or the coldest days in the winter. This scheme means that in addition of wind power, wind power will always bunk off the top of the bid stack the most expensive offers, which are usually from oil generation plants. And that means, the cost of average wholesale of electricity is less for all retail distributors. Wind always wins and so the costumers. In particular, when Cape Wind comes online with 1.6 million megawatt hour a year, it'll most likely offset that much oil generated electricity. Even with recent emission improvements dictated by new regulations. The health impact based on extrapolation of the Harvard protocol, use a benefit of some \$25 million a year in health care cost in avoiding six premature deaths every year. In addition to Cape Wind, it will eliminate the consumption of some 2 million barrels of fuel oil a year. For a nation addicted to oil, that's a considerable reduction. It's like taking 175,000 cars off the road. And add to that, the avoidance of a million tons of carbon dioxide a year, and 9000 tons of sulfur dioxide emitted from oil generators, makes the societal benefits even more attractive. In conclusion, we can say that for every kilowatt hour of wind power dispatched, there will be one less kilowatt hour of fossil generated electricity and its attendant on healthful emission. In particular, the New England fleet of oil fuel generator, is already on its last legs. Last year, the Canal Plant on Cape Cod, which is the third largest plant

in Massachusetts, operated at only 17% of its capacity. Generating some 1.7 million megawatt hours just about exactly the same production that the Cape Wind project would have delivered had it been operated. At Salem Harbor, the fifth largest power plant in the state, they're Oil Unit Number 4, which is larger than all three of their coal burning units, ran only at 6% capacity. And finally, Brayton Point, the second largest plant in Massachusetts they're Oil Unit Number 4 operated at just 1%. When renewable wind power comes online, not only from the Cape wind project but also from the equally large goal of Rhode Island's offshore plan, it spells the 'beginning of the end' of oil-generated electricity in New England. This reduction and mostly imported oil certainly bodes well for the national sustainability, energy independence and easing of global warming from their carbon emissions. So we come full circle from the Harvard study on health impacts to wind power, which is the coup de grace of oil-generated electricity. By the way, the Canal Plant is for sale. Thank you very much. -Thank you Charles and now we're going to hear some perspectives, three perspectives on the criticism or concern about the Cape Wind proposal. And first we'll hear from David Bergeron, who is of the Massachusetts Fisherman's Partnership. So David, thank you. -Thank you very much Barbara and thank you to the museum for sponsoring this program. As I listened to the presentations, I find myself thinking that, "Gees, I could be a hippie too."

And you know, no matter what Jack will say that that he was a former hippie, I know that he was really a surfer, he is not a hippie. And I wonder how he got from surfing to birds but he does good work. Anyway, the main message from our perspective is that this does not have to be a trade off. I mean, I find the presentations that have been just made very, very compelling and as our fishermen do too. I mean, the fisherman are just as worried about global warming and the changes that that's having on the environment as anybody else, more so, because it impacts what happens in the water and what happens to the fish that swim there and the fish that our fishermen depend upon. So, this is something that we're very concerned about, it does not need to be a trade off. Now in Nantucket Sound, we have sustainable fisheries. We've had sustainable fisheries there for several centuries. We have hundreds of families that make a living there but it's not just these families make a living, let's say they're providing high-quality, all natural, organic seafood for consumers. And we're learning today that more and more, all natural. Protein is organic. Organically produced protein, free of pesticides and all of that hormones and all that stuff is very, very important. So, we have a place in Nantucket Sound where we're getting some really high-quality seafood. For everyone, it's benefit. And we're doing it sustainably with the kind of capacity that everybody tells us is really important, small vessels, low impact on the environment,

fishing in well-managed fisheries.
And so, why do we have to displace it,
that's our question
and it doesn't need to be displaced.
The ocean is like the land,
I mean it's not all the same,
you have mountains, you have plains,
and you have deserts.
So, the ocean has many different places.
Some places are much more important
biologically than other areas.
They are very productive
and we posit that if there's an area
that is more economically important
to the fishing fleet,
that's fishing sustainably, then that's
an area that needs to be protected.
And the access of the fishermen
needs to be guaranteed.
So, if we're going to do something
like this, let's do it
but let's do it some place
that makes sense.
Let's do at some place that does not
displace an activity
that's providing a lot of benefits.
Now, speaking of global warming,
Fishermen, there's a news chapter
being written now
about the story of the fisherman.
We all know about him catching fish
and bring it back to us
but they're becoming more and more
involved in working with scientists
and they're becoming more and more a part
of our ability to observe the environment.
You know, if you're commercially fishing,
you're going to pay really close attention
to what's going on in the area
where you fish
and you're going to notice changes
a lot sooner than anyone else is.
So I've observe that becomes
part of the observational capacity
and there's an economic value to that.
We would not be able to replicate
the data collecting capacity
that our fleet provides to our ability
to observe change in the environment,
the cost would be prohibitive.
So, that's a new part of a story, and if
you want to talk about global warming,
then we want to be able
to keep these guys fishing

in places where it's viable
for them to do so.
Now, in Horseshoe Shoal,
we have important fishing
going on
at certain times of the year.
In that particular area,
it's not always important
but at certain seasons,
the warmer weather,
there's a lot of squid,
there's a lot of fluke,
there's conk, it's caught
by some fixed gear fishing vessels
it's caught by some
mobile gear fishing vessels.
They have very low impact
on the sandy bottom there.
The Shoal area is an aggregator
of the food
that starting at the microscopic level
with plankton
and it aggregates the food as it wells up,
everything all the way up
through the food chain follows it.
So, the fish goes up and they're
why are they there?
They're going there
because that's where they eat.
And it's a good place
to catch them as well.
So, that's why the Shoal area
is more important
than some of the other areas in the Sound.
It's worth about a million dollars a year
to the small mobile gear boats
that fish in the area.
And the placement of the towers
in this particular place,
about a third of a mile apart, is going
to present a real hazard to navigation
because fish, they don't swim straight,
they don't swim in straight lines.
They tend to do what they want,
they're following the currents
and how the food moves around.
And so, it doesn't really make
any economic sense
to try to fish on a straight line
between in the grid
of how the towers
are going to be set there.
Now, the experience in Denmark,
we're told from our colleagues

is that the areas where these wind farms have put there are excluded. Fishermen are excluded from those areas, not just for mobile gear but for other types of gear because I guess they're concerned about anchoring and entanglements with cables, that's what we are told. So, I guess in summary, the message is it does not need to be a trade off. We're very much in support of renewable energy, it's very, very important to us, even more so, because of the negative impact the global warming and pollution has on the very fish that our members rely upon to make a living. So, we proposed alternative sites, we tried to meet with the proponents of the project in Nantucket Sound and propose some alternatives. Those have not been analyzed and it's a disappointment to us and we would like to work with proponents of such projects. All right, thank you for your time. -Thank you David.

Now Lisa Linowes who was here from New Hampshire will talk about who's been looking at lot of onshore and offshore impacts of wind turbines, the industrial level wind turbines. So, Lisa?

-Hi, it's great to be here. Thank you for having me Barbara. I wanted to, my mission tonight was to talk to you about the aesthetics and impacts to the ecosystem on a project like Cape Wind or an offshore facility. But, I'd like to take one minute of your time and give you another perspective on what it means, what wind energy means in New England and I'll focus on New England, not that the rest of the United States or worldwide but in fact what I'm going to tell you applies everywhere. I believe that some of the representatives that spoke to you earlier today would've benefited by participating in the ISO New England Scenario Planning Process,

which took place over the last year where we discussed what the fuel makes that New England really needed to address our growing demand for electricity which is growing at 1.5-2% per year. I want just a minute here to say that say that the New England right now has 31,000 megawatts of electricity, 31,000 megawatts, okay, of electricity. The highest consumption or call for electricity ever in history of New England was on August 2, 2006, were called for 28,127 megawatts of electricity. I have a question for you. Where do you think that electricity did not come from or could not have come from in the middle of August, on that afternoon? It's not on the ridge tops of New England and likely not off the Nantucket Sound. There's a very fundamental fact that you have to understand about wind energy when you come to talking about the tradeoffs and the costs and benefits and that is you can't throw money at the wind and make it blow. If it's not blowing, you don't get the electricity. So, you cannot replace wind, you cannot replace nuclear, coal, gas you name it, for your traditional sources of electricity with a renewable source like wind biomass yes, methane gas yes, hydro yes, not with wind. So it's very important to know when I talk to you about the aesthetics and the impacts and then the ecosystem, these impacts may happen and you may still be building the coal plant, the natural gas plant and the like. And one of the things that we in terms of the aesthetics, a lot of arguments have been made in favor of Cape Wind and other projects of this nature by saying, "Look it's all about, people just don't like to look at them.

They're ugly to look at."
That's you know, obviously
people are being very self-centered
and self-serving, when all
they're worried about are their views.
And then we see pictures like this.
This is a typical photograph
of an offshore wind facility,
two turbines, beautiful waters,
billowing clouds, majestic,
not a problem—it's a nice vision.
And then we go to this next image,
this is showing obviously
a beautiful background, three turbines,
but you can't quite see
the mist in the back
but it's a kind of clouded over,
you have kids playing on the beach.
Again, man in harmony with nature, and we're
able to live nicely with that situation.
Here, when we start to recognize
that there is no such thing
as an offshore wind facility
comprised of one, two or three turbines,
it's economically infeasible
to build a project
that only has two or three
particularly offshore.
So, while we're talking
in a hundreds Cape Wind
130 others, it will be larger.
So, there's an effort here to demonstrate
what a hundred plus turbines
will look like offshore, that would
I'd say that's probably
about three miles offshore
and it doesn't show up as well
from the view I have but of course
nature is viewing kindly
the industrialization
of the horizon there.
This is more likely what a wind project
looks like offshore.
Those turbines standing,
today standing at 440 feet,
you've all saw that the publicity
about the blade testing facility
that would be coming
into Massachusetts and Texas,
the intent there
is to be evaluating blades.
These blades on the Cape Wind project
are 180 feet long.
The diameter is 360 feet

for that three-blade rotor.
On the new blades,
300-foot blades,
600-foot rotor,
we're talking of a diameter,
we're talking about towers
that are going to be 700 feet tall.
And there, it's another typical picture,
that's what wind energy looks like offshore.
And that is actually
a simulation of Cape Wind.
You would think that if it was coming
from the Cape Wind folks,
they'd have made an effort to make it
look really nice,
that's from about between
five and six miles offshore,
sticks on the horizon.
Now, when you stop to think
about 'sticks on the horizon',
that may or may not produce electricity
and because,
according on ISO New England evaluations,
you'd have to build four times that
to get anywhere near the development,
the amount of megawatts
that they're claiming
to be getting out of there,
because consistently, onshore and offshore,
wind energy does not produce electricity
in sync with human activity.
We're active doing stuff during the day,
eight to six,
and our peak times are in
the midafternoon in New England,
we're still at in the summer,
we're a summer peaking region.
When does the wind blow?
At night and in the winter time.
So, you'll get that,
you'll get the natural gas,
you'll get the nuclear power plants,
and you'll get all the others.
So, when you're weighing,
and I'm not going to get to talk
about the wildlife family.
But when you're weighing or balancing
the cost benefits,
make sure you understand
what the benefits really are.
They're not all
as we're being told they are, thank you.
-Thank you Lisa.
And actually

segways into Frank Conte,
who's actually speaking tonight,
on behalf of the Beacon Hill Institute
at Suffolk University.
David Turk who was going to speak
had to be away, but Frank is stepping in.
And, just so you know,
the Beacon Hill Institute
was hired by the Alliance
to protect Nantucket Sound,
to do, which is a group opposed
to the Cape Wind proposal,
to do an economic analysis
of the project.
And so he'll talk about the impact
on real-estate values,
tourism and cost benefit,
thank you.
-Thanks for having me.
I didn't have much on carbon footprints today
when I walk down the street
from Beacon Hill
to the beautiful museum of science
to get a view of the city
that I'm not very familiar with
from this perspective.
So it's very nice to be here
and I'm very impressed
with the turnout
and the willingness of people
to hear different points of view
on this issue.
Obviously, we had the Beacon Hills
to bring an economic perspective.
I am probably,
a one-armed economist, I guess.
I don't say "on one hand,
this and on the other hand, that."
But I think you do need
to look at a wider view.
The gentleman this evening said
that the cost of wind energy is zero,
that is not true,
there is no such thing as a free lunch
and that's all you need to know
about economics,
there's no such thing as a free lunch,
somebody's just going to pay.
So, let me just get into my comments here
that were prepared by Dr. Turk
and then I'm willfully
and hopefully engagingly
delivering them to you this evening.
The proposed installation

of 130 wind turbines in Nantucket
was represented as
a much to be desired step
towards energy independence
and towards the development
of an important source
of renewable energy.
Analysis performed by
the Beacon Hills Institute
suggest otherwise, disclosure,
our work has been supported
by proponents of the windmills.
We are upfront about that
and if you want to
as some people have tried
to engage this on another level
by committing the mode of fallacy
by trying to attack the message
as supposed to what
the message is saying,
then you are free to commit
that crime against logic.
At the same time,
we have insisted
on complete independence
in performing our work.
I worked with PhD economists,
some of them published
in the streamed journals
of energy economics,
so I believe they know
what they're talking about.
They've been published
and they're widely respected.
And at the same time that we have
received funding from the Alliance,
we've also insisted
on complete independence
in performing our work
and on the right
to publish our results
which we intend to do.
And this is probably because
we want to follow
the analysis wherever it'll lead us.
That's said
I can report our findings as follows:
The projects would be heavily subsidized.
In 2006, the Beacon Hill Institute
determined that it would receive
a subsidy consisting mainly
of state credits
and federal production credits
of \$731 million in present value terms

assuming, amounting to 48% of the total revenue of the project. Because the project depends on huge public subsidies in order to make a profit for its developers, it should not go forward unless its benefits to society would exceed its cost. A cost benefit just performed by BHI in 2004 shows however, that the cost of the project would exceed its benefits by 28%. We found that the cost would come to \$950 million in present value terms and benefits to \$744 million representing a loss of about \$208 million. The benefits of fuel, which I will enumerate here includes savings of \$4.95 per kilowatt hour, this figure takes into account the likelihood of periods of high energy prices that we're experiencing now and those in the future. The other benefit would be savings in capital and operating costs of about a dollar per kilowatt hour. This figure is relatively small because the backup generating capacity must be still available to offset most of the wind farm's capacity. I believe this is what Lisa was talking about, for times when the wind stops blowing, or blows too hard. Another benefit that you ought to consider is health savings due to reduced emissions, went down in two cents per kilowatt hour, at most. Greater energy independence which we value at 10 cents per kilowatt hour. In this context, note that even when completed, the project would provide less than 1% of the electricity generated in New England and this is not a project just for the Cape. It's for all of New England and it's on federal waters. As I know, one reason that the costs would be so high is that the necessity of maintaining backup generating capacity

for periods when the wind stops blowing. Moving on to tourism, there would be a slight but notable negative effect in tourism. BHI, as to my knowledge, conducted the only in-person survey tourist on Cape Cod, aimed in determining the effect that windmills would have on tourism and hence the Cape economy. We interviewed 500 tourist in the summer of 2004 and found that 52% of those interviewed believed that the turbines worsen the view of Nantucket Sound either slightly or a lot. We found that 3.2% of tourists said that they would spend approximately three fewer days on Cape Cod if the project were built. And another 2% said they would not visit at all. We further found that the installation of the installation of the windmill would cost spending by tourists to fall annually by \$57 million to \$123 million with the consequent lost of 1100-2500 Cape jobs. Let's move on to the subject of property values, which is a highly debated issue on the Cape. Cape homeowners believe, not unsurprisingly, that windmills would have substantial negative effect on property values. Our survey of a 500-homeowners reveal an expectation that property values would fall by more than \$1.3 billion. That is 4% decrease for all homeowners interviewed and 11% decreased for those with shoreline property. Should homeowners be correct in this expectation, Cape communities would lose \$8 million annually in property tax revenues. Promoters of the Cape Wind project argued that homeowners are not a reliable authority on home values and that in any event, existing studies show that early windmill projects

had no effect or even a positive on property values.

We argue in response to Cape realtors surveyed independently of the homeowners, were in rough agreement with our findings.

Also, study of windmills in Denmark did find a negative effect on housing prices.

Finally, it must be remembered that Cape homeowners will receive no royalty payments for windmills situated in view of their homes.

This in contrast to homeowners elsewhere, who do receive royalty payment for windmills situated on your property which on the side,

I might notice one of the reasons why people might not find a negative effect on property values is because there is some offset that are offset by either the energy company involved.

And I know today that in Denmark, they're finally coming around to the idea that yes, windmills do impinge upon property values and that they're trying to derive some kind of formula to offset, compensate and mitigate that.

In conclusion, the proposed windmill project is a heavily subsidized project that would impose amounts on society that's not matched or justified by the corresponding benefits.

The project would hurt tourism and probably reduce property values.

This is a steep price to pay for a project that in the end would supply less than 1% of New England's electric power.

Thank you for your time.

-Our wind story centers on a proposed wind farm of the Coast of Massachusetts.

Tom Bearden has our science unit report.

-Nantucket Sound is extremely valuable to the people who live here.

The scenic beauty attracts millions of tourist to nearby Cape Cod and the surrounding islands.

Hundreds of fishermen

make their living from these waters.

Many residents are afraid all of that will be destroyed by one man's plan to harvest the Sound's steady winds to make electricity.

Jim Gordon, president of a private company called Cape Wind is determined to put America's first offshore wind farm right in the middle of Nantucket Sound.

-One of the reasons that we selected this site is because, it does have some of the best wind resources on the East Coast and it has a reasonable proximity to connecting the transmission line to the existing grid.

The farm looks something like this when off the Coast of Denmark. It would have 130 wind turbines, each taller than the Statue of Liberty, five miles from the nearest land. Collectively, the turbines would be capable of providing Cape Codders with 75% of their electricity or 1% of the amount consumed in the whole state.

-Gordon, who made his fortune building clean natural gas power plants says his aim is to reduce the region's dependence on polluting fuels.

-Every hour that Cape Wind operates, that means we displace power from a more heavily polluting fossil fuel plant. In Massachusetts, we're facing an energy crisis.

We import all of our energy. Cape Wind is about tapping an abundant inexhaustible resource, the wind.

-Gordon claims the wind farm will fit right in with the coastal views.

-What you would see at the closest beach are what appear to be tiny sailing mass, about a half-inch up the horizon.

Now look, we're standing right next to the harbor.

Those sailing mass tower over what the Cape Wind turbines would look like.

-It would seem that building a wind farm in environmentally friendly Cape Cod would be a slam dunk.

Nothing could be further from the truth.

Locals have organized

to fight the project,
claiming it would destroy tourism,
the backbone of the local economy.
-As you look back over the plane,
you can see easily how
the wind turbines are going to cover
not only the ocean surface,
they're going to cover the entire horizon
for 24 square miles.
-Cliff Caroll had windstop.org, a grassroots
organization opposed to Cape Wind.
-If you have a project,
it's going to be 43 stories tall.
It's going to be covering
an area the size
of the island of Manhattan,
New York.
It's going to be the 20th largest
manmade horizon in the world.
-Caroll likes to show off this picture.
It's a photograph of a transformer platform
in a wind farm off the Coast of Denmark.
Cape Wind will have one too
and Caroll says, it'll be a lot bigger.
-This is going to be a 10-story,
40,000 gallon,
oil-filled transformer station
in the middle of this wind farm.
We're very concerned that the transformers,
which are prone to overheating,
could possibly have a massive malfunction
spilling the 40,000 gallons of oil
into our fishing beds,
our clam-flats and our fishing grounds.
-Cape Wind's Gordon says the mineral oil
used to cool the transformers
is far less dangerous than crude oil.
-We have triple-spill control protection
but the important thing is,
is that this project is going to offset
hundreds of millions of gallons
of heavy oil over its life.
We have the local power plant in Cape Cod
now burning
over 300 million gallons
of heavy oil annually.
There was a barge that's spilled
and killed birds,
shutdown shell fishing grounds
and spoiled miles of beaches.
Renewable energy is
about reducing the amount
of fossil fuels
that we burn and transport.

-But even if no oil is ever spilled,
commercial fisherman Ron Borjeson
says the wind farm
would totally disrupt the fishing industry.
-This is a prime fishing territory
for squid and fluke right here.
That's absolutely prime,
and those towers are going to come just like this.
-He says the windmills will create
a navigation hazard
and it can be too dangerous to fish there.
-It would be a severe impact whereas
probably 70% of my income comes from
directly from Nantucket Sound.
And where the proposed site is
for the 130 tower
was one of the prime fishing areas
in the Sound itself.
-But the president of Cape Wind says
that commercial fishermen don't go there
because the draft is too shallow.
-Well, that's what he's going to say
to promote his own interest
but I have 158 commercial fishermen
that fish there that say otherwise.
-Cape Cod is also home
to a large migratory seal and bird population.
Charles Vinick,
president of an opposition group called,
The Alliance to Protect Nantucket Sound
says the wind farm
would endanger these animals.
He says Cape Wind is avoiding
wildlife protections enacted
by Massachusetts
by planting the wind farm
in a small patch
of federally controlled water.
- We're in state waters.
This is a protected area
and it's only in the middle
of Nantucket Sound that Horseshoe Shore
where this developer has decided
to put his project,
so he found a hole in the donut.
A hole in the jurisdiction
and he chose a spot like that
solely for his own purposes
without looking at the public good.
-Supporters of the wind farm
countered that the greatest danger
to wildlife comes from global warming,
caused in part by fossil fuel
used at facilities like

the Cape's Canal Power Plant.
We spoke with two environmental activists
in front of that facility
which they hope will ultimately
be replaced by clean energy plants.
Chris Miller is with Greenpeace.
-We think the proposal for America's
first offshore wind farm
is a very important step
and a solutions based approach
to the issue of global warming.
And so, we feel very strongly
that this project moves this country
in the right direction
in terms of our energy policy.
-But some prominent environmentalists
adamantly opposed Cape Wind.
Earlier this fall, Greenpeace demonstrators
confronted Robert Kennedy Jr.'s sailboat
heckling the environmental attorney
for his opposition
to the Cape Wind project,
despite his longstanding support
for alternative energy.
Critics say Kennedy
and other powerful New Englanders
who have waterfront properties here
are simply exhibiting
the so-called
'not in my backyard' syndrome.
-I believed that much of the opposition
and those who fund our opposition
are in fact people who object to this
on aesthetic grounds,
whether it's RFK Jr.,
Robert F. Kennedy Jr.
or many of the other
wealthy second homeowners
who are funding our opposition.
I believe that is the heart
of the battle that we are fighting.
-Vinick says it's unfair to characterize
his organization
as just a group of wealthy land owners.
-We certainly have some homeowners.
We have some renters.
We had people who are shopkeepers.
We have recreational fishermen.
So it's a diverse group but certainly,
it's the one that we would like to be
as strong as possible to be able to match
someone like Jim Gordon
who's a business leader, who owns
great property, who in many ways

represents much of the same
that he accuses some of us of being.
-Both sides believed that what happens
in Nantucket Sound might determine
the future of offshore wind farms
in the US.
And as the country faces high-energy crisis
and the possibility
of rolling blackouts
in New England this winter,
demand for alternative energy
is on the rise, but at what price
and what communities
will accept these projects in their backyards.
-For more on the debate over wind power,
visit our website at pbs.org.