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what have we been up to?

North Myrtle Beach, SC

north strand coastal wind team

Progress Report · Summer 2010

Evocative, isn't it?

AP Photo/Charlie Riedel - 06/03/10 (top). Flickr Photo/Birder7 - 06/22/09 (bottom).

north strand coastal wind team

NorthStrandCoastalWindTeam.org

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Summer 2010

Economic Development Council North Myrtle Beach Chamber of Commerce
Mr. Monroe Glass Baldwin, III
Chairman

Mr. Doug Chastain
Wind Team

North Myrtle Beach Chamber of Commerce
Mr. Marc Jordan
CEO

Coastal Carolina University Center for Marine and Wetland Studies
Paul T. Gayes, Ph.D.
Director

Mr. Scott Wolfry
Wind Team

Clemson University Renewable Energy
Nicholas C. Rigas, Ph.D.
Director

Savannah River National Laboratory
Mr. Ralph Nichols
Fellow Engineer

Santee Cooper Renewable Energy
Ms. Elizabeth A. Kress
Principal Engineer

Mr. Eric Boessneck
Associate Engineer

SC Energy Office
Mrs. Erika H. Myers
Manager
Renewable Energy Programs

SC Sea Grant Consortium
Mr. M. Richard DeVoe
Executive Director

Caudle Reef Foundation
Ron McManus
Chairman

City of North Myrtle Beach, South Carolina
Hon. Gregory D. Duckworth
Councilman

Mr. John Smithson
City Manager

Mr. Aaron Rucker
Planning Department

Myrtle Beach Regional Economic Development Authority
Mr. Bill Britton
Director

SCORE
Mr. Bill Cole
Grand Strand Chapter 381

Dear Wind Team Members and Friends,

Our beaches are now filled with guests and as we enter the summer months, I reflect on just how much has happened since this project got off the ground! In little more than a year, this effort has gone from an idea of bringing wind energy to the Grand Strand Region, to turbines planned for installation at a number of our public beach accesses.

Frequently people talk about bringing new industry to the coast, but rarely do we hear how this is going to be done. Tourism will remain the cash cow on our beaches and presently sports-tourism is being leveraged to boost visitors during our shoulder seasons. So, why not bring in an entire new green industry to our region than can contribute to the already forming SC Wind Industry Commons with jobs and research to benefit the local economy? It's just one of the multi-faceted tiers of our Green Synergy program. The process to get there has been fluid and we've kept open minds while listening to the expert advice and excellent ideas of our ever-expanding group of highly talented team members.

Reducing our reliance on carbon based fuels as well as foreign oil and imported products are just a part of the spirit that drives our efforts. Small wind energy systems are being developed in people's garages and the technologies surrounding many of these developments are fast moving and quite seat-of-the-pants in nature. The moment that the first prototype turbine lands on the North Strand, the race is on! We're moving technology back to the USA; this is what America is all about - creating things in an open environment.

The North Strand Coastal Wind Team is a group of like-minded folks with the vision of a greater good for our community, region, state, and nation. Please take a few moments to review our Progress Report to see what we've been up to. As we move forward, we hope you will remain interested in what the Wind Team is doing and we would like for you to get involved in your community-based wind program.

Sincerely,

north strand coastal wind team

Monroe Baldwin

Monroe Baldwin

www.northstrandcoastalwindteam.org

Green Synergy: Building a Small Wind Industry within the South Carolina Wind Commons

The State of South Carolina

The City of North Myrtle Beach

Our state is **developing a new wind energy commons** comprised of the Palmetto Wind Research Project, the Clemson Turbine Test Facility, and O-C Technical College, among others.

The wind-related activities of these and other entities in our state offer immediate benefit to the North Strand Coastal Wind Team - research, oversight, etc.

The North Strand Coastal Wind Team is **developing small wind opportunities** within the City of North Myrtle Beach and the surrounding region. We are working to promote all levels of wind energy progress along the North Strand.

The activities of the North Strand Coastal Wind Team strive to support and advance the state's formation of an economic cluster.

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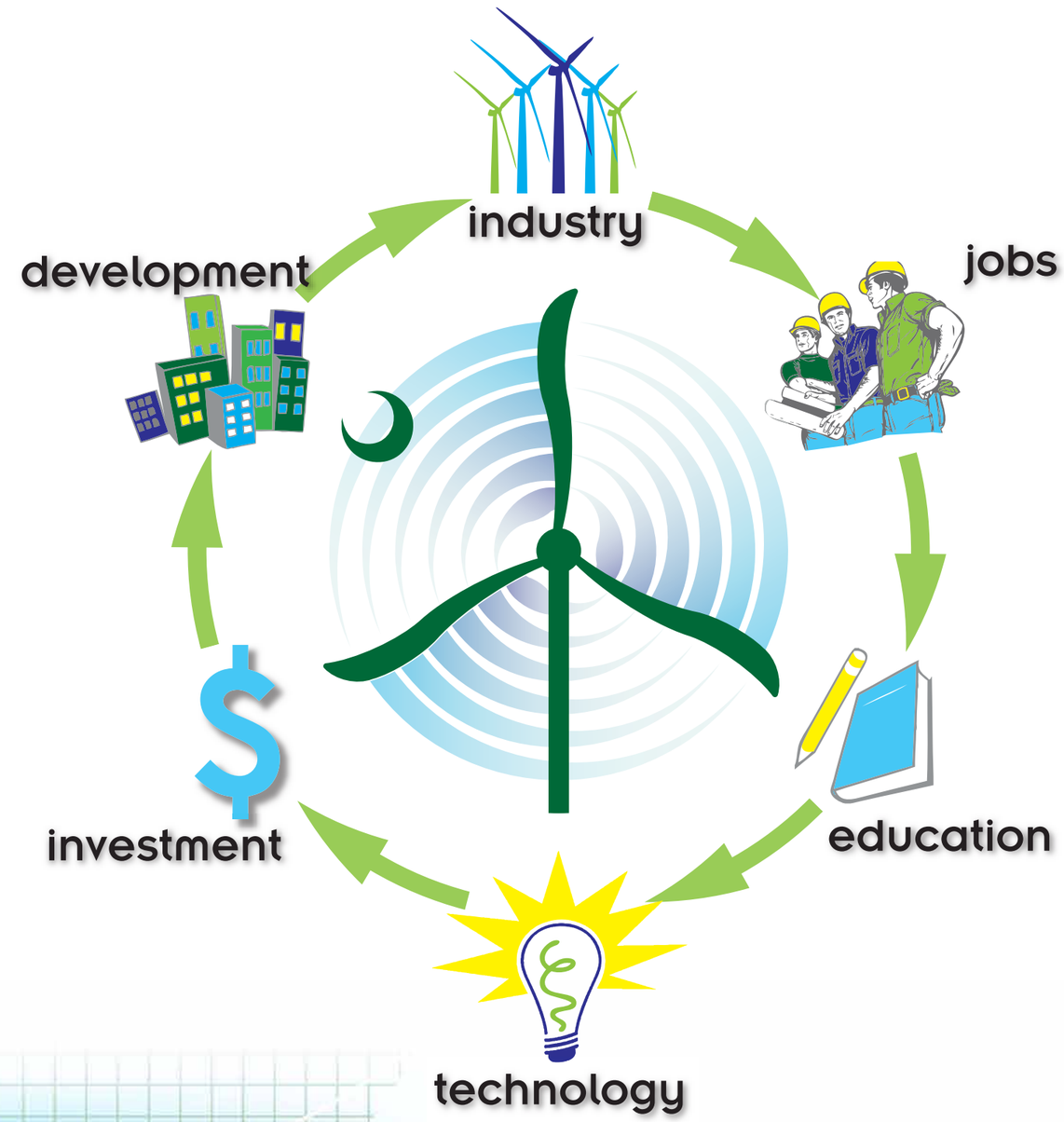
NorthStrandCoastalWindTeam.org

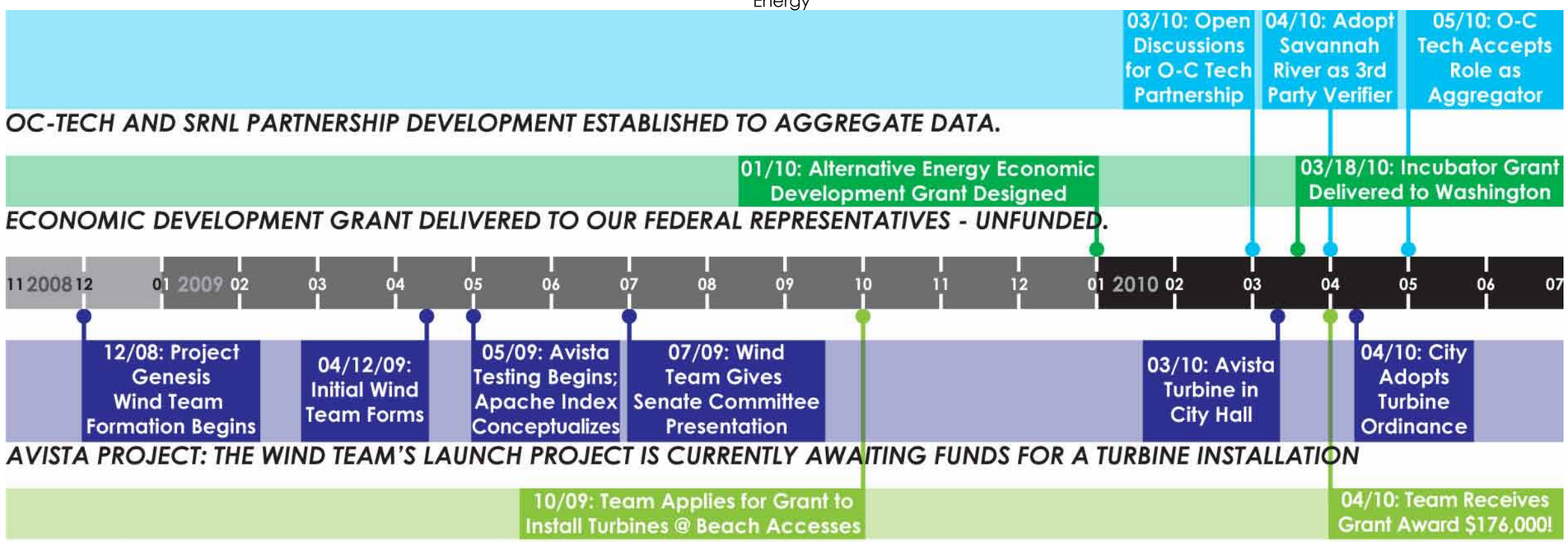


Vision Statement & Projects Timeline

VISION STATEMENT: **The vision of the North Strand Coastal Wind Team is to establish a community-based wind energy program and sustainable energy plan in the City of North Myrtle Beach, in collaboration with the city and other strategic partners. North Myrtle Beach will serve as a demonstration city in building the local economy and developing energy independence.**

VAWT from Cleanfield Energy

PROJECTS TIMELINE:



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Mission Statement

MISSION STATEMENT: **The North Strand Coastal Wind Team will seek to develop wind energy resources for the City of North Myrtle Beach, to facilitate this initiative, and partner with other organizations. This will be accomplished by:**

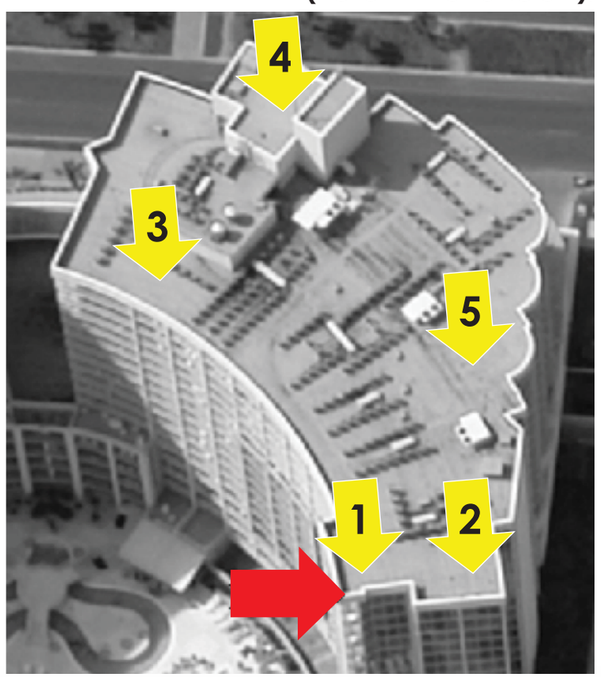
- **Introducing the campaign to the community through educational programs and research;**
- **Developing the economy to create a conducive environment for wind industry;**
- **Establishing a program to introduce rooftop Vertical Axis Wind Turbines (VAWT) to the oceanfront business community;**
- **Instituting a municipal hurricane preparation program;**
- **Acting as a liaison to attract wind energy businesses;**
- **Representing North Myrtle Beach on the subject of offshore wind farms;**
- **And, working to ensure maximum economic impact from wind energy development for the North Strand region.**

Just a few of the many rooftops that could become small wind energy platforms along the North Strand.

May 2009: Avista Resort Turbine Test Site

A recording anemometer station was established on the rooftop of the Avista Hotel in North Myrtle Beach, South Carolina to evaluate resource potential for small wind turbine electrical production along tall oceanfront hotel rooftops. Measurements were made over a 6-month period 7.5' above the roof top along an ocean-facing edge of the building (Red Arrow Below). In addition, a program of short-term measurements around different locations on the Avista rooftop was completed to gauge variability in the small scale wind field at the site (Yellow Arrows Below).

North Strand Coastal Wind Team members Ralph Nichols (Savannah River National Laboratory) and Monroe Baldwin installing Anemometer.

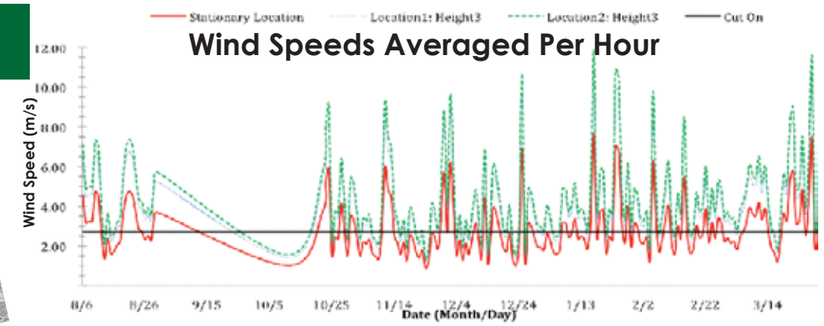


Location of wind measurements taken on the Avista Rooftop.

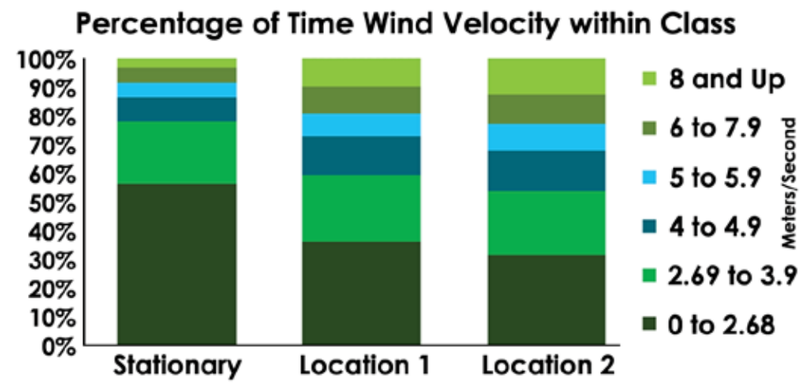
North Strand Coastal Wind Team members making spot measurements of wind on the Avista Rooftop.

For ocean-facing locations at 17' above the rooftop level, a typical turbine would be contributing electricity to the building up to nearly 70% of the time.

Ocean view of the Avista Towers



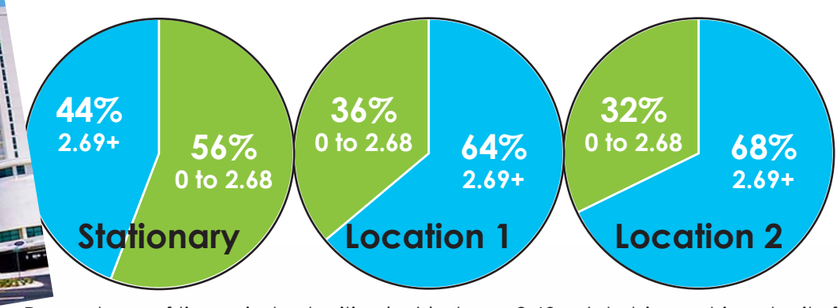
Wind velocities measured at the stationary recording station over 6-month study Oct '09 – April '10.



A VAWT on display at NMB City Hall, courtesy of Cleanfield Energy!

Percentage of time wind was measured in various velocity bands over 6-month study at oceanfront rooftop locations.

The Avista Resort



Percentage of time wind velocities (m/s) above 2.69 m/s turbine cut-in velocity for typical vertical axis turbine (above).

Approximately 60 high rise buildings with rooftop space, 54 beach access right-of-way sites, and plenty of wind yield a renewable energy potential of over *1.5 Million Watts* of green power!

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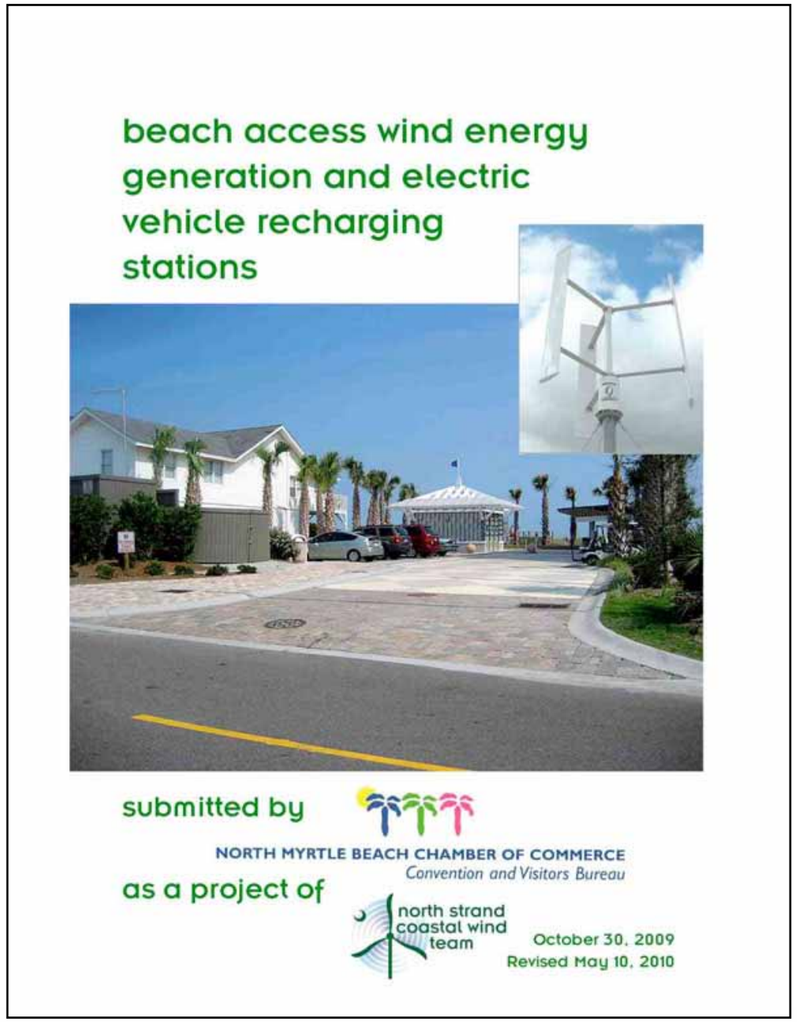
October 2009: SC Meeting/SCEO Grant Application



In the fall of 2009, the NSCWT submitted a grant application to the SC Energy Office.

March 2010: Washington, DC Trip

In the spring of 2010, the team paid a visit to our lobbyist consultants and national leaders to gain an understanding of federal dollars and opportunities.

Click here to see the article at TheHill.com for more information.
http://thehill.com/business-a-lobbying/86911-earmark-bans-force-k-st-to-seek-new-money-sources

Mayor Marilyn Hatley speaking to James Alfano (top); James Shehan, Mayor Hatley, and Monroe Baldwin in conference (middle); Monroe Baldwin, Mayor Hatley, and Councilman Gregory Duckworth on Capitol Hill (bottom).

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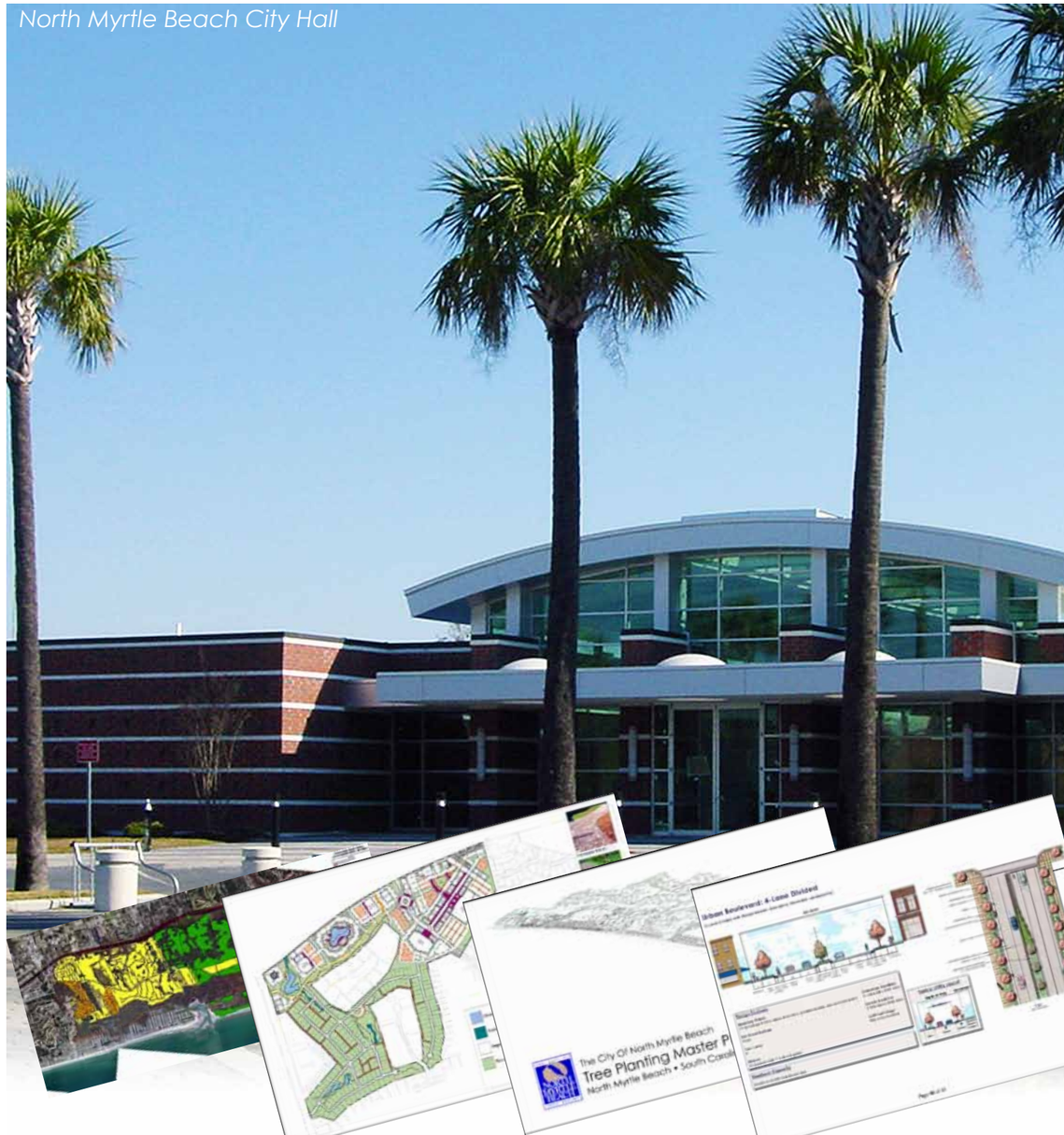
NorthStrandCoastalWindTeam.org


North Myrtle Beach City Hall

north myrtle beach is a city with a vision

demonstrating a livable, sustainable community through projects, plans, & policy

North Myrtle Beach Documents Pictured from Left to Right: Little River Neck Special Study Area, Low Impact Development (LID) Guidelines, City Tree Planting Master Plan, Complete Streets Ordinance, Beach Management Plan, Golf Cart Transportation Plan, Comprehensive Plan Update, Main Street Redevelopment, Traditional Neighborhood District (TND) Overlay Zone Ordinance, Small Wind Energy Systems Ordinance.

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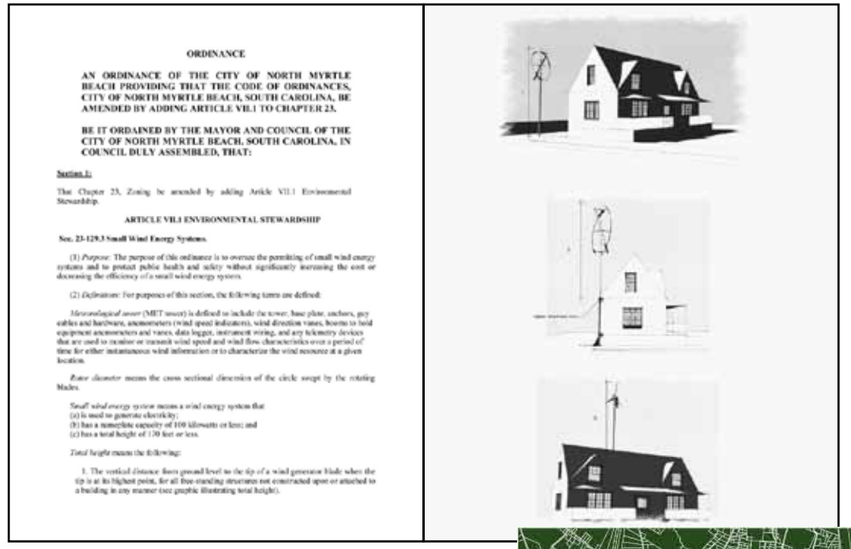
April 2010: Community Backing & Ordinance Approval

Text and images at right from the City of North Myrtle Beach Zoning Ordinance, Article VII.1 Environmental Stewardship, Section. 23-129.3, allowing "Small Wind Energy Systems."



ORDINANCE

AN ORDINANCE OF THE CITY OF NORTH MYRTLE BEACH PROVIDING THAT THE CODE OF ORDINANCES, CITY OF NORTH MYRTLE BEACH, SOUTH CAROLINA, BE AMENDED BY ADDING ARTICLE VII.1 TO CHAPTER 23.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF NORTH MYRTLE BEACH, SOUTH CAROLINA, IN COUNCIL DULY ASSEMBLED, THAT:

Section 1:

That Chapter 23, Zoning be amended by adding Article VII.1 Environmental Stewardship.

ARTICLE VII.1 ENVIRONMENTAL STEWARDSHIP

Sec. 23-129.3 Small Wind Energy Systems.

(1) *Purpose.* The purpose of this ordinance is to oversee the permitting of small wind energy systems and to protect public health and safety without significantly increasing the cost or decreasing the efficiency of a small wind energy system.

(2) *Definitions:* For purposes of this section, the following terms are defined:

Meteorological tower (MET tower) is defined to include the tower, base plate, anchors, guy cables and hardware, anemometers (wind speed indicators), wind direction vanes, booms to hold equipment anemometers and vanes, data logger, instrument wiring, and any telemetry devices that are used to monitor or transmit wind speed and wind flow characteristics over a period of time for either instantaneous wind information or to characterize the wind resource at a given location.

Rotor diameter means the cross sectional dimension of the circle swept by the rotating blades.

Small wind energy system means a wind energy system that
(a) is used to generate electricity;
(b) has a nameplate capacity of 100 kilowatts or less; and
(c) has a total height of 130 feet or less.

Total height means the following:

1. The vertical distance from ground level to the tip of a wind generator blade when the tip is at its highest point, for all free-standing structures not constructed upon or attached to a building in any manner (see graphic illustrating total height).

Provisions of the North Myrtle Beach wind energy ordinance include specifications for storm events: "The system must be certified by the manufacturer or a structural engineer to be able to withstand sustained winds of 130 miles per hour without structural failure of any component. If the specifications indicate that the system needs to be immobilized and secured prior to a storm event in order to meet this standard, a detailed plan for doing so shall be submitted and periodically updated."

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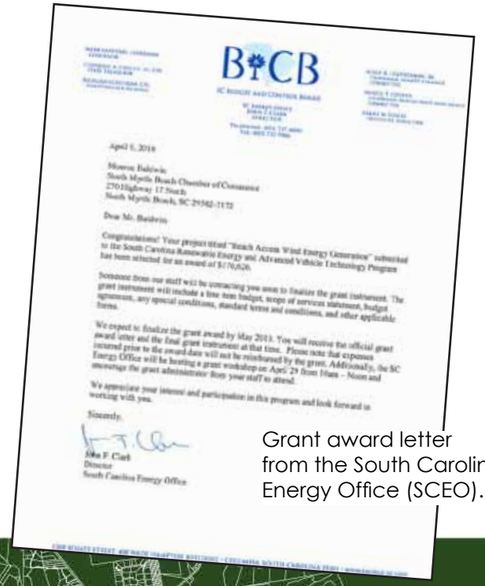
April 2010: SCEO Grant Award Notification

Now that the NSCWT has been awarded a grant for installation of VAWT's along our shore, work is underway to identify and develop suitable sites to install the turbines. These turbine sites along the North Myrtle Beach coast offer a unique, real world, oceanfront test environment for turbine prototype manufacturers and ideal locations to educate residents, visitors, and policy makers.



BCB

April 5, 2010

Marion Baldwin
North Myrtle Beach Chamber of Commerce
270 Highway 17 North
North Myrtle Beach, SC 29582-7172

Dear Mr. Baldwin:

Congratulations! Your project titled "Beach Access Wind Energy Generation" submitted to the South Carolina Renewable Energy and Advanced Vehicle Technology Program has been selected for an award of $170,920.

Someone from our staff will be contacting you soon to finalize the grant instrument. The grant instrument will include a line item budget, scope of services statement, budget agreement, any special conditions, standard terms and conditions, and other applicable forms.

We expect to finalize the grant award by May 2010. You will receive the official grant award letter and the final grant instrument at that time. Please note that expenses incurred prior to the award date will not be reimbursed by the grant. Additionally, the SC Energy Office will be hosting a grant workshop on April 29 from 10am – Noon and encourage the grant administrator from your staff to attend.

We appreciate your interest and participation in this program and look forward to working with you.

Sincerely,

John F. Clark
Director
South Carolina Energy Office

Grant award letter from the South Carolina Energy Office (SCEO).

June 2010: DOE Officials Tour NMB Turbine Sites

PRESS RELEASE: On June 11, 2010, officials from the Federal Department of Energy were in town to follow up on a wind energy grant for the North Strand Coastal Wind Team.

Energy Project Officer Otis Mills, Jr., along with members of his staff and the SC Energy Office met with the Wind Team and toured some of the beach access sites where wind turbines may be placed when the grant is fulfilled.

Monroe Baldwin and NMB Councilman Greg Duckworth presented plans for the installation of several beachfront turbines to be used for powering Beach Access facilities as well as returning power to the grid. Mayor Marilyn Hatley, City Manager John Smithson, and other city officials met with Mills, who oversees grants from the National Energy Technology Laboratory, a DOE Lab.

The first goal is to have wind turbines up and running for testing by the end of the year. Ultimately, the Team hopes to have competing companies from around the world use the infrastructure here to rate their equipment.

A further goal is to bring industry facilities (and jobs) to the Grand Strand and help establish South Carolina as a leader in wind powered energy.

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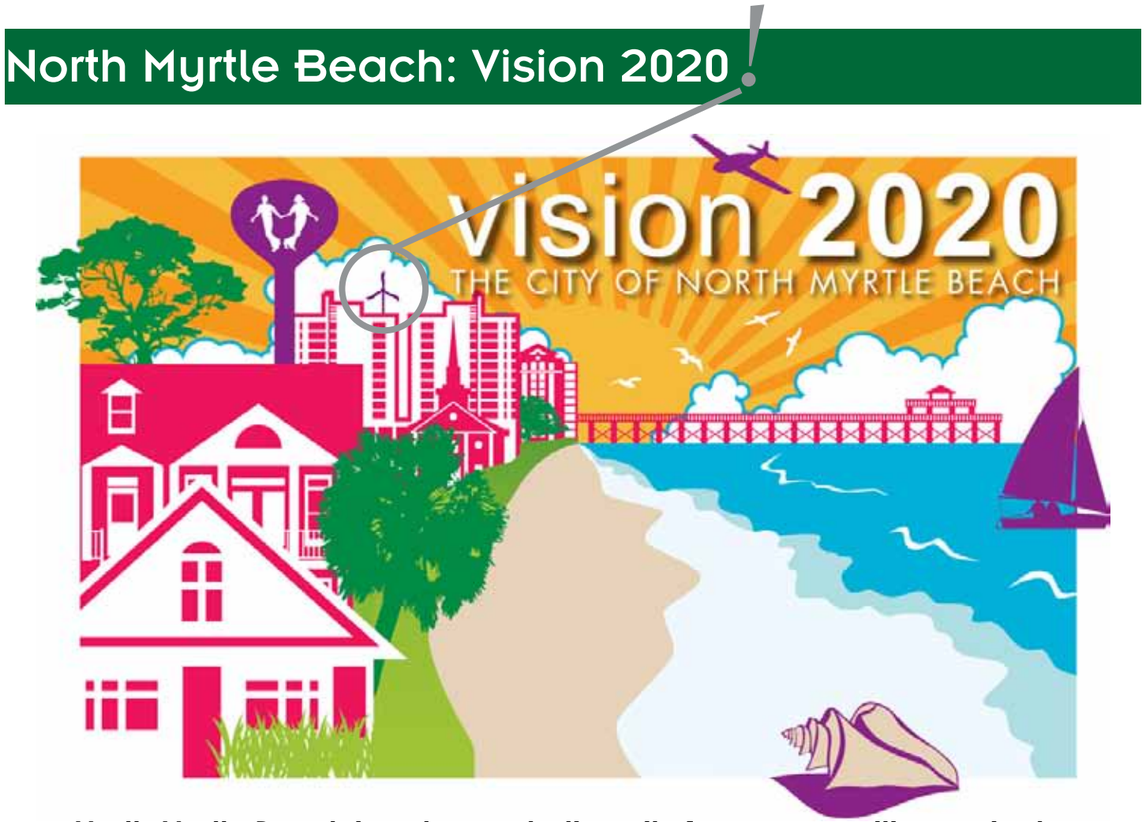
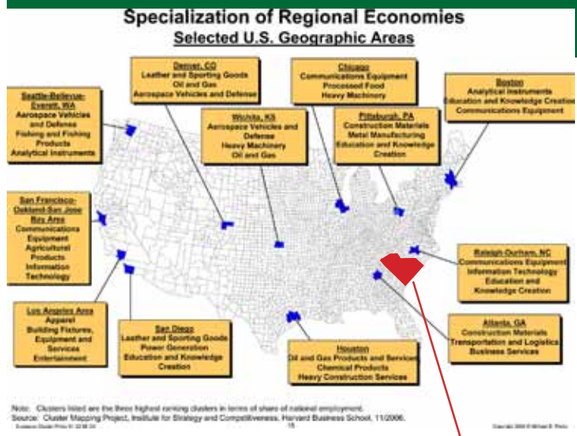
North Myrtle Beach: Vision 2020



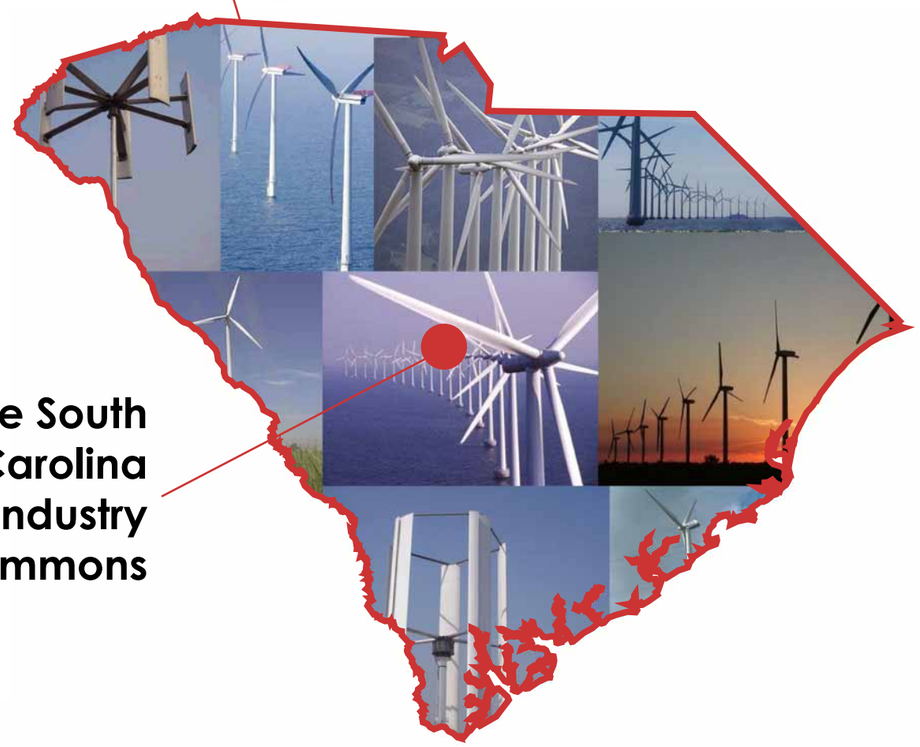
North Myrtle Beach is a demonstration city for many exciting projects. Wind energy development is just one component of the city's plan for the future.

"The moment that the first prototype lands on the North Strand, the race is on! We're moving technology back to the USA; this is what America is all about - creating things in an open environment."

Monroe Baldwin
North Strand Coastal Wind Team



Industry Commons: **Formation of similarly goal oriented agencies that as a whole, serve to support the birth of an industry.**



The South Carolina Wind Industry Commons

what is the south carolina wind energy commons?

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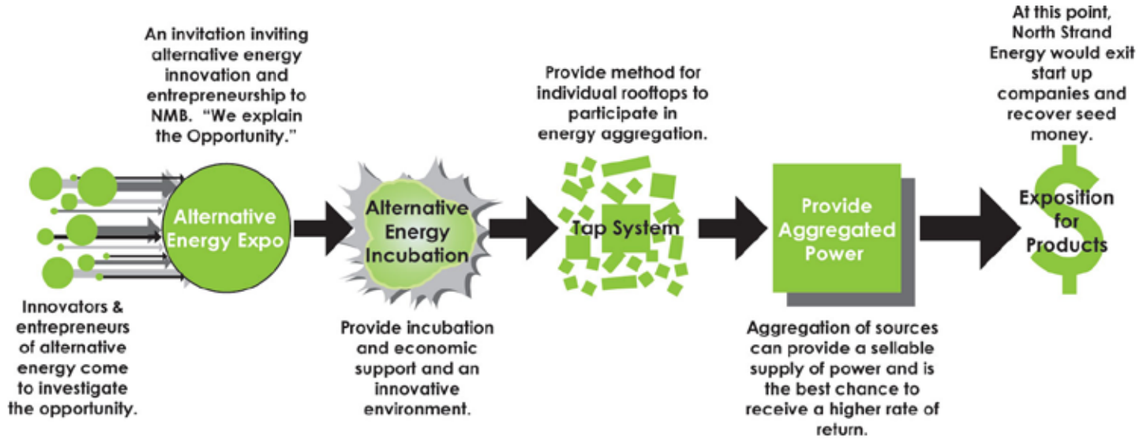
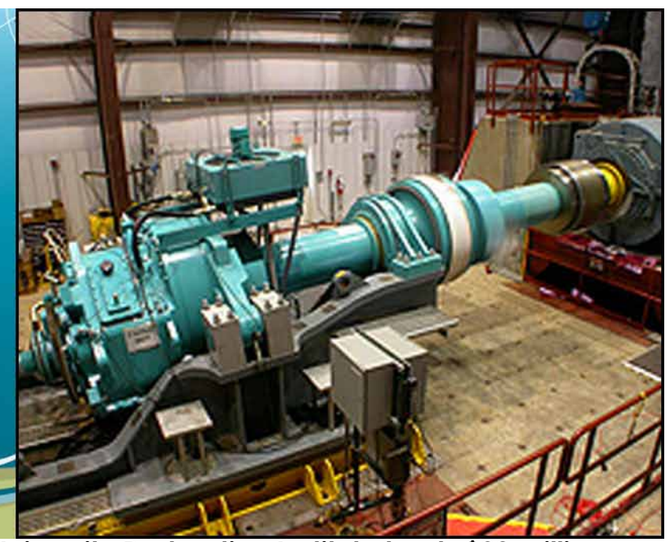
Wind: a new industry commons to serve the world



A small wind economic development platform to provide capital and incubator assistance to turbine innovators (above)



Nick Rigas, Ph.D. and the Clemson University Restoration Institute lands $98 million funding to develop next-generation wind turbines.

Image from Clemson World Magazine Online, Spring 2010 Issue. http://www.clemson.edu/clemsonworld/2010/spring/article1.html

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Possible Working Prototype Systems for North Myrtle Beach

Artist Rendering of Beacon Tech Net, LLC Proposed Air Bearing VAWT (left).

Cleanfield Eergy VAWT on display at North Myrtle Beach City Hall (below).

Photograph if Zwynd Magnetic Levitated Vertical Access Wind Turbine (MVAWT) (left).

Point of Aggregation

Orangeburg-Calhoun Technical College (O-C Tech) will serve as an aggregating, central point in our group. Wind data from the coast will be transmitted to O-C Tech for use in their green education program. Additionally, this data will be sent to the Savannah River National Laboratory for third party verification and publishing.

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Knowledge-Based Economy

The North Strand Coastal Wind Team is dedicated to broadening our relationship with institutions of higher learning and raising the bar for intellectual capital in the region.

Orangeburg-Calhoun Technical College is participating in **"Career Pathways for a Green South,"** a multi-state project designed to create a **new green technology workforce**. Within the green technology sector, a high regional demand for trained workers is expected in both existing and emerging industries. Jobs in manufacturing and energy production that **promote energy efficiency and ensure environmental sustainability** will continue to grow in South Carolina. In addition, renewable energy production, is predicted to produce **high growth, high wage, and high demand jobs** in the state.

"Move over Silicon Valley, here comes Turbine Alley!"

Monroe Baldwin
North Strand Coastal Wind Team

Partnerships

The Palmetto Wind Research Project is a collaborative project by Santee Cooper, Coastal Carolina University, and the South Carolina Energy Office to study the possibilities of generating wind energy off the coast. A series of wind-measuring weather buoys were placed off the coastline at Winyah Bay near Georgetown and Waites Island near Little River. This project helps to position South Carolina as a leader in the rapidly developing national wind energy landscape.

Plug In Carolina is a 501 c3, non-profit, tasked with educating the public on the benefits of plugin vehicles. Partnered with the North Strand Coastal Wind Team, Plug In Carolina is developing their first green vehicle charging stations in the state. Some of these charging stations may be powered by green energy produced by small wind energy systems in North Myrtle Beach.

The Grand Strand Chapter of SCORE is delighted to offer their services for assisting in the implementation of the start up and operation of the North Strand Coastal Wind Team alternative energy Economic Cluster. SCORE will provide counseling and company mentoring in Economic Cluster startup and Economic Cluster Operation.

3rd Party Review

The Savannah River National Laboratory has partnered with the North Strand Coastal Wind Team to provide an additional layer of expertise and oversight as part of the marine grade turbine certification process.

The Small Wind Certification Council (SWCC) of the AWEA *Small Wind Turbine Performance and Safety Standard*. This certification provides a common North American standard for reporting turbine energy and sound performance, and helps small wind technology gain mainstream acceptance.

The National Renewable Energy Laboratory

Current Testing Approach

- Acoustic Noise Emissions
- Duration- performance over long time periods
- Power Performance - power vs. wind speed graph to summarize the turbine's power generation performance at different wind speeds
- Power quality testing - assessment of power, flicker, and harmonics levels for compliance with the standard
- Safety and function testing

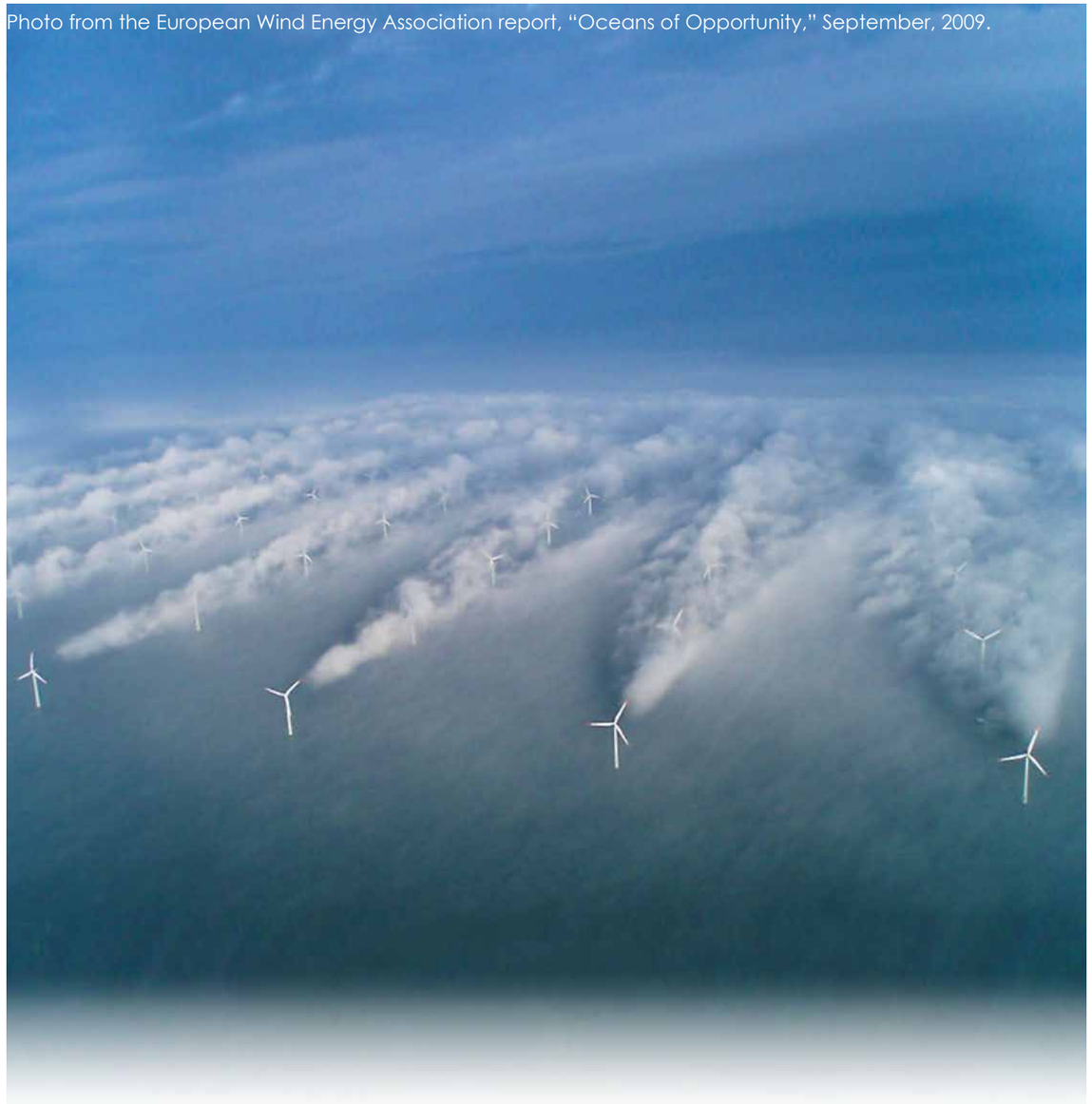

Photo from the European Wind Energy Association report, "Oceans of Opportunity," September, 2009.

what is the future of offshore wind in south carolina?

north strand coastal wind team

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Community Involvement & Ownership

The North Strand Coastal Wind Team recognizes that offshore wind development presents a tremendous economic opportunity for South Carolina and the North Strand. The onshore wind program offers many benefits, but it is only the beginning; we are working to facilitate forward movement in offshore wind development. Before we bring the issue of offshore wind turbine development to the community for discussion, certain specific elements of offshore wind development need to be addressed:

Investment – The discussion of offshore wind development and permitting should involve the North Myrtle Beach Community from a grassroots level. This project has to be perceived as community-based to benefit from the pride in ownership phenomenon.

Test Platforms – Test platforms would be dedicated to the purpose of testing new turbine design. As the industry supporting the innovation and design of this new turbine technology develops, our economy will grow to be more knowledge-based. As this knowledge economy grows, more jobs will be created, more people will move to our area to fill these jobs, and our communities will grow.

Sea Base - Little River Inlet is a logical port for service boats required to maintain an offshore turbine field. The turbines and test platforms will require daily offshore trips to monitor and service the machines. This will require a sea base with a staging area. The North Strand Coastal Wind Team can envision establishing a Little River Sea Base in conjunction and partnership with Coastal Carolina University's Marine study program.

Carbon Neutral Rating - If the power generated by offshore wind were to be greater than the measured annual electrical consumption of North Myrtle Beach, our city would greatly benefit. Having a symbolically carbon neutral city powered by renewable energy would bring a tremendous amount of positive attention to our city and the state of South Carolina and help develop our state as a green energy leader.

Economic Diversification - These development initiatives will clearly bring jobs to our area. Not only does the initial development of wind energy require support and industrial development, the long-term depth and scope of this project will develop our educational and vocational systems, service sector, and support enterprises. The North Strand has the potential to become a full-scale economic cluster for alternative energy. This diversification of our tourist economy can actually supplement the tourism industry in our area through green tourism development and by increasing activity in the traditional off-season.

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Will the residents of North Myrtle Beach accept the idea of wind turbines on their horizon? This debate generally revolves around the issues of perception—"Do I want to see that out there?" If we can begin to inform the visiblity conversation during its very early stages by enumerating the advantages of wind energy technology to a community, the natural scenery vs. technological seascape conflict becomes less black and white as people begin to realize the gray shades of benefits.

The discussion about offshore wind farms needs to be shaped from debating the relative visibility of the wind farms in the landscape to taking pride in the presence of the turbines.

Key Points of Offshore Wind

- The **City of North Myrtle Beach** can be **self-sustaining** from wind energy with a **40 Megawatt (MW)** turbine farm.

- We can avoid damage to the environment and expensive horizontal drilling by **utilizing the route of our existing/proposed deepwater outfall drainpipes for wind energy infrastructure**.

- Our city requires a **targeted electrical load**; success in offsetting our power needs with wind energy by a **small percentage may be economically sustainable.**

- The Grand Strand already enjoys the support of a **tolerant local community** that accepts the resort and tourism-based landscape our economy supports.

- An offshore wind turbine farm could help **bring green tourism** to South Carolina.

- There is growing **grass-roots support** for a community-owned wind farm.

- We can help develop a relationship of **mutual support** with our **local universities**. Utilization and cooperative development of local technologies and research, such as the portable LIDAR buoy system in conjunction with Coastal Carolina University, can help promote and expand our wind farm development and the university's research program.

- The North Strand Coastal Wind Team is developing partnerships with **other community groups** to **align our interests to reap common benefits**. For example, we have created a partnership with the Caudel Reed foundation to support artificial reef construction during wind farm development.

Scroby Sands Wind Turbine Farm in Fog Photo ©Albanpix/Mike Page

north strand coastal wind team

NorthStrandCoastalWindTeam.org

Members of the North Strand Coastal Wind Team

THE CITY OF NORTH MYRTLE BEACH SOUTH CAROLINA

COASTAL CAROLINA UNIVERSITY

Jim Caudle Reef Foundation

santee cooper

MYRTLE BEACH REGIONAL ECONOMIC DEVELOPMENT
Building For The Future

NORTH MYRTLE BEACH CHAMBER OF COMMERCE
Convention & Visitors Bureau
www.northmyrtlebeachchamber.com

CLEMSON UNIVERSITY

Sea Grant
S.C. Sea Grant Consortium

Your Success. Powered by SCORE®

Ctech
Orangeburg-Calhoun Technical College

SRNL
SAVANNAH RIVER NATIONAL LABORATORY

SC ENERGY OFFICE
B&CB
SC BUDGET AND CONTROL BOARD

Environmental Concepts, LLC
landscape architecture · land planning
established 1992

Report Provided by Environmental Concepts, LLC