McCallum Sweeney Consulting
the geography of business

South Carolina Opportunities for Wind:

Industry Overview and Competitive Focus

Columbia, SC
July 13, 2009

Ed McCallum, Senior Principal

South Carolina

Presentation Overview

- Introduction to McCallum Sweeney Consulting
- The Wind Industry in General
- South Carolina's Place for Economic Development
- Challenges/Opportunities

McCallum Sweeney Consulting

Helping Companies Decide Where to Build

Introduction to McCallum Sweeney Consulting

McCallum Sweeney Consulting

Helping Companies Decide Where to Build

MSC Overview

- Specializes in site selection and incentive negotiation services
- Established in July 2000 by Ed McCallum and Mark Sweeney
- Brings more than 50 years of combined location consulting experience to our clients worldwide
- Provides clients with uncompromised service, conducting site selection and incentive negotiations with the highest standards of integrity

MSC C.I.R.C.L.E. of Values

Customer Service
•Unrestricted commitment to our clients
•Active involvement in every project by senior principals Ed McCallum and Mark Sweeney
•Independence, allowing sole focus on our clients' projects (not a platform to sell other services)

Integrity
•Emphasis on communication, with an "open process" allowing our clients to know what we are doing and why
•Redirection of any and all "location bonuses" from communities or developers to the benefit of our clients
•Policy not to pursue or accept economic development assignments in locations that are, or may be, under consideration by our siting clients

Excellence
•Maintaining the goal of MSC, as a company, to be the best in our business
•Creating and maintaining an operating environment based on the principles of continuous performance improvement
•Conducting our business with an unrestrained passion for quality

Respect
•For the values of our clients, and the responsibility we have in representing them
•For the stewardship role states, provinces, and communities have as part of their efforts in attracting and retaining investment and employment
•For each other here at MSC, creating a supportive and collegial environment that thrives on the unique strengths we each bring to the company, and striving to balance the demands of our profession with the rewards of a personal life

Leading-Edge Technology
•Maintaining in-house expertise in geographic information systems (GIS) technologies
•Supporting integration of GIS into all our assignments, exploring new ways to leverage its value for our clients
•Managing the technology as a powerful tool and avoiding the temptation to let it serve as a substitute for a sound and comprehensive site selection process

Creativity
•Maintaining a broad knowledge of successful location strategies
•Emphasizing the promotion of new ideas and finding value in them
•Committing to an operating environment that fosters innovation and nurtures its development

McCallum Sweeney Consulting

Helping Companies Decide Where to Build

MSC Wind Energy Clients

Does Not Include Confidential Clients with NDA's

MSC Project Experience

Project Experience

Commercial / Industrial Projects

Indicates State/location where commercial/industrial siting took place

		AL	AZ	AR	CA	CT	DE	FL	GA	IL	IN	IA	KS	KY	LA	MD	MA	MI	MS	MO	NE	NV	NJ	NM	NY	NC	ND	OH	OK	OR	PA	SC	SD	TN	TX	UT	VA	WA	WV	WI	WY
09	**Zarges Gmbh**			x								x																							x						
'08	**SLM Corp. (Sallie Mae)**						x									x															x							x			
'08	**Nordex**			x								x	x	x						x	x								x					x	x					
'08	**American Titanium Works**			x															x							x			x			x		x			x			
'08	**Austal**	x						x							x				x																						
'07	**Atlantic Marine**	x						x																																	
'07	Project C21													x												x					x			x			x			
'07	Project Heron								x																	x					x						x			
'07	**Oreck (headquarters)**														x																			x						
'07	Project Pioneer	x							x		x			x	x	x				x						x		x	x		x			x	x		x			
'07	**LM Glasfiber**			x																										x						x				
07	**Eastman Chemicals**																																x		x						
'07	**PACCAR, Inc.**	x		x					x										x	x									x						x		x			
'07	**Berg Steel Pipe Corp.**	x		x						x					x					x															x						
'06	**Cytec Engineered Materials**																															x			x				x		
'06	**Varian**				x																																				
'06	**International Shipholding**	x													x				x																						
'06	Project Jazz South	x							x						x				x																		x				
'06	**Oreck (Bus. Dev. Ctr.)**								x																		x								x	x					
'06	**Oreck**			x						x	x			x							x						x		x			x			x						
'05	Project Vanquish	x		x				x	x	x	x			x	x				x	x						x		x	x			x			x	x					
'05	**Alenia NA/L-3 Com.**	x	x					x											x												x	x			x						
'05	Project Cottonwood											x	x								x												x								x
'05	Project Spruce					x											x						x		x					x										
'05	**Nissan (headquarters)**				x																					x						x		x	x					
'05	Project Holly	x							x																																
'05	**Roberts Irrigation**								x																							x									
'04	Lakeshore Learning																																								
'04	**Michelin / TNT (distribution)**															x							x								x									
'04	**Dollar General**									x	x																														
'04	Project Jupiter			x					x											x									x			x			x		x			
'04	**INEOS/Innovene (BP)**									x																										x					
'04	Project Sun		x		x																	x														x				
'04	**Vought - Alenia**	x																											x			x			x					
'04	**Michelin / TNT (distribution)**														x														x						x					

MSC Project Experience (continued)

Project Experience

Commercial / Industrial Projects

Indicates State/location where commercial/industrial siting took place

		AL	AZ	AR	CA	CT	DE	FL	GA	IL	IN	IA	KS	KY	LA	MD	MA	MI	MS	MO	NE	NV	NJ	NM	NY	NC	ND	OH	OK	OR	PA	SC	SD	TN	TX	UT	VA	WA	WV	WI	WY
'03	**Dollar General**	x							x																	x						x									
'03	**Weil-McLain**													x												x								x			x				
'03	**Boeing**	x		x				x	x										x							x			x		x			x	x			x			
'03	Dollar General (Grizzly)					x											x						x		x						x									
'03	**Trex**			x										x					x	x						x								x						
'03	**Mitsubishi**	x							x	x				x					x							x						x		x						
'02	**MS Technology Alliance**																		x																					
'02	**Harley Davidson Financial**																					x													x					
'02	**Michelin / TNT** (distribution)									x	x																													
'02	**Kasle Steel**										x			x																										
'01	**Michelin** (earthmover tire)																															x								
'01	**Nissan** (distribution)																									x						x								
'01	**Tower**																		x															x						
'01	**Trex**																									x						x		x			x			
'01	**Comcast**																						x		x						x									
'01	**Project Beartooth**	x										x									x					x	x							x						
'00	**Flowserve**				x											x					x							x						x			x			
'00	**Nissan** (auto Assembly)	x							x										x													x		x						
'00	**Nissan** (assembly expansion	x																																x						
'00	**Nissan** (engine expansion)	x																																x						
'00	Datastream								x																							x								
'00	Trex													x				x										x												
'00	**Columbia Energy**													x				x										x										x		
'00	**Navistar Transportation Co.**	x												x												x		x				x								
'00	Confidential HQ Study																																	x						
'00	**Amtran**	x		x										x					x												x		x						

MSC Clients - Wind Energy

Completed/Engaged

NORDEX
We've got the power.

LM Glasfiber

ALSTOM

ZARGES
ALUMINIUM SYSTEME

Confidential 1 (Tower)

Confidential 2

Discussions/Negotiations

- Nacelle Assembler 1
- Nacelle Assembler 2
- Tower Manufacturer
- Gears/Shafts Manufacturer
- Blade Manufacturer 1
- Blade Manufacturer 2
- Electronics/Internals

The Wind Industry

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Change in US Wind Energy

US is World's Largest Market

Installed Wind Energy Capacity

#	Nation	2005	2006	2007	2008[1]
1	United States	9,149	11,603	16,818	25,170
2	Germany	18,415	20,622	22,247	23,903
3	Spain	10,028	11,615	15,145	16,740
4	China	1,260	2,604	6,050	12,210
5	India	4,430	6,270	8,000	9,587
6	Italy	1,718	2,123	2,726	3,736
7	France	757	1,567	2,454	3,404
8	United Kingdom	1,332	1,963	2,389	3,288
9	Denmark (& Faeroe Islands)	3,136	3,140	3,129	3,160
10	Portugal	1,022	1,716	2,150	2,862

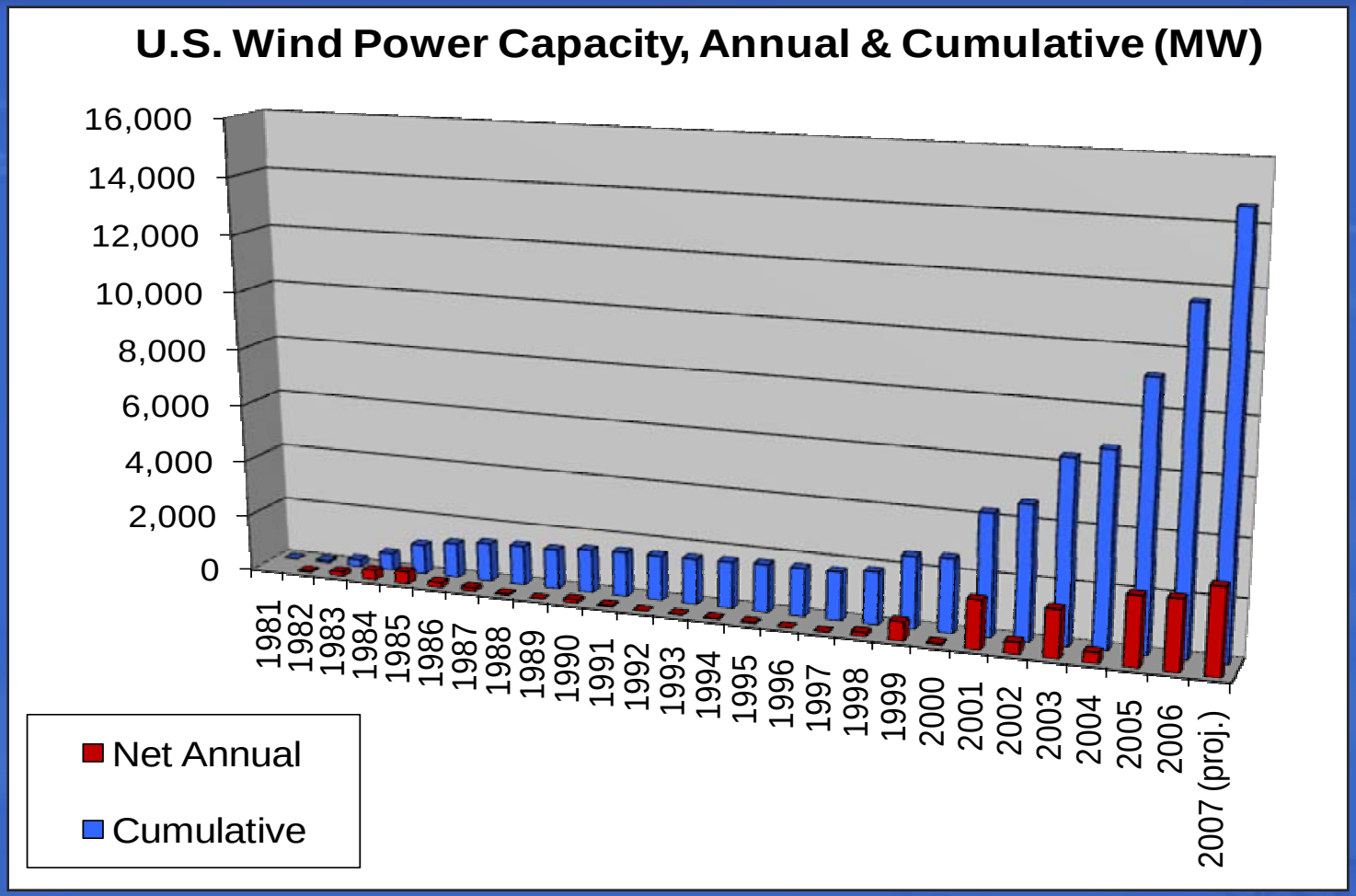
Source:

Global Wind Energy Council

http://www.gwec.net/uploads/media/0702_PR_Global_Statistics_2006.pdf

Growth Before Stimulus

20-30% Growth Every Year



Source American Wind Energy Association Database

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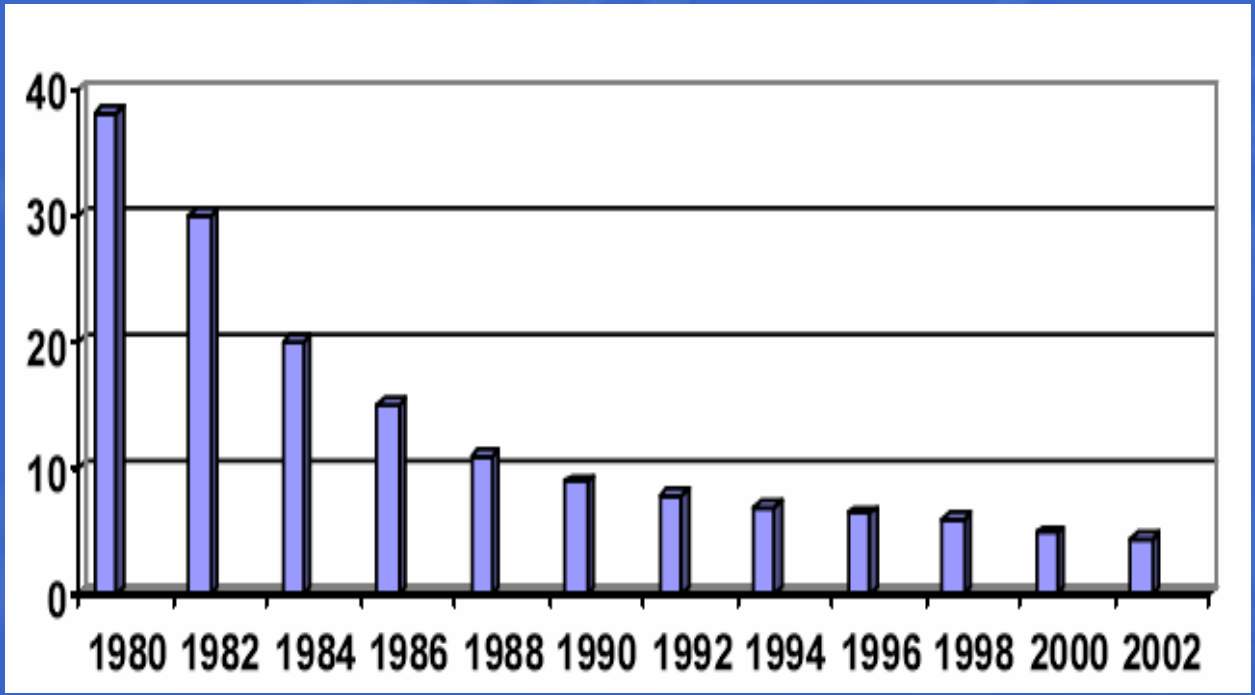
Economics Make Sense

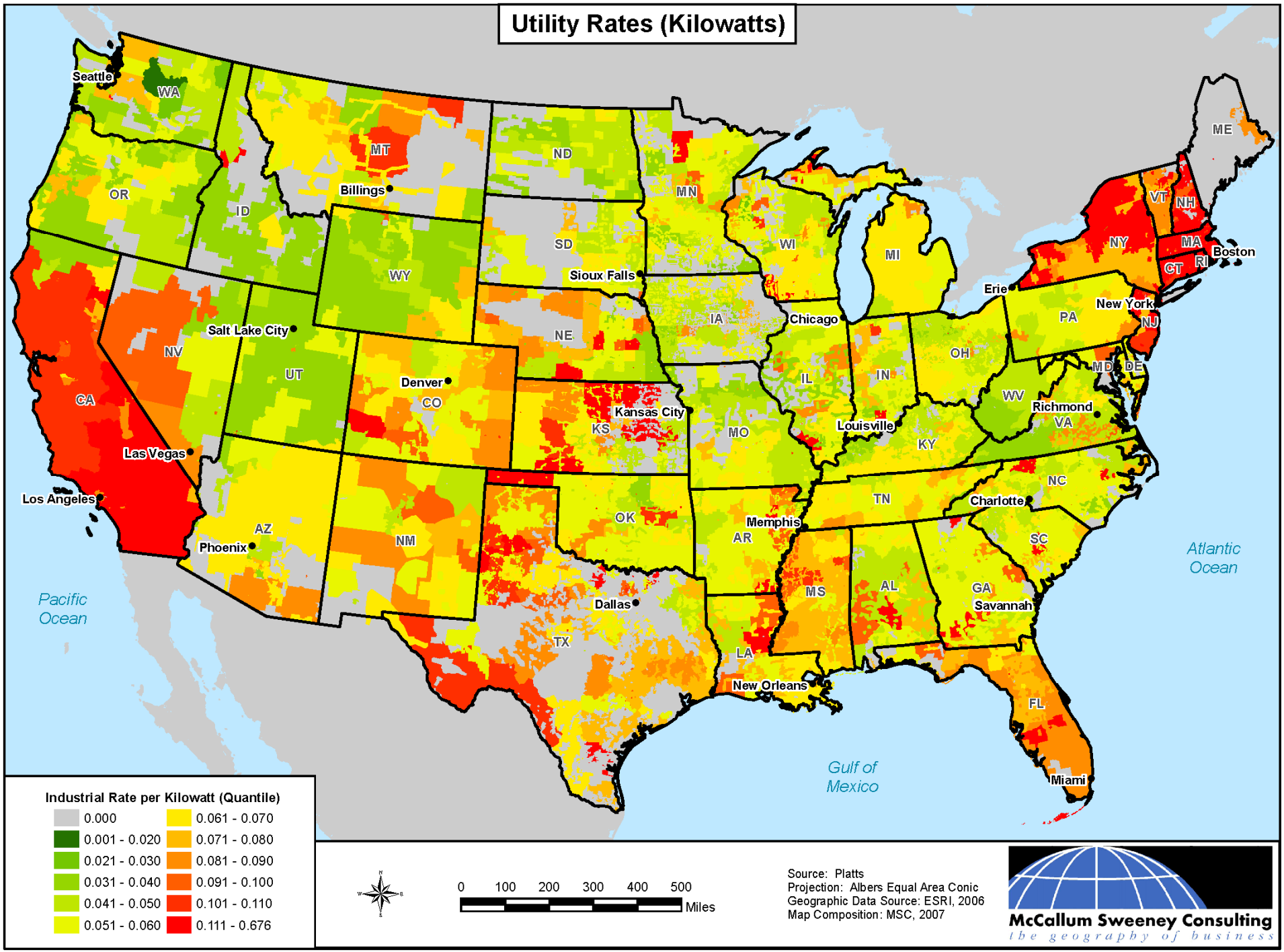
Wind Energy is Not a Flash in the Pan - Trend

Cost of Wind Energy in Levelized Cents/Kwh

Assumptions: levelized cost at excellent wind sites, large project size, not including Production Tax Credits (PTC)



Source: American Wind Energy Association122 C Street, N.W., Washington, D.C. 20001, (202) 383-2500, fax (202) 383-2505, windmail@awea.org, http://www.awea.org.


Utility Rates (Kilowatts)
Seattle
WA
OR
CA
ID
NV
MT
Billings
WY
UT
AZ
CO
Denver
NM
Salt Lake City
Las Vegas
Los Angeles
Phoenix
ND
SD
Sioux Falls
NE
KS
Kansas City
OK
TX
Dallas
MN
IA
MO
AR
LA
New Orleans
WI
IL
Chicago
MS
MI
IN
KY
Louisville
TN
Memphis
AL
OH
WV
GA
Savannah
FL
Miami
SC
NC
Charlotte
VA
Richmond
PA
Erie
NY
New York
NJ
MD
DE
CT
RI
MA
Boston
VT
NH
ME
Pacific Ocean
Atlantic Ocean
Gulf of Mexico
Industrial Rate per Kilowatt (Quantile)
0.000
0.001 - 0.020
0.021 - 0.030
0.031 - 0.040
0.041 - 0.050
0.051 - 0.060
0.061 - 0.070
0.071 - 0.080
0.081 - 0.090
0.091 - 0.100
0.101 - 0.110
0.111 - 0.676
0 100 200 300 400 500
Miles
Source: Platts
Projection: Albers Equal Area Conic
Geographic Data Source: ESRI, 2006
Map Composition: MSC, 2007
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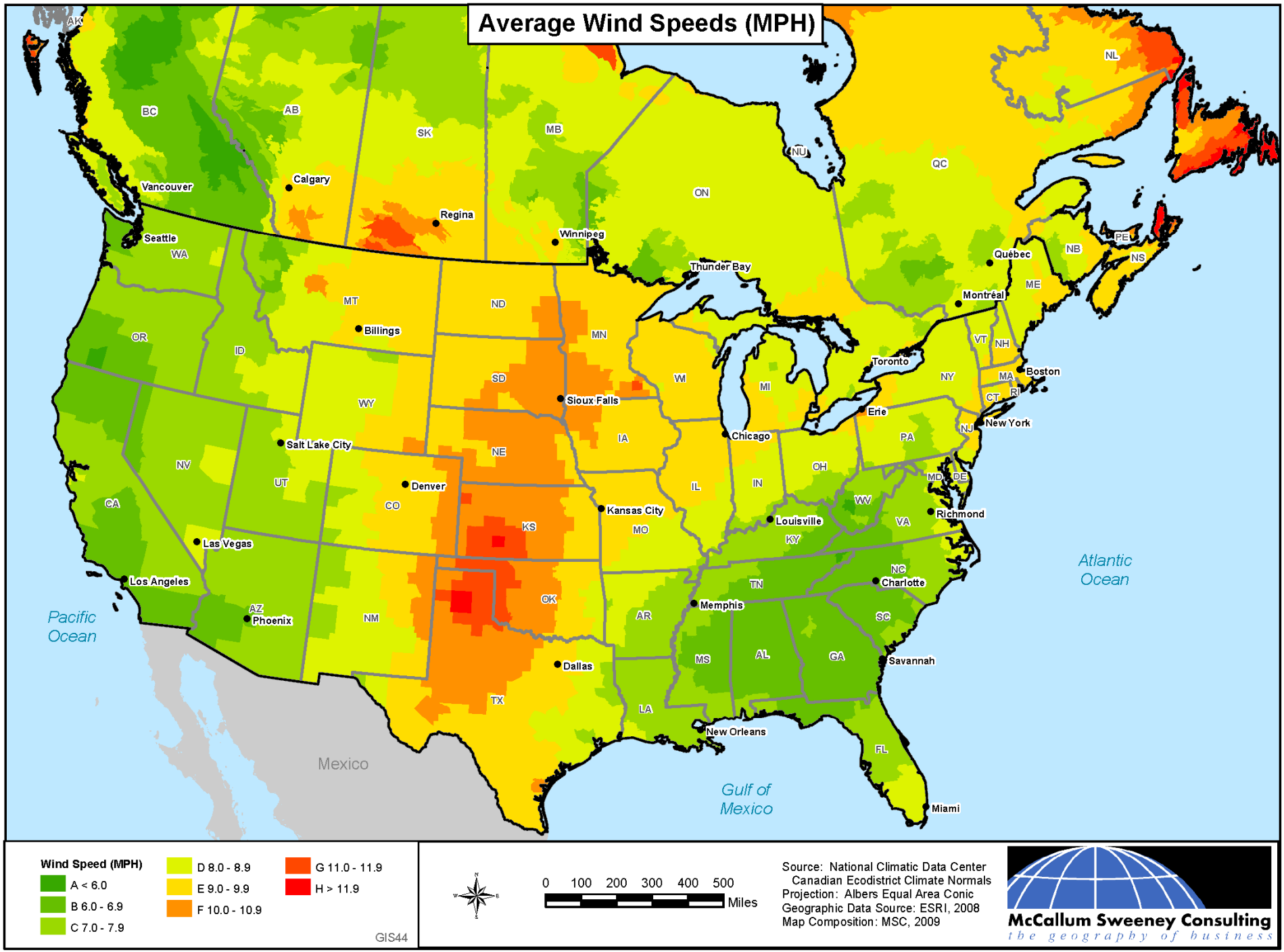
Average Wind Speeds (MPH)
AK
BC
AB
SK
MB
NU
QC
NL
Vancouver
Calgary
Regina
Winnipeg
Seattle
WA
Thunder Bay
Québec
PE
NB
NS
ON
Montréal
ME
MT
ND
Billings
OR
ID
MN
VT
NH
Toronto
NY
MA
Boston
SD
WI
MI
CT
RI
Sioux Falls
WY
Erie
NJ
New York
Chicago
PA
Salt Lake City
IA
NE
NV
OH
UT
Denver
IL
IN
MD
DE
CO
WV
CA
Kansas City
Richmond
Louisville
VA
KS
MO
KY
Las Vegas
Los Angeles
NC
Charlotte
TN
Memphis
OK
AR
SC
AZ
Phoenix
NM
MS
AL
GA
Savannah
Dallas
TX
LA
New Orleans
FL
Miami
Pacific Ocean
Atlantic Ocean
Gulf of Mexico
Mexico
Wind Speed (MPH)
A < 6.0
B 6.0 - 6.9
C 7.0 - 7.9
D 8.0 - 8.9
E 9.0 - 9.9
F 10.0 - 10.9
G 11.0 - 11.9
H > 11.9
GIS44
0 100 200 300 400 500
Miles
Source: National Climatic Data Center
Canadian Ecodistrict Climate Normals
Projection: Albers Equal Area Conic
Geographic Data Source: ESRI, 2008
Map Composition: MSC, 2009
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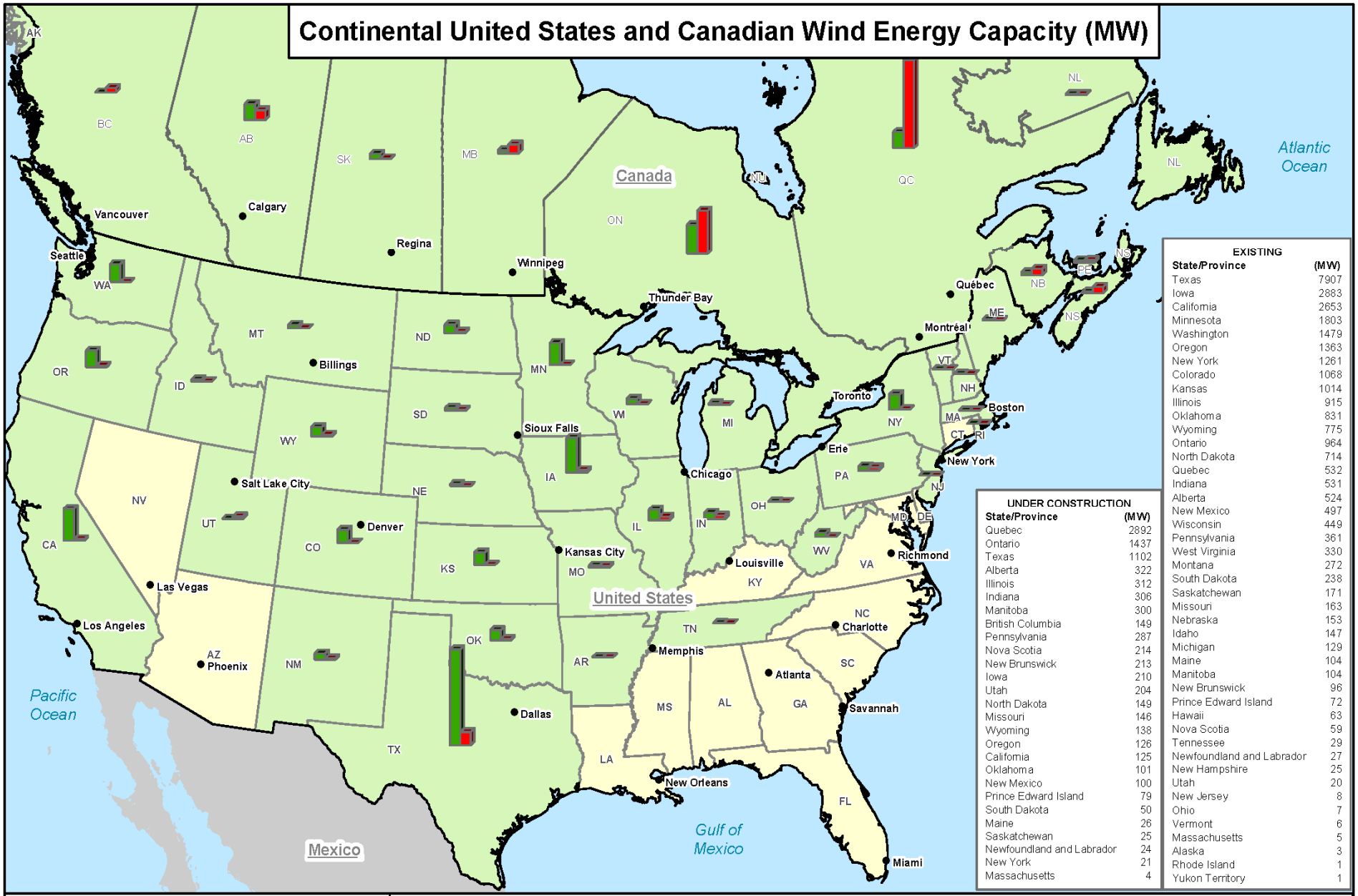
Continental United States and Canadian Wind Energy Capacity (MW)



EXISTING

State/Province	(MW)
Texas	7907
Iowa	2883
California	2653
Minnesota	1803
Washington	1479
Oregon	1363
New York	1261
Colorado	1068
Kansas	1014
Illinois	915
Oklahoma	831
Wyoming	775
Ontario	964
North Dakota	714
Quebec	532
Indiana	531
Alberta	524
New Mexico	497
Wisconsin	449
Pennsylvania	361
West Virginia	330
Montana	272
South Dakota	238
Saskatchewan	171
Missouri	163
Nebraska	153
Idaho	147
Michigan	129
Maine	104
Manitoba	104
New Brunswick	96
Prince Edward Island	72
Hawaii	63
Nova Scotia	59
Tennessee	29
Newfoundland and Labrador	27
New Hampshire	25
Utah	20
New Jersey	8
Ohio	7
Vermont	6
Massachusetts	5
Alaska	3
Rhode Island	1
Yukon Territory	1

UNDER CONSTRUCTION

State/Province	(MW)
Quebec	2892
Ontario	1437
Texas	1102
Alberta	322
Illinois	312
Indiana	306
Manitoba	300
British Columbia	149
Pennsylvania	287
Nova Scotia	214
New Brunswick	213
Iowa	210
Utah	204
North Dakota	149
Missouri	146
Wyoming	138
Oregon	126
California	125
Oklahoma	101
New Mexico	100
Prince Edward Island	79
South Dakota	50
Maine	26
Saskatchewan	25
Newfoundland and Labrador	24
New York	21
Massachusetts	4

Existing Wind Energy Capacity (MW)

Under Construction Wind Energy Capacity (MW)

GIS41

0 100 200 300 400 500 Miles

Data Source: www.awea.org, www.canwea.org (1Q 2009)
Projection: Albers Equal Area Conic
Geographic Data Source: ESRI, 2008
Map Composition: MSC, 2009

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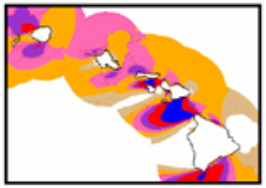
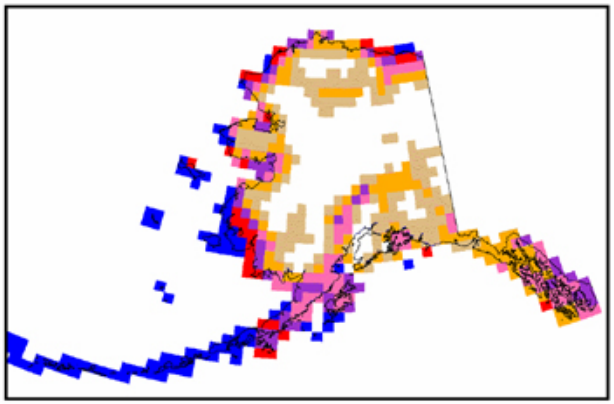
Wind Resources and Transmission Lines

NREL Updated Maps:
Arizona (2003)
California (2002)
Colorado (2004)
Connecticut (2001)
Delaware (2002)
Hawaii (2004)
Idaho (2002)
Illinois (2001)
Indiana (2004)
Maine (2001)
Maryland (2002)
Massachusetts (2001)
Michigan (2004)
Missouri (2005)
Montana (2002)
Nebraska (2005)
Nevada (2003)
New Jersey (2002)
New Hampshire (2001)
New Mexico (2003)
North Carolina (2002)
North Dakota (2000)
Ohio (2004)
Oregon (2002)
Pennsylvania (2002)
Rhode Island (2001)
South Dakota (2001)
Texas mesas (2000)
Utah (2003)
Vermont (2001)
Virginia (2002)
Washington (2002)
West Virginia (2002)
Wyoming (2002)



The remaining states use data from the 1987 "Wind Energy Atlas of the United States".



Transmission Lines
Voltage (kV)
345 - 499
500 - 699
700 - 799
1000 (DC)

Source: POWERmap, powermap.platts.com, ©2007 Platts, a division of the McGraw-Hill Companies

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed [a] at 50 m m/s	Wind Speed [a] at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

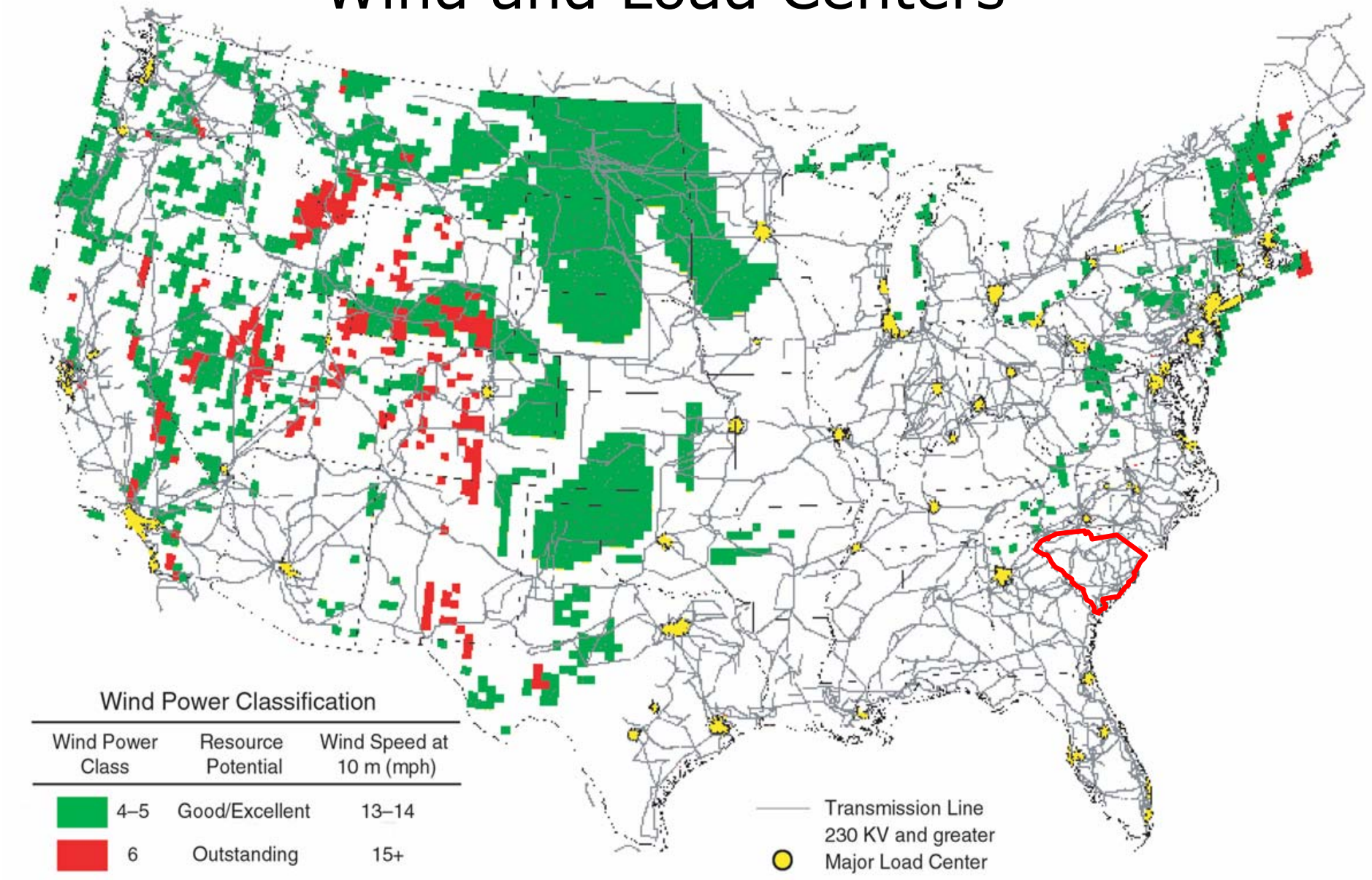
[a] Wind speeds are based on a Weibull k value of 2.0

U.S. Department of Energy
National Renewable Energy Laboratory

NREL

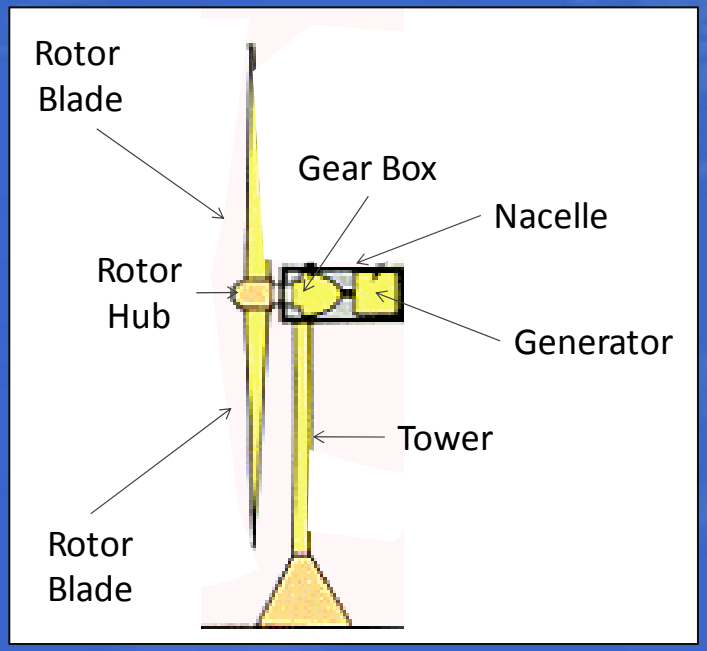
19-APR-2007 1.5.9

Wind and Load Centers



Basic Components

Expensive to Transport, Dimensional Size, Easily Damaged



Tower

Rotor Blade

Completed Nacelle

Rotor Hub

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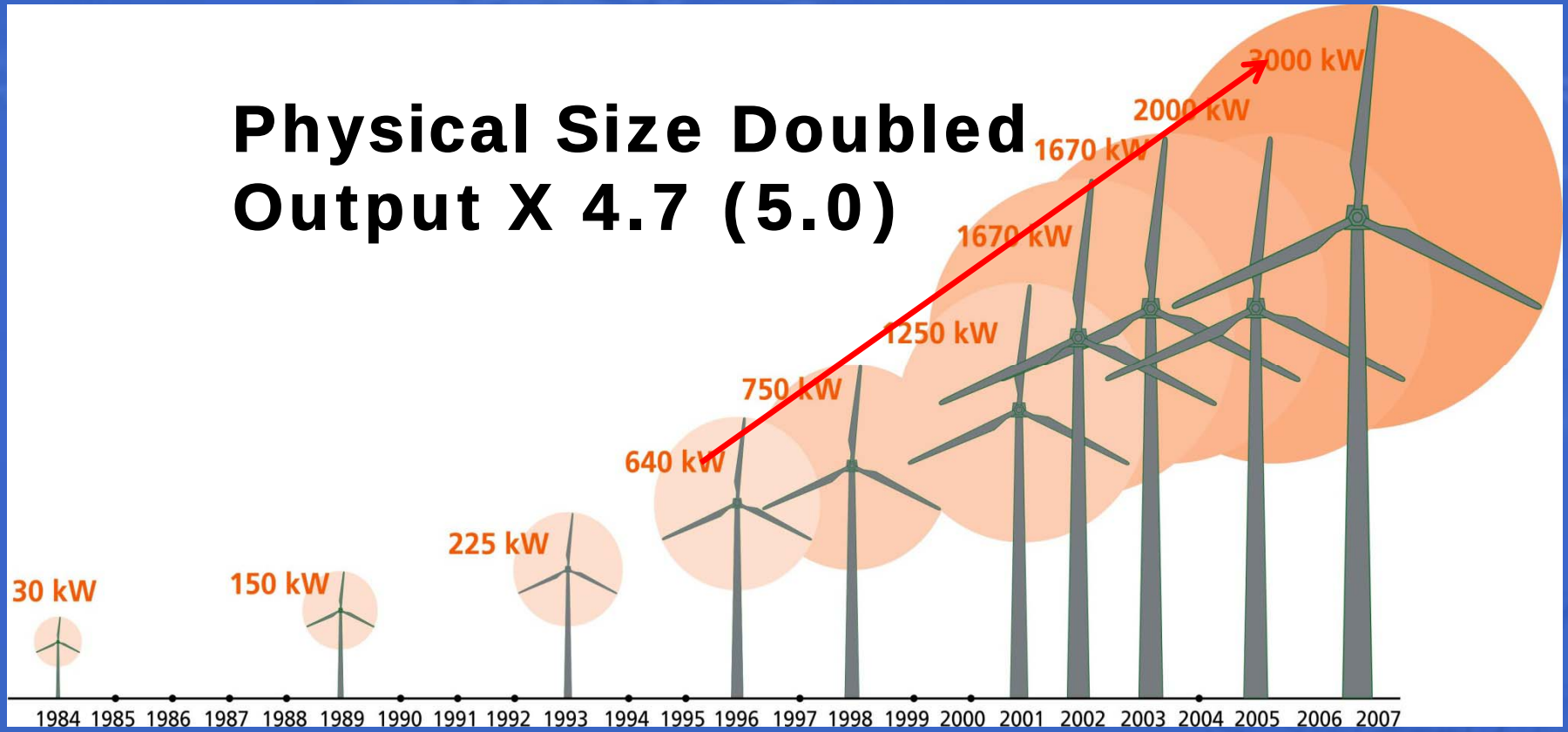
SPEED
LIMIT
25

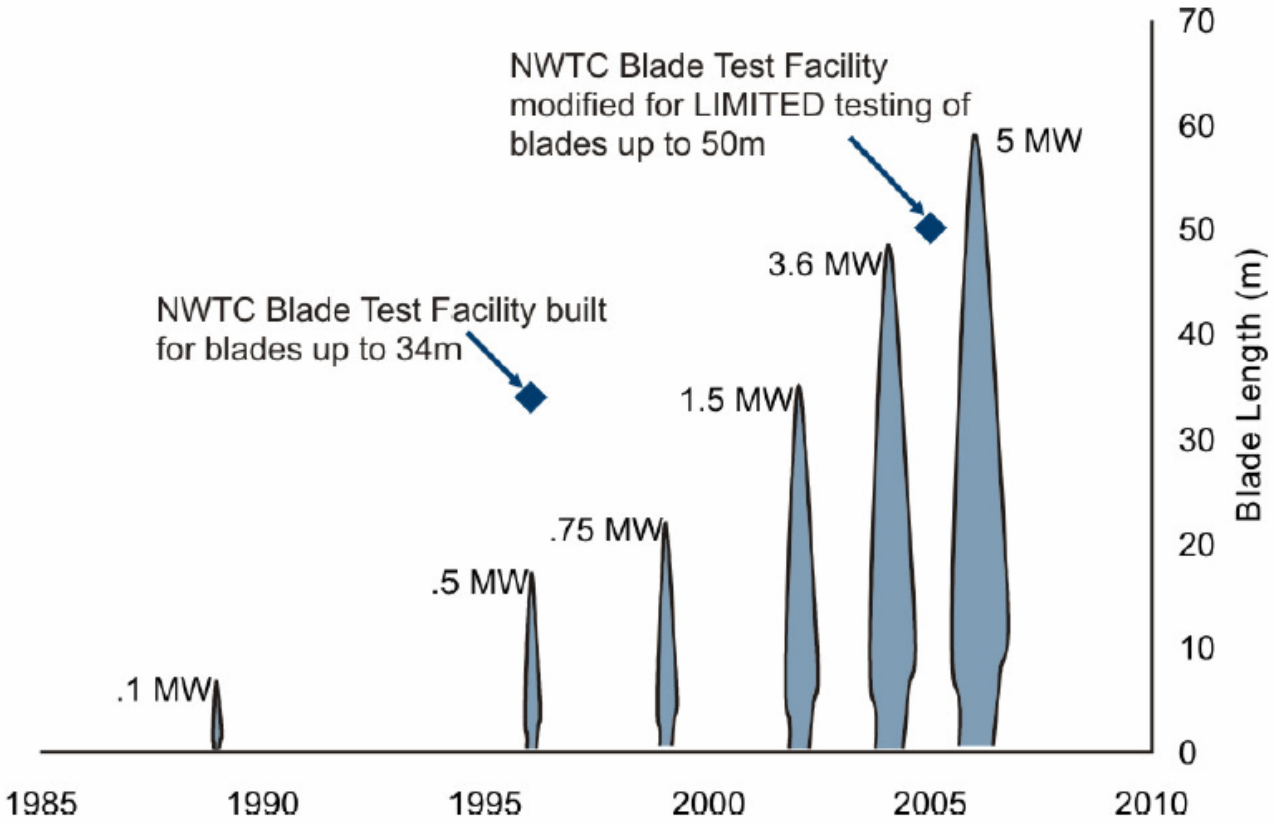
Wind Generation Units

Affecting Manufacturing Location and Logistics



Increasing Size

Figure 2-16. Blade growth and startup dates for U.S. blade test facilities



Source: US Department of Energy – 20% Wind Energy by 2030, http://www.20percentwind.org/20percent_wind_energy_report_revOct08.pdf

Size Considerations

Towers

Tower sections for the common 250-foot (80-meter) wind turbine tower in the United States can weigh more than 150,000 lbs (70 tons), be 120 feet long (36 meters) and have a diameter of 15 feet (4.5 meters). The next generation of 330foot (105-meter) towers will be 18 feet (5.4 meters) in diameter at the base.

Nacelles

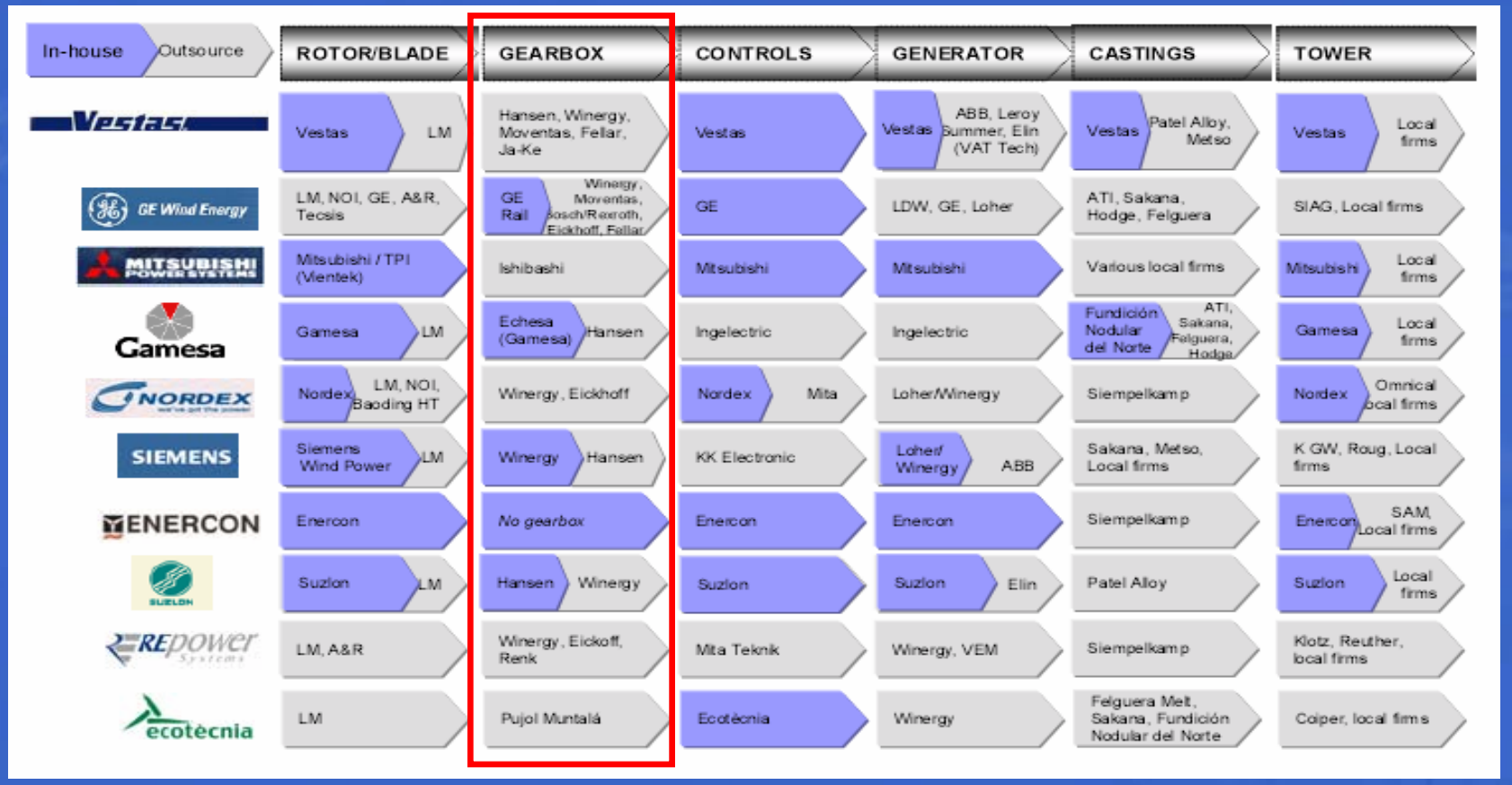
Nacelles commonly weigh 50-70 tons and can weigh 90 tons or more. Getting bigger.

Blades

For commercial scale projects, blades run from around 110 feet (33 meters) to 145 feet (44 meters). Blade lengths may continue to grow in the future, particularly for offshore wind projects. The largest blades are just over 200 feet long (60 meters-plus) for a 5-MW turbine scenario.

Major Component Supply Chain

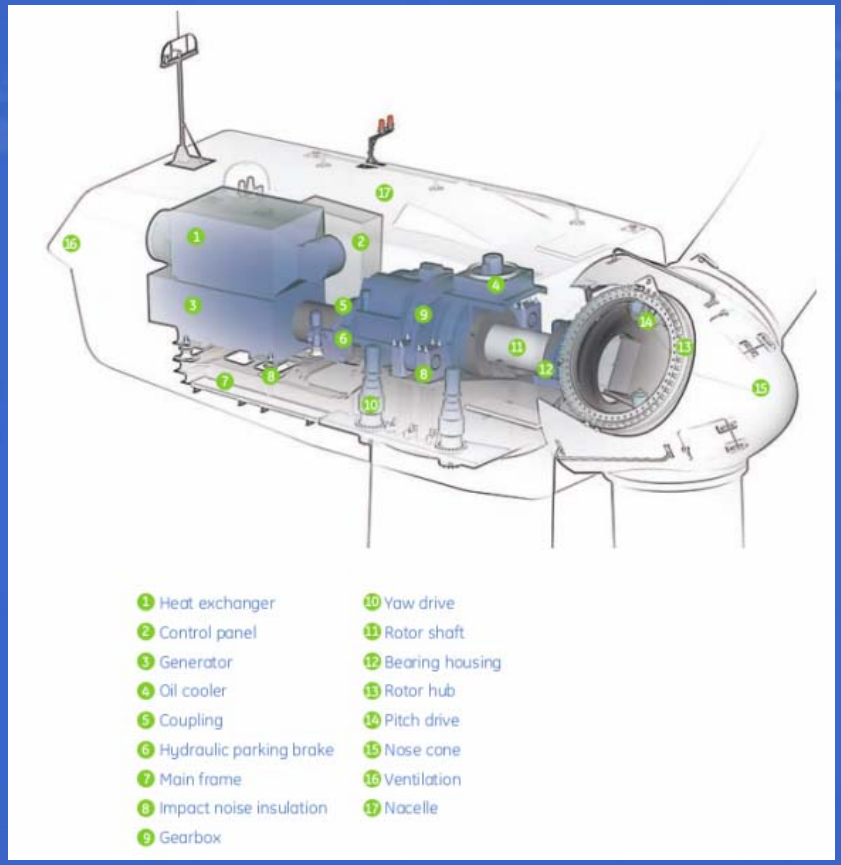
Bottleneck



In-house / Outsource	ROTOR/BLADE	GEARBOX	CONTROLS	GENERATOR	CASTINGS	TOWER
Vestas	Vestas / LM	Hansen, Winergy, Moventas, Fellar, Ja-Ke	Vestas	Vestas / ABB, Leroy Summer, Elin (VAT Tech)	Vestas / Patel Alloy, Metso	Vestas / Local firms
GE Wind Energy	LM, NOI, GE, A&R, Tecsis	GE Rail / Winergy, Moventas, Bosch/Rexroth, Eickhoff, Fellar	GE	LDW, GE, Loher	ATI, Sakana, Hodge, Felguera	SIAG, Local firms
Mitsubishi Power Systems	Mitsubishi / TPI (Vientek)	Ishibashi	Mitsubishi	Mitsubishi	Various local firms	Mitsubishi / Local firms
Gamesa	Gamesa / LM	Echesa (Gamesa) / Hansen	Ingelectric	Ingelectric	Fundición Nodular del Norte / ATI, Sakana, Felguera, Hodge	Gamesa / Local firms
Nordex	Nordex / LM, NOI, Baoding HT	Winergy, Eickhoff	Nordex / Mita	Loher/Winergy	Siempelkamp	Nordex / Omnical, local firms
Siemens	Siemens Wind Power / LM	Winergy / Hansen	KK Electronic	Loher/ Winergy / ABB	Sakana, Metso, Local firms	K GW, Roug, Local firms
Enercon	Enercon	*No gearbox*	Enercon	Enercon	Siempelkamp	Enercon / SAM, Local firms
Suzlon	Suzlon / LM	Hansen / Winergy	Suzlon	Suzlon / Elin	Patel Alloy	Suzlon / Local firms
REpower Systems	LM, A&R	Winergy, Eickoff, Renk	Mita Teknik	Winergy, VEM	Siempelkamp	Klotz, Reuther, local firms
ecotècnia	LM	Pujol Muntalá	Ecotècnia	Winergy	Felguera Melt, Sakana, Fundición Nodular del Norte	Coiper, local firms

Source: Emerging Energy Research, Strategy White Paper, *Wind at a Crossroads – Supply Shortages Spark Industry Restructuring*, November 14, 2006 ID# GW 905-061114. www.emerging-energy.com

Nacelle Units – the Green OEM



Nacelle Component Parts

There are over 8,000 individual parts that make up a completed Nacelle unit much of which is shipped in and assembled; however, critical mass has been reached where it makes sense for the sub-component manufacturers to start considering additional locations on a regional basis – particularly for very large pieces. This scenario is not too much different than the automotive OEM scenario where a supplier base within close proximity is the desire of the OEM.

Jobs Throughout the Value Chain

Probably a Conservative Number

U.S. construction-related economic impacts from 20% wind

Average Annual Impacts	Jobs	Earnings	Output	
Direct Impacts	72,946	$5,221	$12,217	
Construction Sector Only	47,020	$3,547		
Manufacturing Sector Only	22,346	$1,446		
Other Industry Sectors	3,580	$228		
Indirect Impacts	66,035	$3,008	$11,377	
Induced Impacts	119,774	$4,483	$15,749	
Total Impacts (Direct, Indirect, Induced)	258,755	$12,712	$39,343	
Total Construction Impacts 2007-2030	**Jobs**	**Earnings**	**Output**	**NPV of Output**
Direct Impacts	1,750,706	$125,305	$293,197	$111,153
Construction Sector Only	1,128,479	$85,129		
Manufacturing Sector Only	536,305	$34,706		
Other Industry Sectors	85,922	$5,471		
Indirect Impacts	1,584,842	$72,197	$273,057	$103,541
Induced Impacts	2,874,582	$107,591	$377,984	$143,367
Total Impacts (Direct, Indirect, Induced)	6,210,129	$305,093	$944,238	$358,061

Source:
20% Wind Energy by 2030 - Increasing Wind Energy's Contribution to U.S. Electricity Supply. DOE/GO-102008-2567 • July 2008

http://www1.eere.energy.gov/windandhydro/pdfs/41869.pdf

Takeaway

- Large structures getting bigger
- Transportation infrastructure is critical
  - —Rail
  - —Highways
  - —River/Ocean
- OEM and Supplier scenario exists
- There will be lots of companies in this space (for a while)

South Carolina's Place in Wind Energy for Economic Development

McCallum Sweeney Consulting

Helping Companies Decide Where to Build

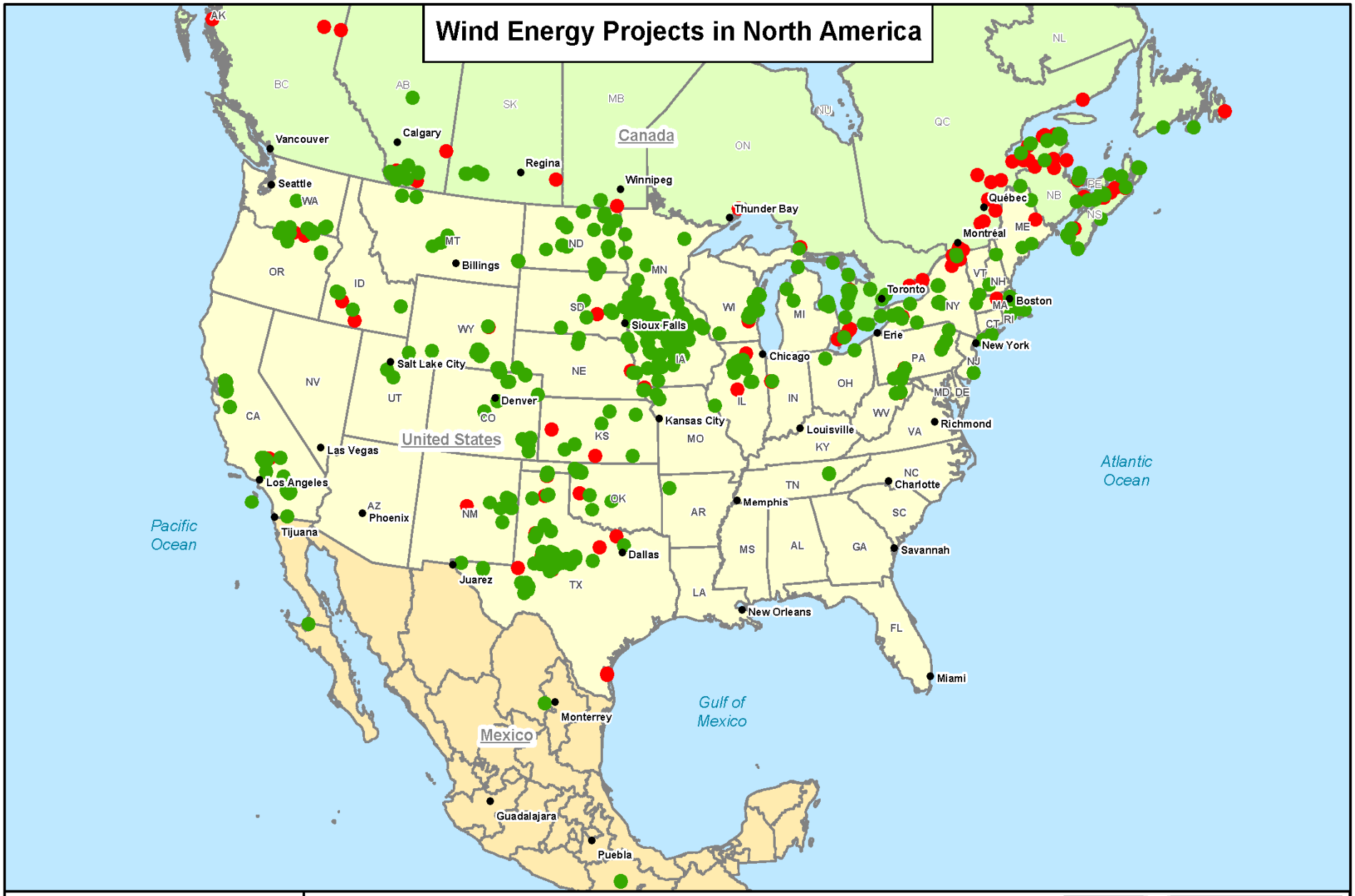
Question:

Is South Carolina a Major Play in Wind?

Answer:

Yes and No

Wind Energy Projects in North America



Wind Energy Projects

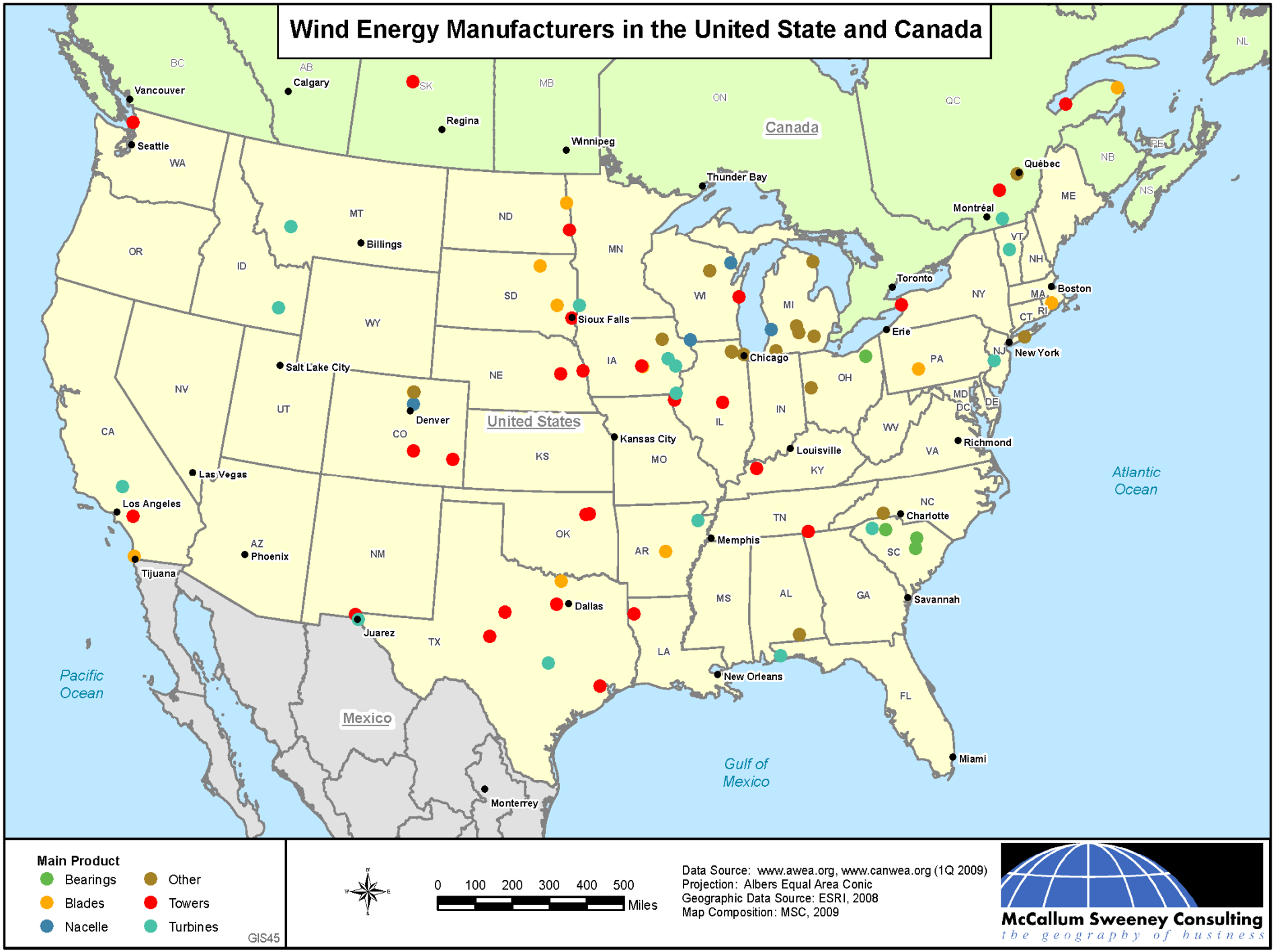
- Existing
- Under Construction

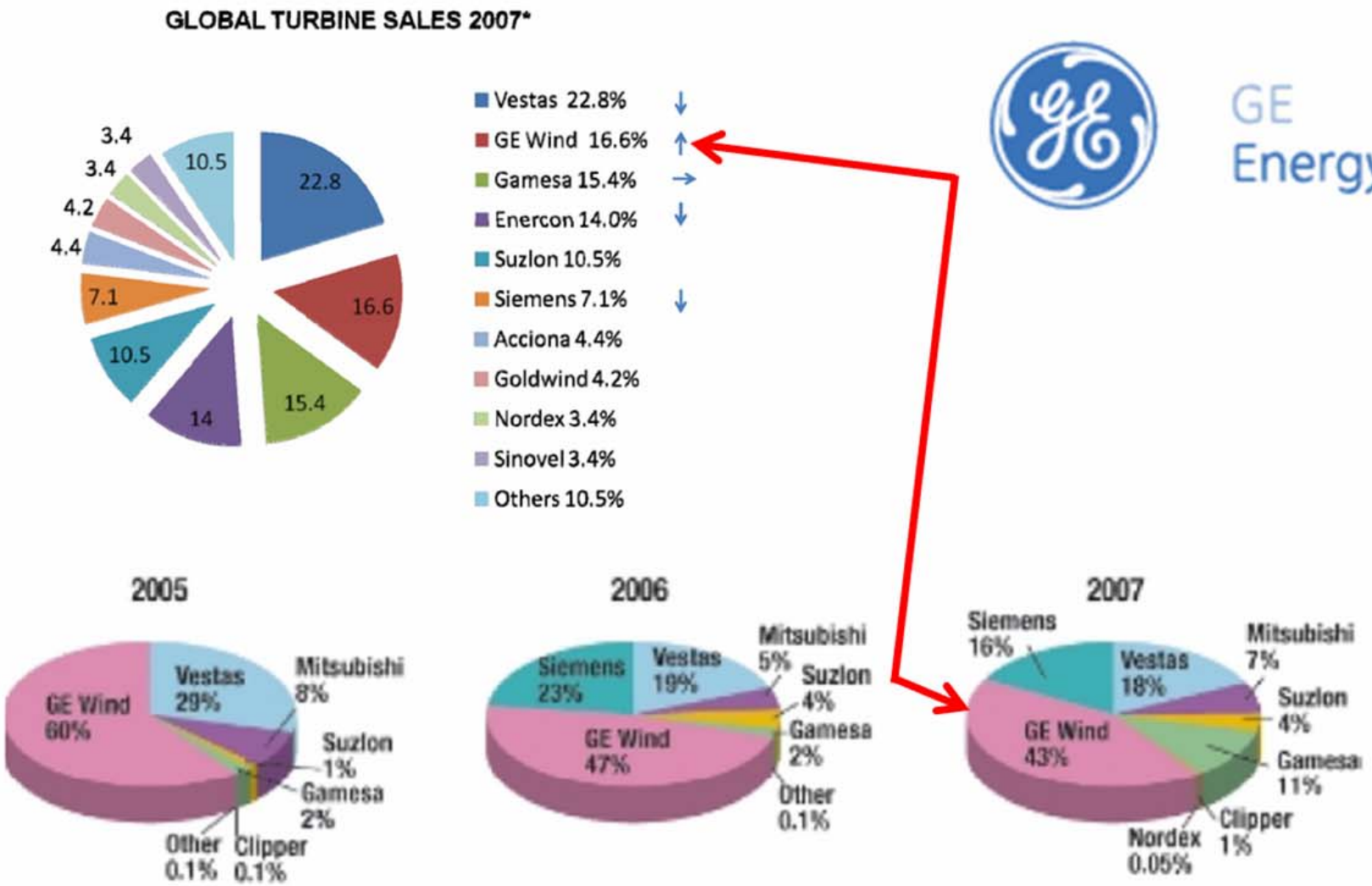
GIS40

0 100 200 300 400 500 Miles

Data Source: www.awea.org, www.canwea.org
Projection: Albers Equal Area Conic
Geographic Data Source: ESRI, 2008
Map Composition: MSC, 2009

McCallum Sweeney Consulting
the geography of business


Wind Energy Manufacturers in the United State and Canada
Canada
United States
Mexico
Pacific Ocean
Atlantic Ocean
Gulf of Mexico
BC
AB
SK
MB
ON
QC
NL
PE
NB
NS
ME
VT
NH
MA
RI
CT
NY
NJ
PA
MD
DC
DE
WV
VA
NC
SC
GA
FL
AL
MS
LA
TN
KY
OH
IN
IL
MI
WI
MN
IA
MO
AR
OK
KS
NE
SD
ND
MT
WY
CO
NM
AZ
UT
NV
CA
OR
WA
Vancouver
Calgary
Regina
Winnipeg
Thunder Bay
Québec
Montréal
Toronto
Boston
Erie
New York
Chicago
Sioux Falls
Billings
Salt Lake City
Denver
Kansas City
Louisville
Richmond
Charlotte
Memphis
Savannah
Las Vegas
Los Angeles
Phoenix
Tijuana
Juarez
Dallas
New Orleans
Miami
Monterrey
Seattle
Main Product
Bearings
Blades
Nacelle
Other
Towers
Turbines
GIS45
0 100 200 300 400 500
Miles
Data Source: www.awea.org, www.canwea.org (1Q 2009)
Projection: Albers Equal Area Conic
Geographic Data Source: ESRI, 2008
Map Composition: MSC, 2009
McCallum Sweeney Consulting
the geography of business



Source: http://www.repp.org/articles/static/1/binaries/WindLocator.pdf

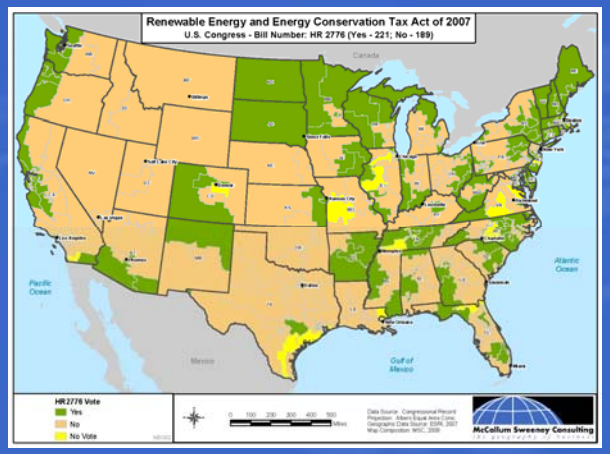
Challenges/Opportunities for SC

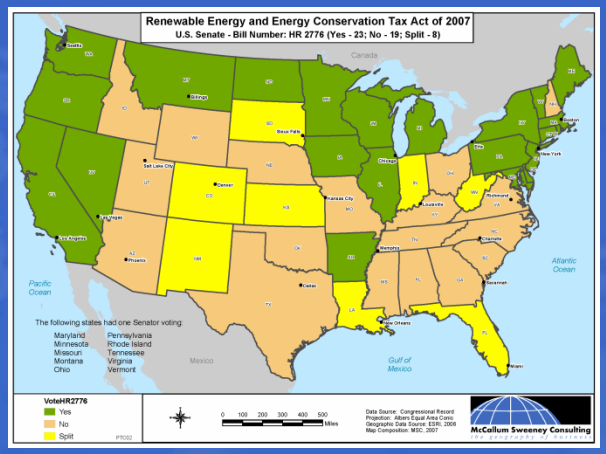
Support the Industry

2007 vs. 2008 PTC Vote

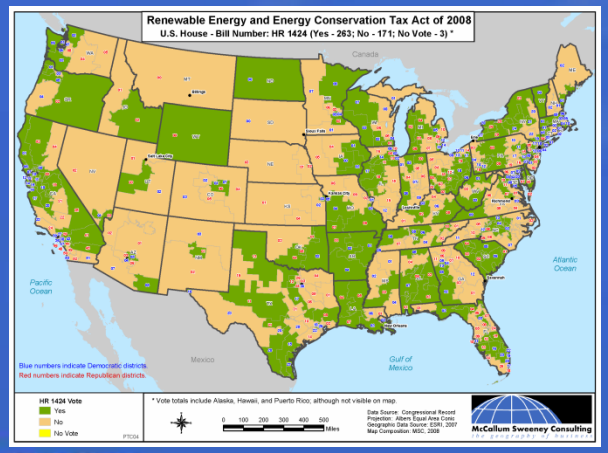
House of Representatives

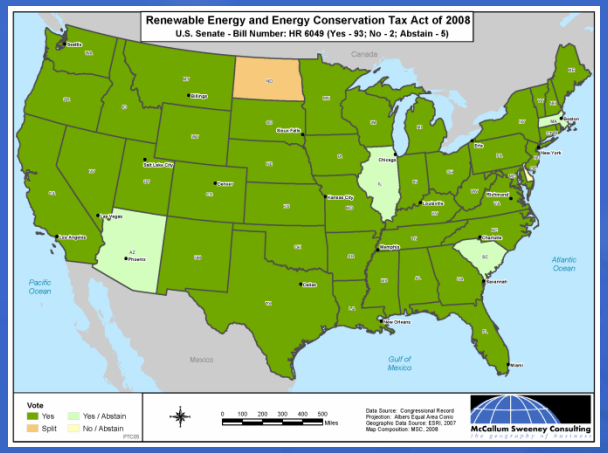
Senate





2007





2008

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Helping Companies Decide Where to Build

Electric Market Overview: Renewable Portfolio Standards

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

30 States* including D.C. have Renewable Energy Portfolio Standards (RPS)

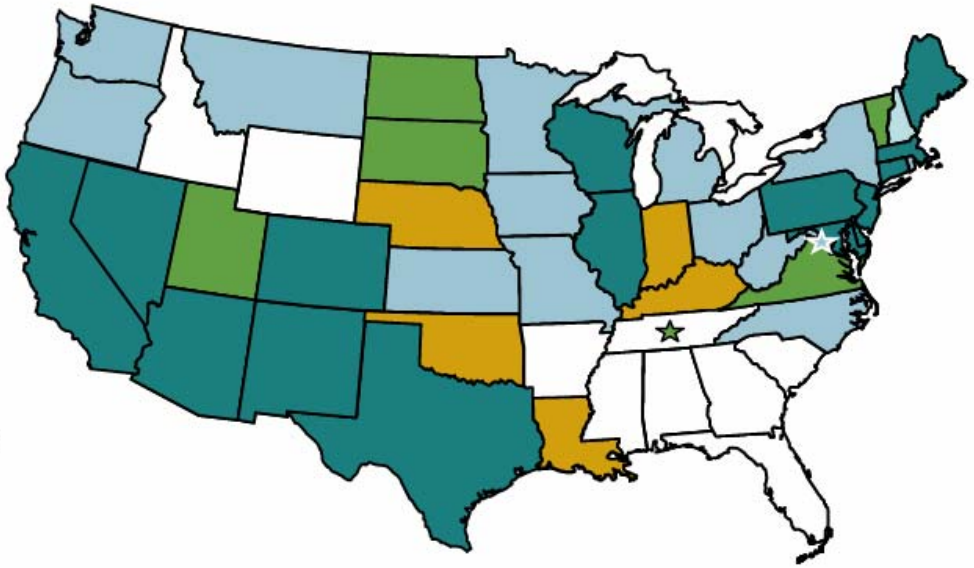
ND: 10% by 2015
SD: 10% by 2015
NE: studying an RPS
KS: 20% by 2020
OK: Studying an RPS

MN: 25% by 2025
IA: 105 MW
MO: 15% by 2021
WI: 10% by 2015
IL: 25% by 2025

MI: 10% MWh and 1,100 MW by 2015
IN: different bills pending
OH: 12.5% by 2025
WV: 25% by 2025
KY: Report recommends RPS

WA: 15% by 2020
OR: 25% by 2025
CA: 20% by 2010; Exec order: 33% by 2020
MT: 15% by 2015
NV: 25% by 2025
UT: 20% by 2025
CO: 20% by 2020
AZ: 15% by 2025
NM: 20% by 2020
TX: 5,880 MW by 2015

HI: 20% by 2020



ME: 40% by 2017
NH: 23.8% by 2025
VT: 25% by 2025
MA:15% by 2020
RI: 16% by end 2019
CT: 27% by 2020
NY: 25% by 2013
PA: 18% by 2020
NJ: 22.5% by 2020
DE: 20% by 2019
DC: 20% by 2020 ☆
MD: 20% by 2022
VA: 12% by 2022
NC: 12.5% by 2021
TVA: 50% by 2020 ★

Updates at: http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-rps.pdf

RPS
Accelerated or strengthened RPS
Voluntary standards or goals
Proposed RPS or studying RPS

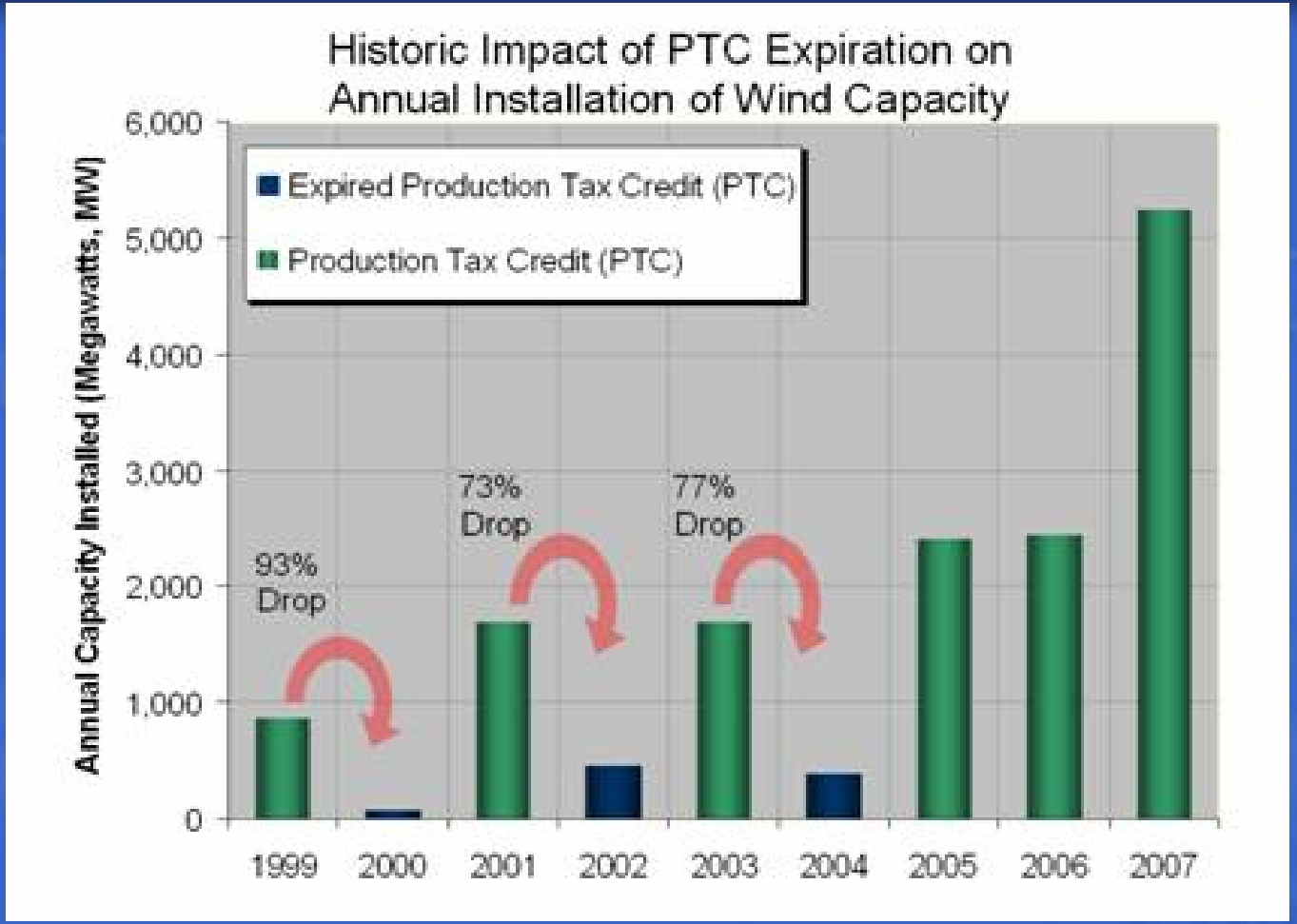
Notes: ***31 states if WV**'s Governor signs the Alternative & Renewable Energy Portfolio Act, passed 6/2/09.
An RPS requires a percent of an electric provider's energy sales (MWh) or installed capacity (MW) to come from renewable resources. Most specify sales (MWh). Map percents are final years' targets. *TVA's goal is not state policy; it calls for 50% zero- or low-carbon generation by 2020. Alaska has no RPS.
Sources: Derived from data in: LBNL, *RPS in the U.S. through* 2007 (4/08), PUCs, State legislative tracking services, Pew Center, and the Union of Concerned Scientists. Details, including timelines, are in the Database of State Incentives for Renewables and Energy Efficiency: http://www.dsireusa.org

Updated June 8, 2009

1109

PTC Renewed for 3 Years

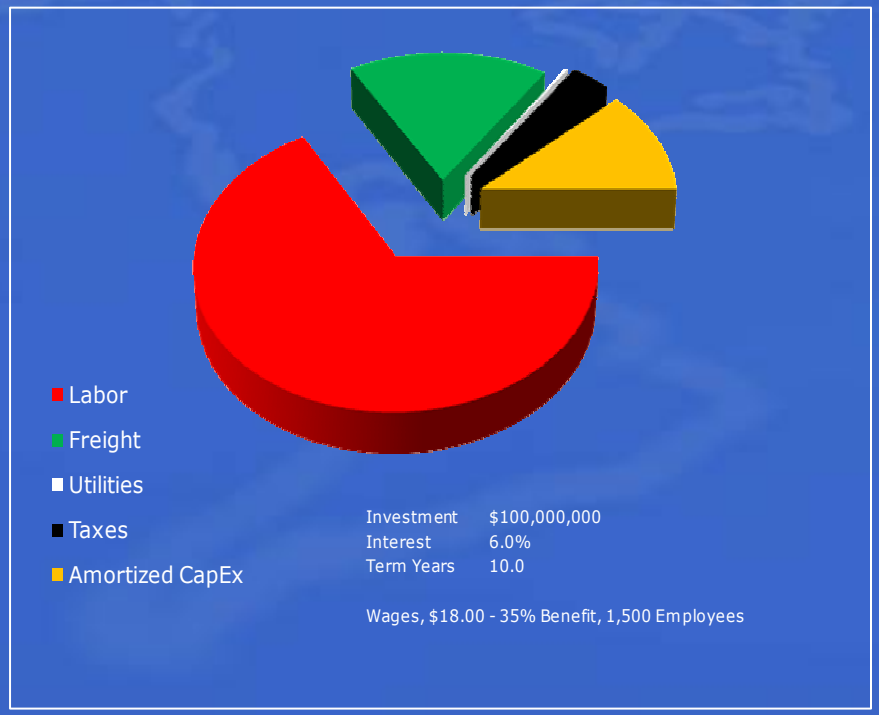
What happens when the support stops



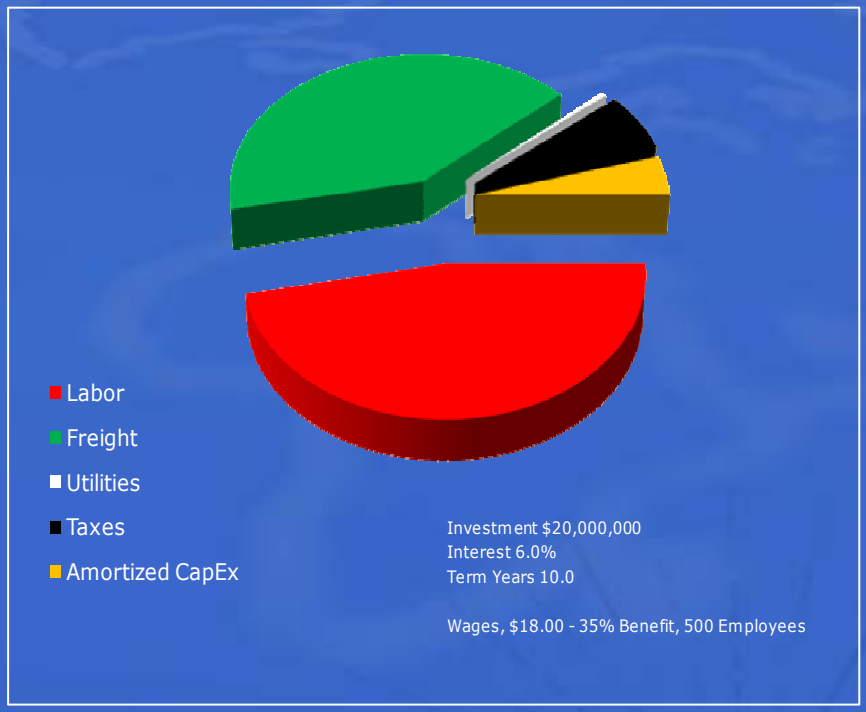
Source: American Wind Energy Association122 C Street, N.W., Washington, D.C. 20001, (202) 383-2500, fax (202) 383-2505, windmail@awea.org, http://www.awea.org.

Freight and Labor is a Needle Mover

Example Blade Manufacturing Facility



Example Nacelle Assembly Facility



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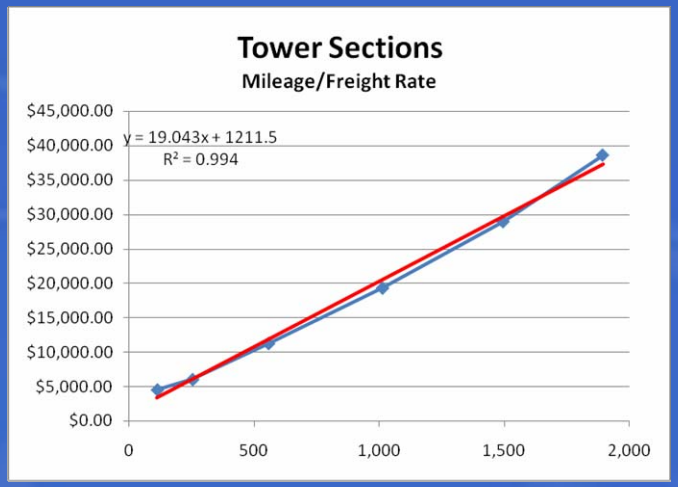
The Case for Rail

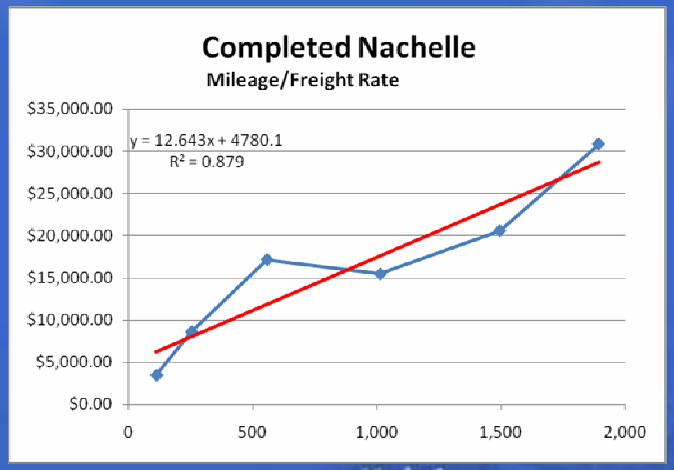
Logistics Cost and Complications Affect Access to Inland Markets

Truck Transport Costs

Due to the length and weights of the towers and blades, customized trailers and heavy haul tractors are required. Each trailer is customized requiring a significant amount of investment from the carriers. The cost of each combined trailer and heavy haul tractor unit can reach $500,000 to $750,000. Escort vehicles are also required for the trucks. Depending upon the state, the number of escort vehicles varies but typically range from one to three escort cars per truck for the blades or towers.

Rail Transport Cost Curves





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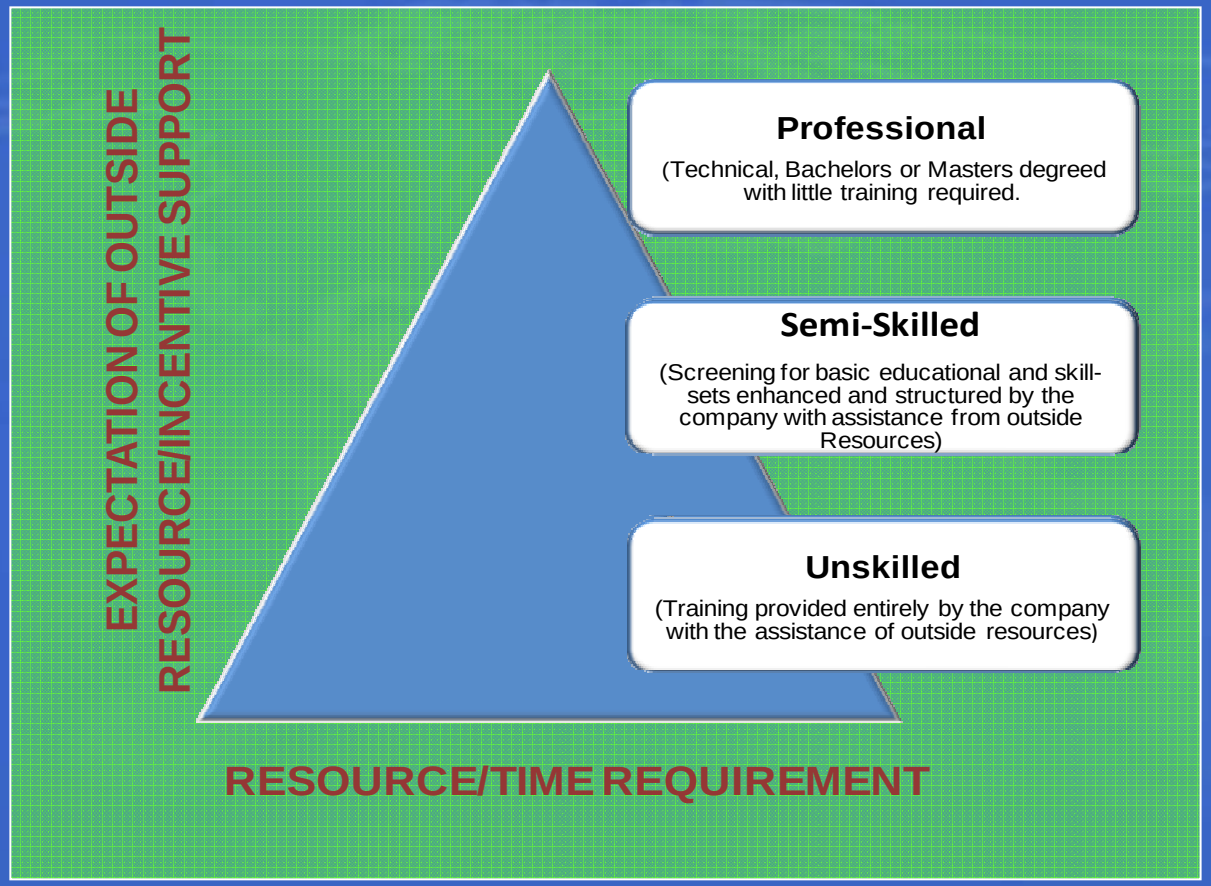
Skills vs. Training

Assistance/Resources Relationship



Professional

Engineering and Design
Project Management
Logistics
Etc.

Skilled

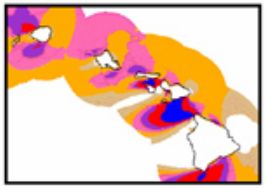
Nacelle Assembly and Testing
Electronics Troubleshooting/Testing
Mechanical Troubleshooting/Testing
Machining (Gears and Shafts)
Bearings
Gear Box Assembly

Semi-skilled

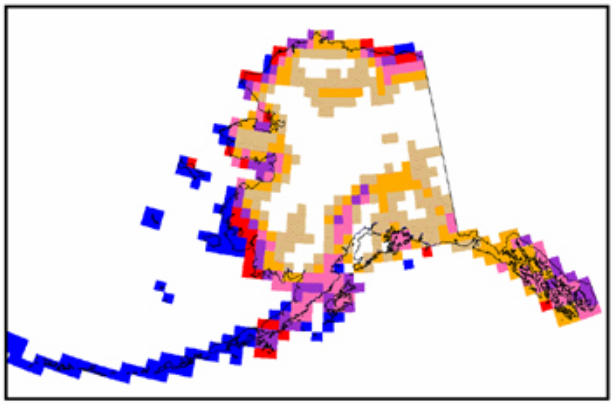
Rotor Blade Technicians
Nacelle Covering
Control Box Assembly
Towers
Castings

Wind Resources and Transmission Lines

NREL Updated Maps:
Arizona (2003)
California (2002)
Colorado (2004)
Connecticut (2001)
Delaware (2002)
Hawaii (2004)
Idaho (2002)
Illinois (2001)
Indiana (2004)
Maine (2001)
Maryland (2002)
Massachusetts (2001)
Michigan (2004)
Missouri (2005)
Montana (2002)
Nebraska (2005)
Nevada (2003)
New Jersey (2002)
New Hampshire (2001)
New Mexico (2003)
North Carolina (2002)
North Dakota (2000)
Ohio (2004)
Oregon (2002)
Pennsylvania (2002)
Rhode Island (2001)
South Dakota (2001)
Texas mesas (2000)
Utah (2003)
Vermont (2001)
Virginia (2002)
Washington (2002)
West Virginia (2002)
Wyoming (2002)



The remaining states use data from the 1987 "Wind Energy Atlas of the United States".



Transmission Lines
Voltage (kV)
345 - 499
500 - 699
700 - 799
1000 (DC)

Source: POWERmap, powermap.platts.com, ©2007 Platts, a division of the McGraw-Hill Companies

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed [a] at 50 m m/s	Wind Speed [a] at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

[a] Wind speeds are based on a Weibull k value of 2.0

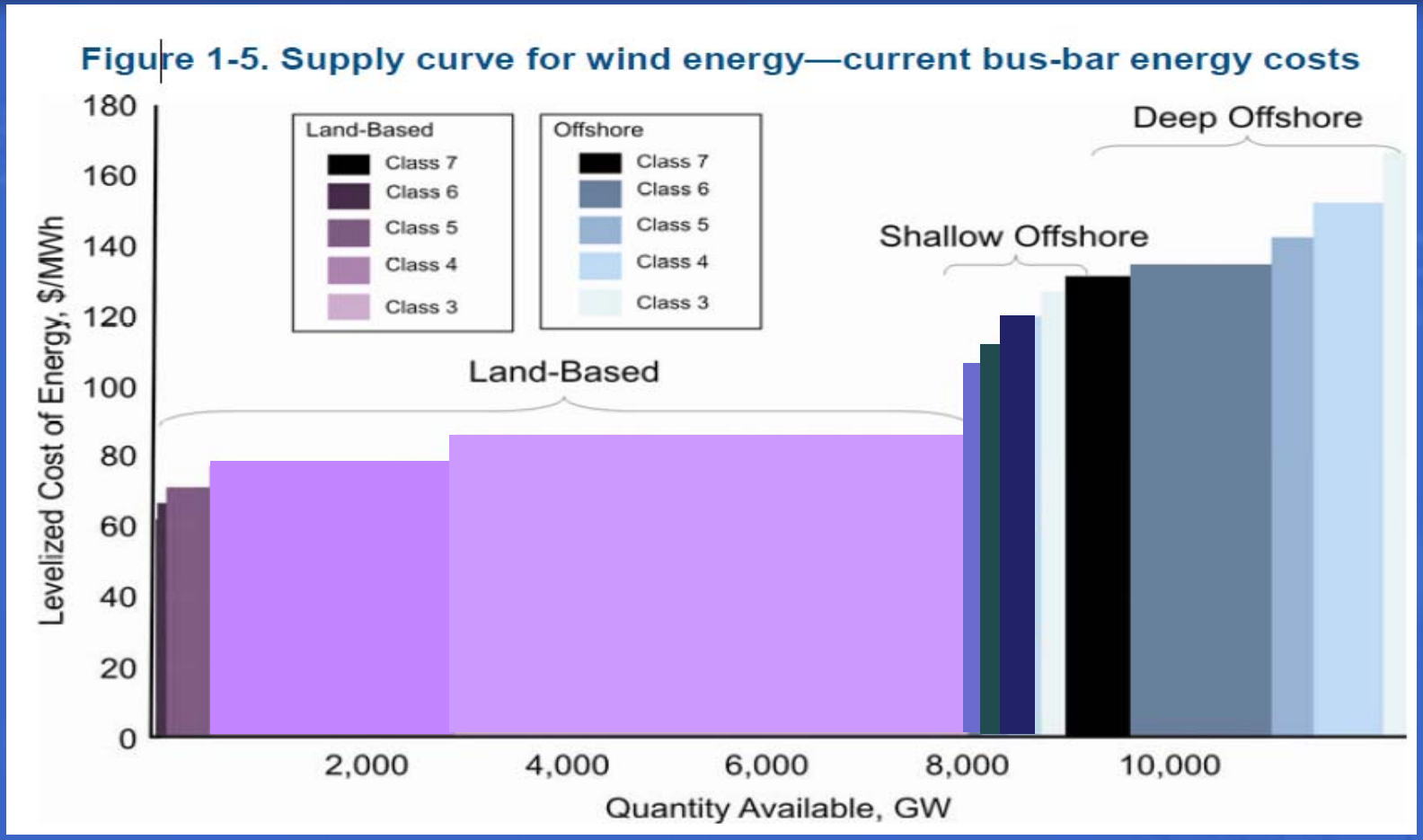
U.S. Department of Energy
National Renewable Energy Laboratory

NREL

19-APR-2007 1.5.9

South Carolina and Offshore Wind

Technology Improvements will Capture Opportunity



Source:
20% Wind Energy by 2030 - Increasing Wind Energy's Contribution to U.S. Electricity Supply. DOE/GO-102008-2567 • July 2008

http://www1.eere.energy.gov/windandhydro/pdfs/41869.pdf

Offshore Wind is SC's Greatest Immediate Opportunity

- Incumbent OEM that can serve the market immediately
  - Access to the Port of Charleston is imperative from Greenville, SC as turbine size increases
  - In the absence of rail clearance to the Port of Charleston – adequate property in close proximity
- Leverage ability to manufacture components, import parts/assemble/ship, and "project manage large" developments
  - General electric, Timken, Bosch, and others
  - Port of Charleston access (North America and Beyond)
  - Engineering, Procurement, Construction (EPC) Presence
- Recruit and Develop the Supply Chain
  - Combination of component imports, manufacturing expansions, and recruitment
- Legislative support for industries – Federal, State
  - Industry support to promote and assist innovation
  - Tailored to assist in recruitment

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