Prosperity for Delmarva

Plan for Sustainable Growth and Clean Life for Our Citizens

Clean Solutions

- Clean Air
- Clean Water
- Clean Food
- Clean Energy
- Clean Growth of Jobs and Prosperity
- Fully Sustainable for Generations

Clean Air, Water, Food, & Energy

- Eliminates Carbon and All Fossil Fuels from Our Environment
- Eliminates Nuclear Power and All Its Faustian Bargains
- Eliminates All Sources of Heavy Metals, Biotoxins, and Toxic Wastes from the Air, Water, and Food
- Uses Clean Energy for a Clean Life

Clean Growth of Jobs and Prosperity

- All Materials and Resources Taken from Delmarva
- Human Resources Are Already Here, Waiting for the Opportunities
- Financial Resources Are Already Available Right Here
- Technology Is All Home-Grown
- Clean Energy Resource Is Abundant and Right Here

Fully Sustainable for Generations

- Delaware
  - Population:
    - 200,000 Rural, 700,000 Urban
- Maryland
  - Population:
    - 310,000 Rural, 5,650,000 Urban
- Virginia
  - Population:
    - 1,110,000 Rural, 6,770,000 Urban

Expected Changes

- Approximately 7% Growth in Population Per Decade
- Reduction of 10% Per Capita Fossil Energy Use Per Decade
- 90% Reduction In Pollutants by 2050
- Unemployment Rates Well Below 4% for the Rest of the Century
- Vast Expansion of the Middle Class

New Jobs

- Two Million New Jobs Created for Clean Energy
- One Trillion Dollar Industry Centered in Delmarva
- World-Class Competitive System for Delmarva's Economy
- All Intellectual Property Based Upon U.S. Inventions

Elements Of The Solution

- Conversion from Carbon to Hydrogen
- Use of Vast Domestic Renewable Clean Energy
- Use of Breakthrough Technologies Developed Within Delmarva
- Recycle Used Materials (Plastics, Metals, Etc.)
- Finance All Projects Within Borders
  - Energy Development Bonds and Equity Shares Sold To Citizens
  - U.S. Loan Guarantees Acceptable But Not Necessary Beyond First Generation Projects

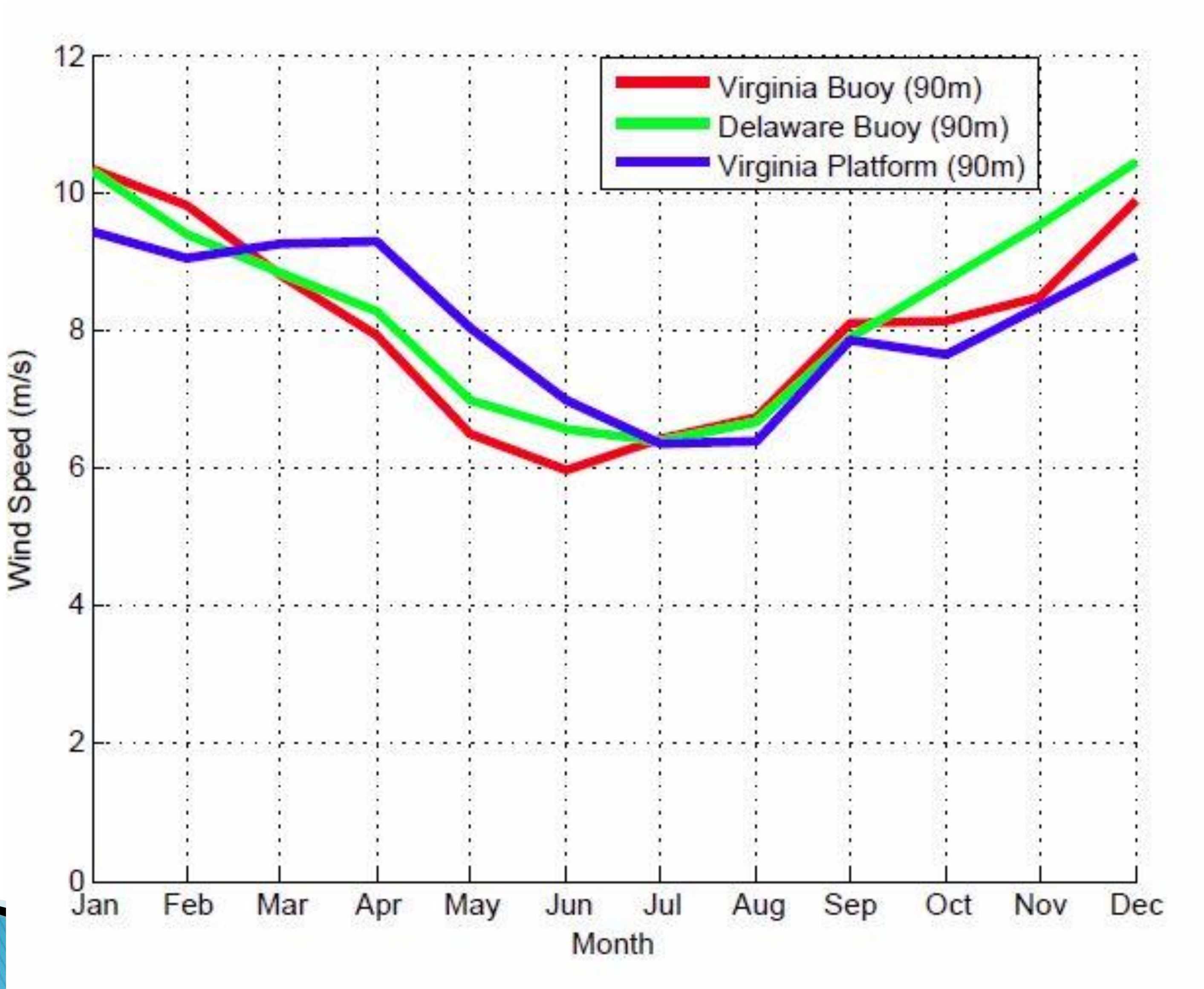
Hydrogen Technology

- Hydrogen Energy Carrier
- Conversion of Air, Water, and Renewable Power to Ammonia
- Offshore Floating Wind Platforms
- Solid State Ammonia Synthesis
- Ammonia Pipelines To Distribute Hydrogen Throughout Region
- New Hydrogen Combustion and Conversion Technologies

Sustainable Life

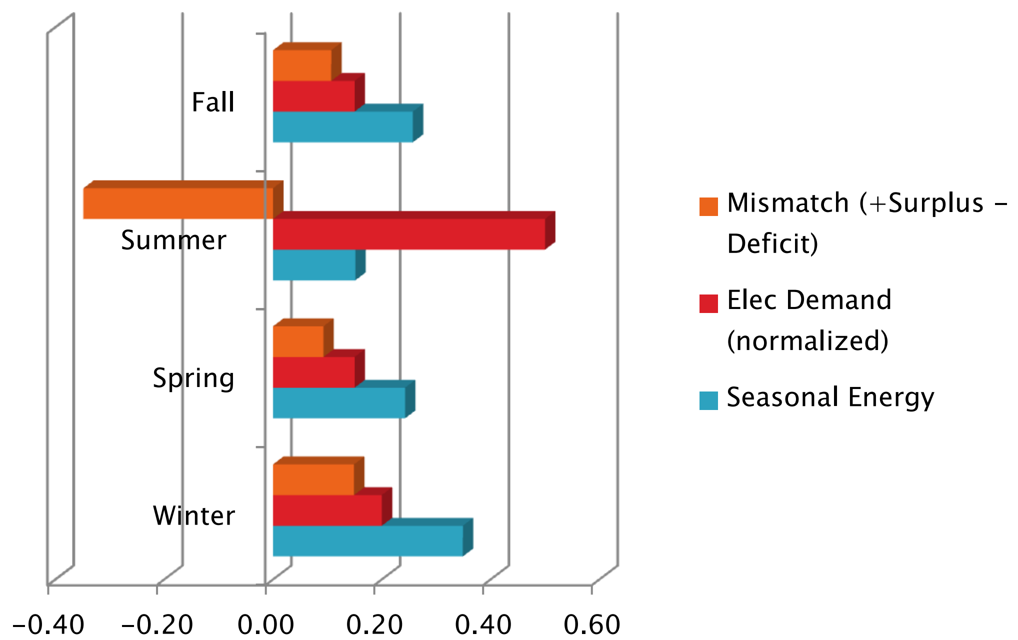
- 50 Gigawatts of Power at Sea Off Delmarva Coast (Average 8 m/s annual winds @ 90m)
- Some Power Sold to TVA and DoD for Greening Their Networks
- Use of Ammonia Fuel Cells
  - 1kW to 10MW for Homes and Transportation
- Use of Ammonia for Industry and Utilities
  - Gas and Steam Turbines for Large Power Plants and Clean Cogeneration

How Much Power Is There?



Matching the Load
Seasonal Analysis

	Winter	Spring	Summer	Fall
Seasonal Energy	0.35	0.24	0.15	0.26
Elec Demand (normalized)	0.20	0.15	0.50	0.15
Mismatch (+Surplus -Deficit)	0.15	0.09	-0.35	0.11
35% Mismatch of product and demand!				



Financing Of Each Unit

Analysis	Amount financed	$25,000,000
Assumptions:	Annual interest (e.g., 8.25)	5.2
$20 million per 8MW Power Turbine	Duration of loan (in years)	15
$3 million per 15MT/Day SSAS NH3 Production Unit	Start date of loan	1-Jan-15
$1 million per Storage and Piping Facility		
$1 million per 300 MT/day Reverse Osmosis Seawater-Fresh water facility	Monthly payments	200,312.79
7 Unit Clusters	Total number of payments	180
20% Equity at 10% dividend on Convertible Stock	Yearly principal + interest	2,403,753.43
80% Debt at 4% Interest		
15 year loan life	Principal amount	25,000,000.00
	Finance charges	11,056,301.39
	Total cost	36,056,301.39

Product Mix Pricing

Production Products and Pricing Per Unit						
Using Product Mix					*Electricity Only*	
Product	*Amount*	*Price*	*Revenue*			
Ammonia (MT/yr)	4000	400	$1,600,000		0	0
Oxygen (MT/yr)	100	500	$50,000		0	0
Fresh Water (MT/yr)	1000000	1	$1,000,000		0	0
Electric Power (MWh)	9000	40	$360,000		36000	$1,440,000
Total			**$3,010,000**			**$1,440,000**

Profit & Loss

	Per Unit	Per Cluster	100 Clusters
Deployed Capital	**$25,000,000**	**$175,000,000**	**$17,500,000,000**
Revenue	$3,010,000	$21,070,000	$2,107,000,000
O&M	$25,000	$175,000	$17,500,000
G&A	$75,000	$525,000	$52,500,000
Loan P&I	$2,403,744	$16,826,208	$1,682,620,800
Insurance	$250,000	$1,750,000	$175,000,000
Gross P (L)	$256,256	$1,793,792	$179,379,200
Taxes	$76,877	$538,138	$53,813,760
Net Profit (Loss)	**$179,379**	**$1,255,654**	**$125,565,440**
Annual Payments to:			
Equity Partners	$179,379	$1,255,654	$125,565,440
Debt Holders	$1,479,227	$10,354,590	$1,035,458,954
Convertible Stock Holders	$924,517	$6,471,618	$647,161,846
Insurance Co.*	$250,000	$1,750,000	$175,000,000
State & Federal Govt.			
Tax on project	$76,877	$538,138	$53,813,760
Tax on participants	$800,000	$5,600,000	$560,000,000

**Note: Insurance sufficient to cover loss of 0.5% of assets yearly -- e.g., 50 units over 15 years*

Enormous Annual Export Potential

- 100 Million Tons of Ammonia
- 10 GW+ of Power to Eastern Grid
- 1000s Wind Power Turbines For Export
- 1000s Floating Ocean Energy Islands For Export
- $100+ Billion Annual Income for Delmarva From Renewable Energy Production

Key Innovations

- Polyimide-Based Wind Turbine Blades and Integrated Generators Inside Hubs
- Hydrogen Transport Based On Ammonia
- New Classes of Ammonia Burning Engines and Fuel Cells
- Solid State Ammonia Synthesis
  - 50% More Efficient Than Any Other Method
  - Eliminates Electrolysis of Water
- Next Generation Floating Energy Islands
  - Phase Over to Ocean Thermal Energy Conversion As Wind Resources Are Saturated

Resource Requirements

- $100 Billion New Capital In 10 Years
- Reopen Large Shipyards for Manufacturing Floating Islands
- 10 Billion Tons of Concrete
- 10 Million Tons of Steel
- Other Metals (Al, Cu, etc.) Captured from Recycle
- Recycled Plastics Used to Make Polyimides
- New Wind Turbine, Generator, Engine and Fuel Cell Manufacturing Plants
- New Pipelines to Feed Ammonia to End Users
- Ammonia Fertilizer Distributed Directly to Farms

Fresh Water Production

- Floating Platforms Convert Sea Water to Fresh Water for Making Ammonia and Surplus for Thirsty Cities
- Products (Ammonia, Water, Oxygen, and Power) Optimized for Maximum Profit
- Baseload Power Can Be Shipped to Shore By Cable or Generated By Fuel Cells From Ammonia
- Fresh Water Also Created By Fuel Cells
- Ships Carry Ammonia and Water to Ports for Distribution Worldwide

Some Inventions Of Note

- RP-46 and RP-50 Polyimides From NASA Langley Research Center (Ruth Pater)
- Collier Research *HyperSizer* Wind Turbine Design Software
- Solid State Ammonia Synthesis (Jason Ganley, et.al.)
- Hydrogen Hub (John Holbrook, et.al.)
- Advanced Ammonia Engines (Ted Hollinger)
- Advanced Ammonia Fuel Cells (Nigel Sammes, et.al.)
- System Design Improvements (Paul Curto, et.al.)

What Are We Waiting For?

- The Decision Is Yours
- Do You Want A Future For Us and Our Children?
  - Clean
  - Renewable
  - Sustainable
  - Economic
  - Prosperous

CCLLC

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MD Offshore Seasonal Variations

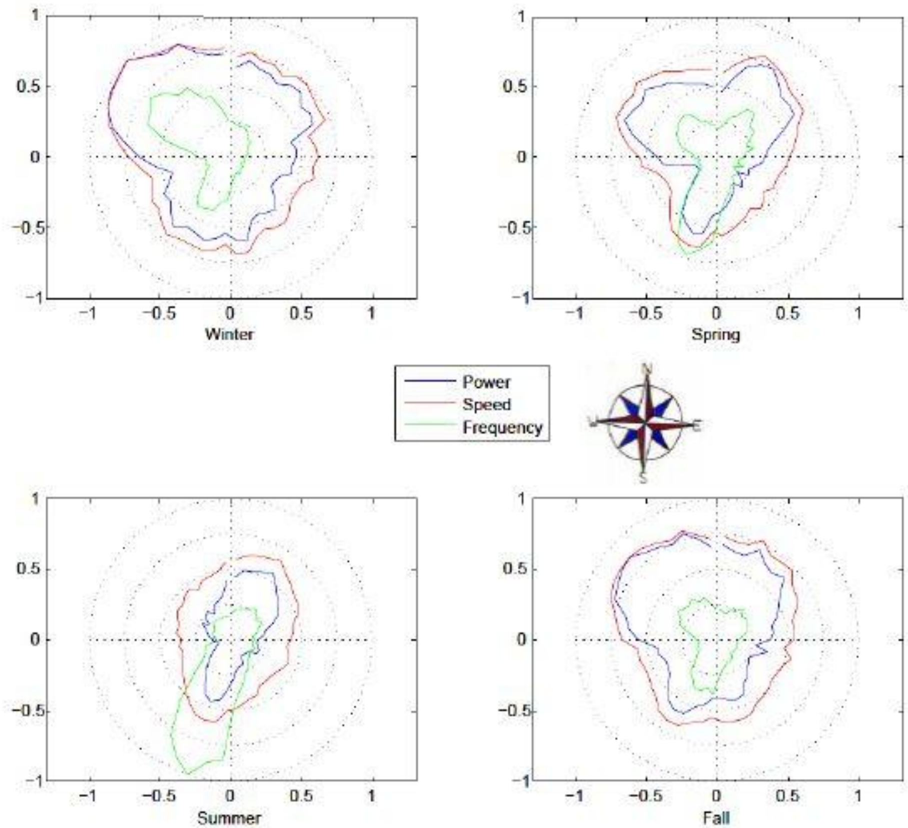
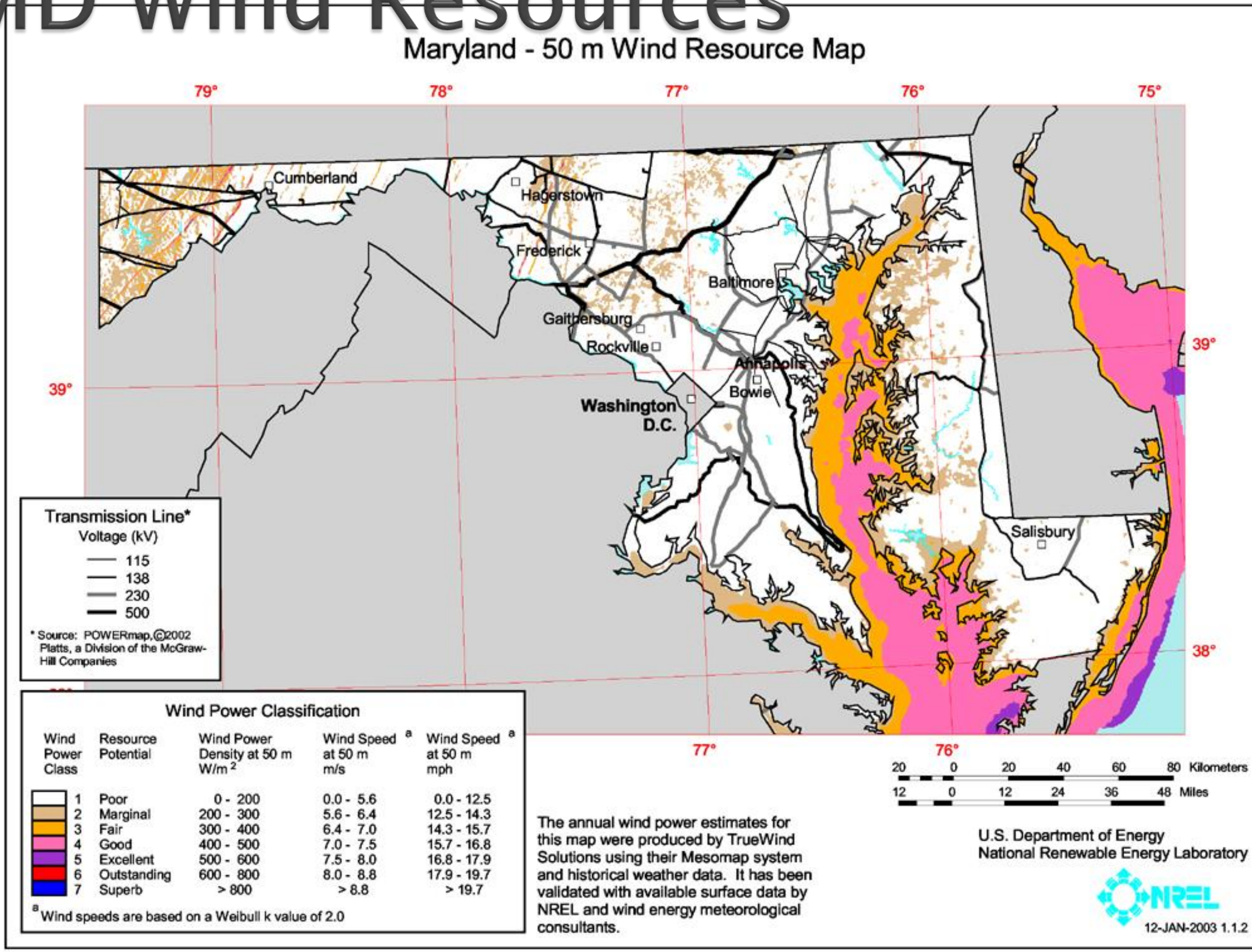


Figure 14. Seasonal Rose Plots depicting power, hub height wind speed, and wind frequency by direction. The values are normalized by the maximum yearly values.

MD Wind Resources

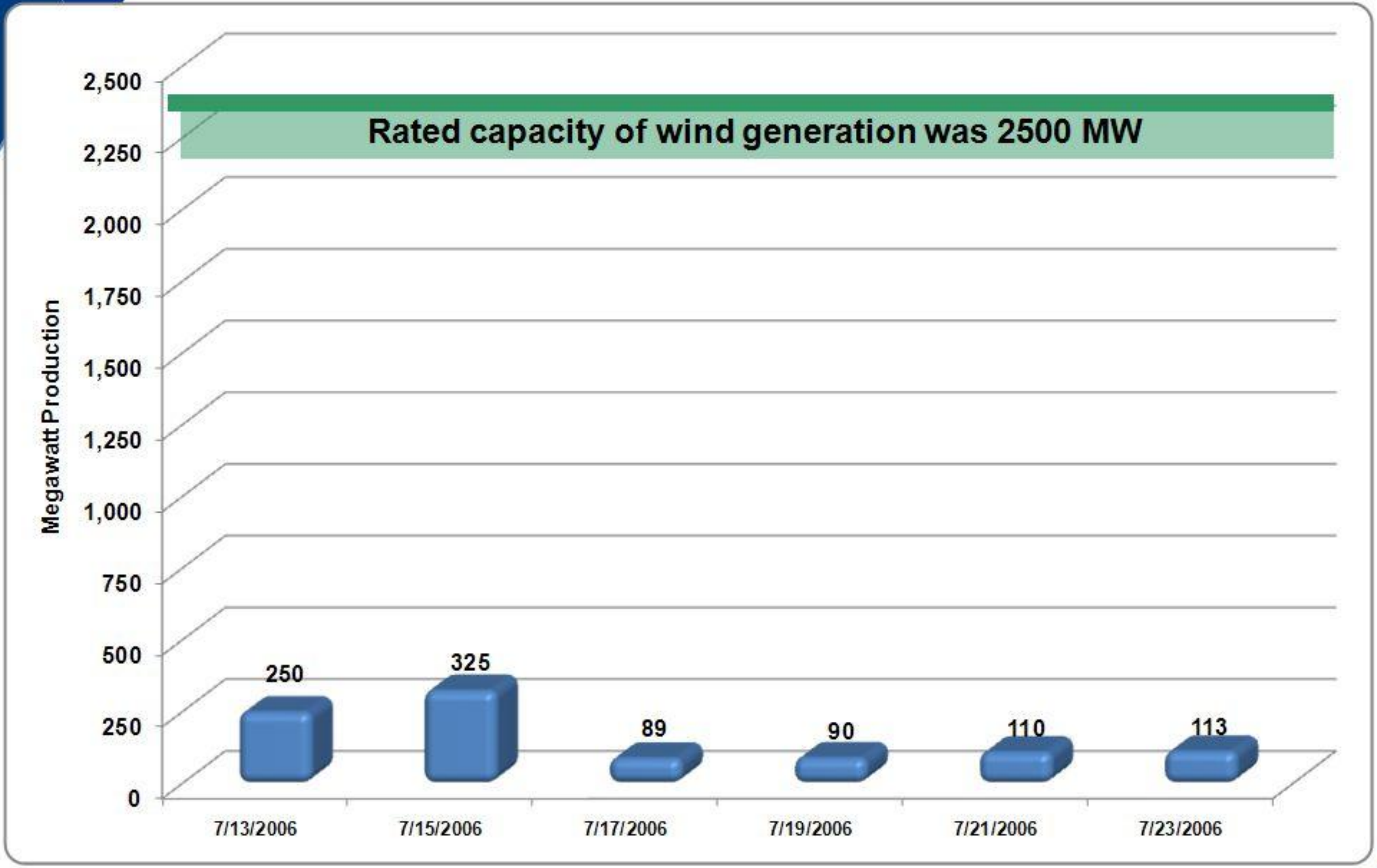


Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m²	Wind Speed [a] at 50 m m/s	Wind Speed [a] at 50 m mph
1	Poor	0 - 200	0.0 - 5.6	0.0 - 12.5
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	> 8.8	> 19.7

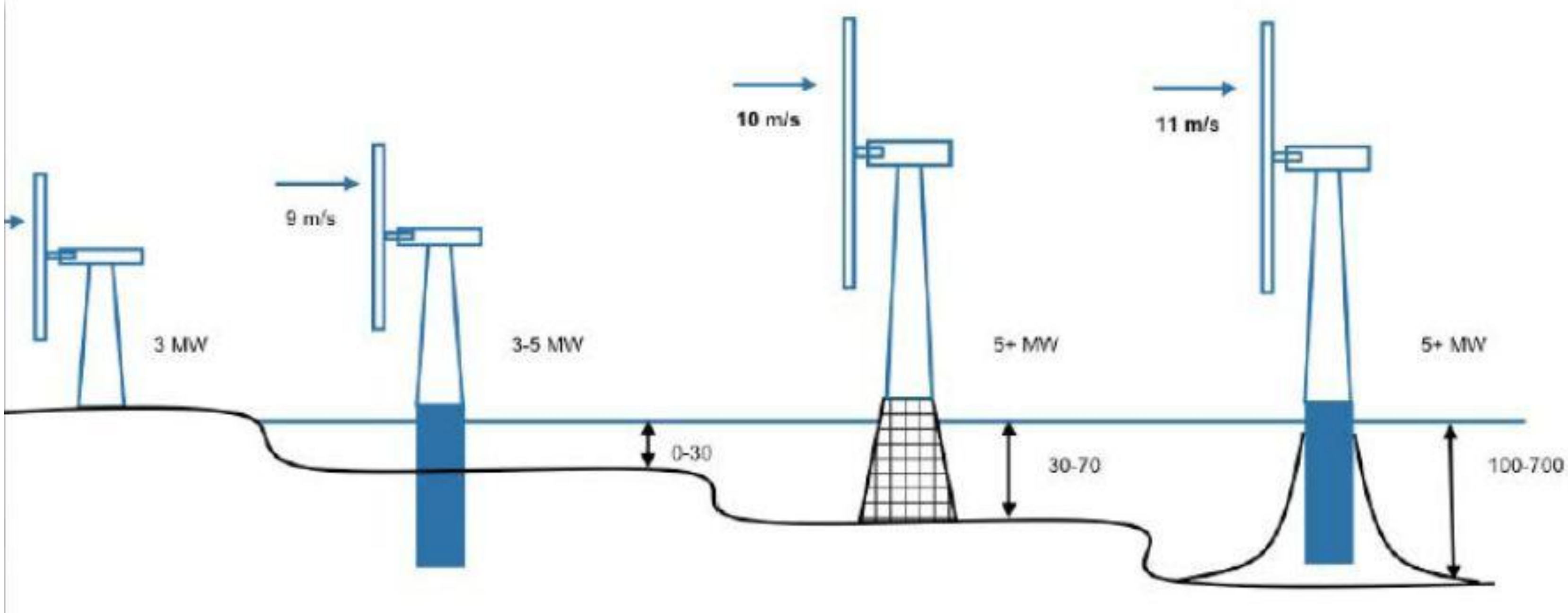
[a] Wind speeds are based on a Weibull k value of 2.0

Wind Generation's Performance During 2006 California Heat Wave

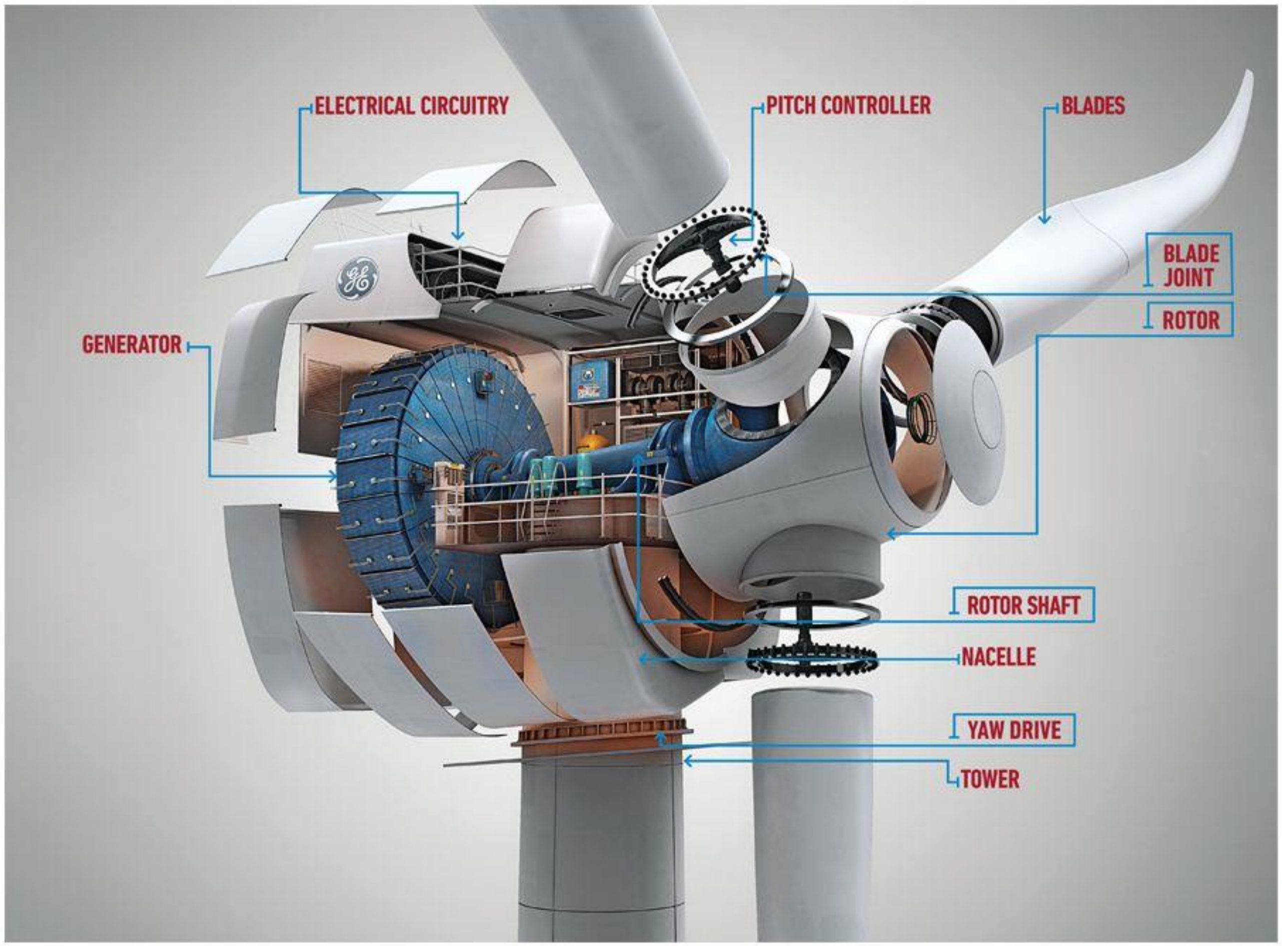


* Adapted and estimated from Dixon, U.S. DOE (2006)

Offshore Wind Machine Designs

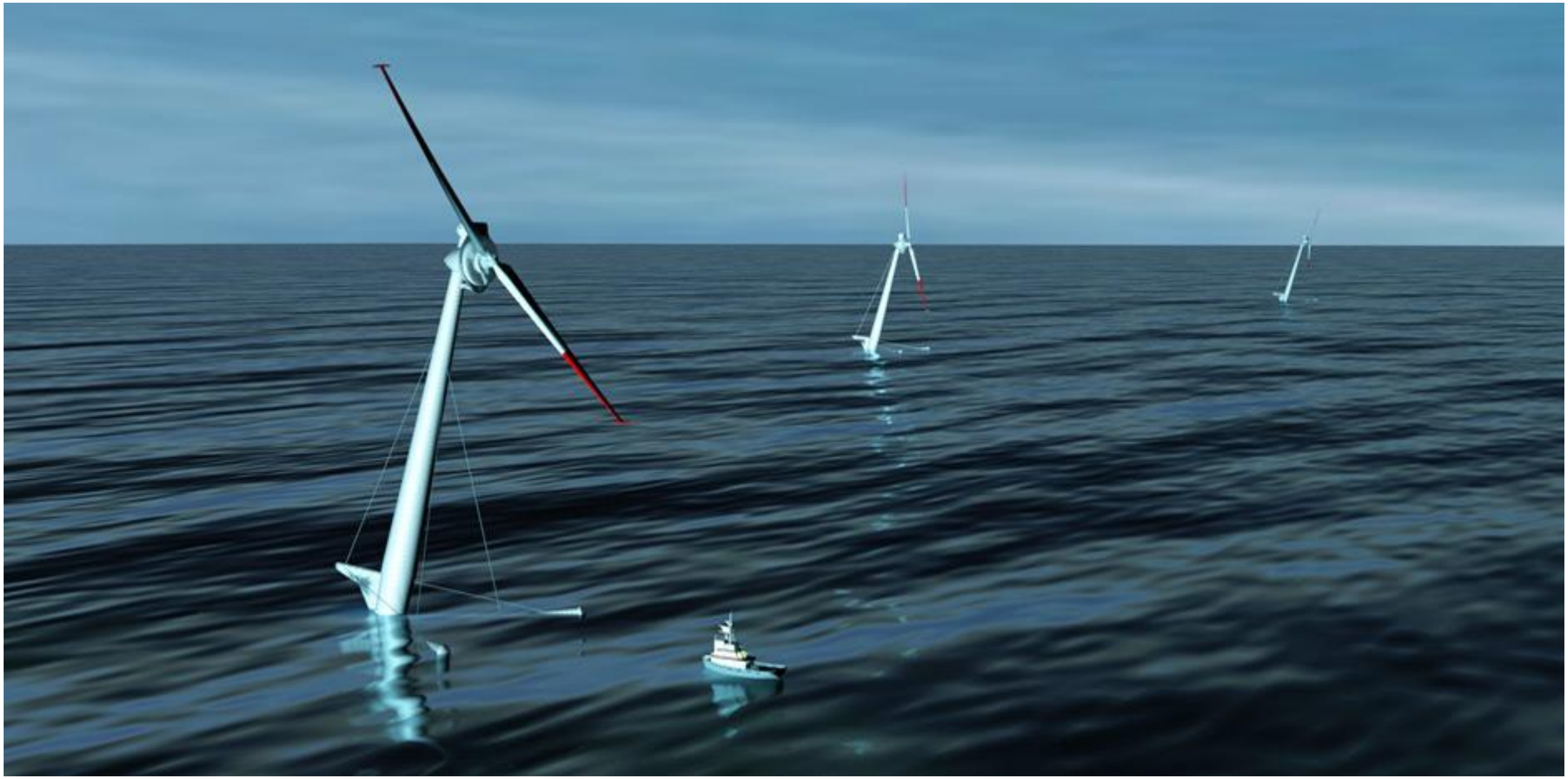


GE 4MW Offshore Wind Turbine



C-Power 5MW Offshore Wind Turbine

Nautica Windpower

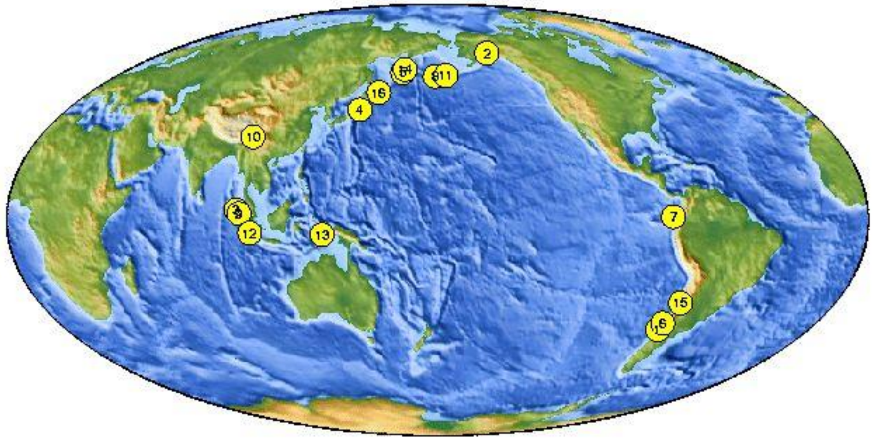


Load-Matched Product Mix

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**Product Mix Analysis for 8MW Offshore Wind Machine**														
2	**Month**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Yearly**	**Value**
3	**Avg Vel (m/s)**	10.3	9.5	8.9	8.5	7.2	6.6	6.4	6.5	8.1	8.4	8.9	9.8		
4	**Energy Factor**	106.09	90.25	79.21	72.25	51.84	43.56	40.96	42.25	65.61	70.56	79.21	96.04	**837.83**	
5	**Mon Avg Energy**	0.126625	0.107719	0.094542	0.086235	0.061874	0.051991	0.048888	0.050428	0.078309	0.084218	0.094542	0.114629	**1**	
6	**Seasonal Energy**	0.348973			0.242651			0.151308			0.257069			**1**	
7	**AEP=36 GWH**														
8	**Monthly Generation**	4.55849	3.877875	3.403507	3.104448	2.227469	1.871692	1.759975	1.815404	2.81914	3.031832	3.403507	4.126661	**36**	
9	**Value ($1000s)**	381.1404	324.2334	284.571	259.5664	186.2411	156.4943	147.1535	151.788	235.7114	253.4949	284.571	345.0347	**3010**	
10															
11	**With Optimized Generation Mix**														
12	**Ammonia (MT)**	506.4989	430.875	378.1674	344.9387	247.4965	207.9658	195.5528	201.7116	313.2378	336.8702	378.1674	458.5178	**4000**	**$ 1,600,000**
13	**Oxygen (MT)**	12.66247	10.77187	9.454185	8.623468	6.187413	5.199145	4.88882	5.042789	7.830944	8.421756	9.454185	11.46295	**100**	**$ 50,000**
14	**Water (MT)**	95285.11	81058.36	71142.74	64891.59	46560.28	39123.57	36788.37	37946.99	58927.86	63373.72	71142.74	86258.67	**1000000**	**$ 1,000,000**
15	**Electricity (MWH)**	1139.623	969.4687	850.8767	776.1121	556.8671	467.9231	439.9938	453.851	704.785	757.9581	850.8767	1031.665	**9000**	**$ 360,000**
16														**Total**	**$ 3,010,000**
17															
18	**All Electricity (MWH)**	4558.49	3877.875	3403.507	3104.448	2227.469	1871.692	1759.975	1815.404	2819.14	3031.832	3403.507	4126.661	**36000**	**$ 1,440,000**
19															
20	**All Ammonia (MT)**	701.3062	596.5962	523.6164	477.6074	342.6875	287.9527	270.7654	279.2929	433.7138	466.4357	523.6164	634.8709	**5538.46**	**$ 2,215,385**

Yet Another Concern – Link Between Global Warming and Megaquakes

Largest Earthquakes in the World Since 1900



USGS National Earthquake Information Center

	Location	Date UTC	Magnitude	Lat.	Long.	Reference
1.	Chile	1960 05 22	9.5	-38.29	-73.05	Kanamori, 1977
2.	Prince William Sound, Alaska	1964 03 28	9.2	61.02	-147.65	Kanamori, 1977
3.	Off the West Coast of Northern Sumatra	2004 12 26	9.1	3.30	95.78	Park et al., 2005
4.	Near the East Coast of Honshu, Japan	2011 03 11	9.0	38.322	142.369	PDE
5.	Kamchatka	1952 11 04	9.0	52.76	160.06	Kanamori, 1977
6.	Offshore Maule, Chile	2010 02 27	8.8	-35.846	-72.719	PDE
7.	Off the Coast of Ecuador	1906 01 31	8.8	1.0	-81.5	Kanamori, 1977
8.	Rat Islands, Alaska	1965 02 04	8.7	51.21	178.50	Kanamori, 1977
9.	Northern Sumatra, Indonesia	2005 03 28	8.6	2.08	97.01	PDE
10.	Assam - Tibet	1950 08 15	8.6	28.5	96.5	Kanamori, 1977
11.	Andreanof Islands, Alaska	1957 03 09	8.6	51.56	-175.39	Johnson et al., 1994
12.	Southern Sumatra, Indonesia	2007 09 12	8.5	-4.438	101.367	PDE
13.	Banda Sea, Indonesia	1938 02 01	8.5	-5.05	131.62	Okal and Reymond, 2003
14.	Kamchatka	1923 02 03	8.5	54.0	161.0	Kanamori, 1988
15.	Chile-Argentina Border	1922 11 11	8.5	-28.55	-70.50	Kanamori, 1977
16.	Kuril Islands	1963 10 13	8.5	44.9	149.6	Kanamori, 1977

Updated 2011 March 15

Troubling Data