

GE Power & Water

GE Energy

Onshore Wind Turbines

November, 2010



GE imagination at work



GE and WY – an American partnership



GE Energy equipment in WY
539 GE wind turbines (800MW's)
> 5GW's steam turbines
6 gas turbines 250MW's

Researching together
Wind R&D program funded
by GE at U of WY
50/50 partnership for High
Plains Gasification center

**GE has been a true American company
since 1892 – and always will be**

Wyoming wind ... a great, yet *challenging* resource

Wyoming wind a perfect fit for GE technology ...

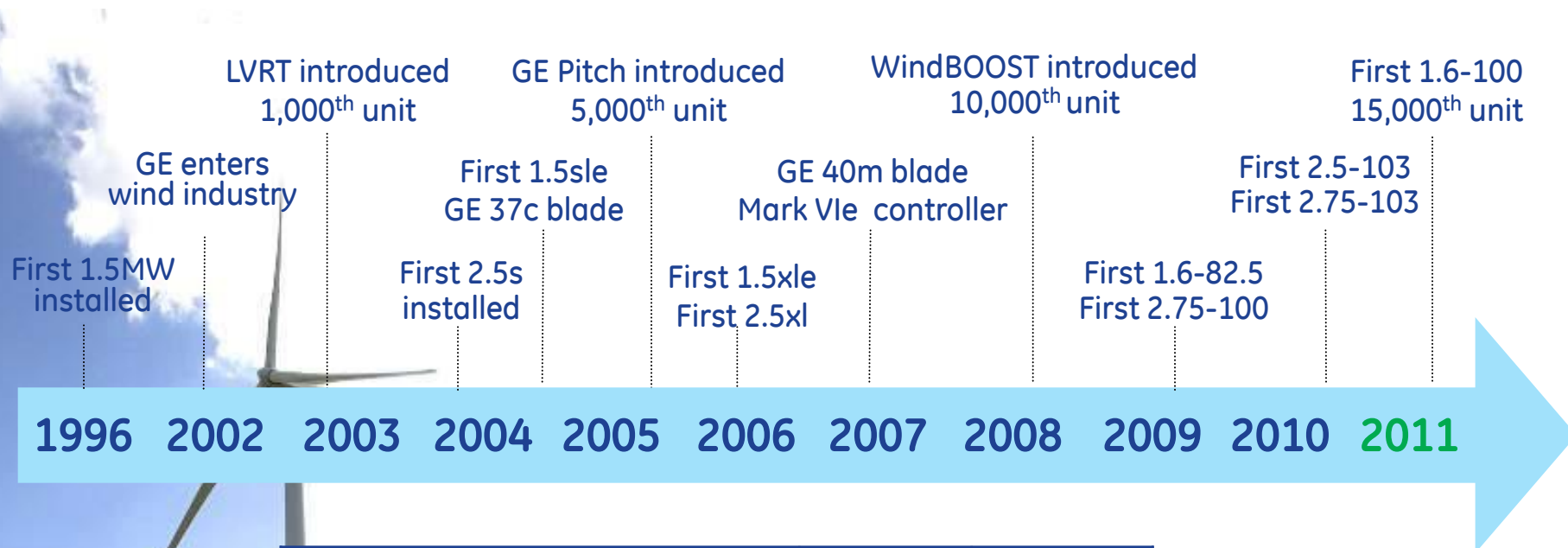
- Temperature ... GE Cold Weather capabilities
- High elevation ... GE Wind turbines are optimized to maximize output
- High wind speeds ... GE's focus on availability ensures maximum output
- High turbulence ... GE product portfolio ensures the right match for all wind regimes
- Grid requirements ... GE's power generation heritage ensures grid compatibility

GE technology is a perfect fit for Wyoming's unique conditions



GE imagination at work

Evolution of GE Onshore Wind Products



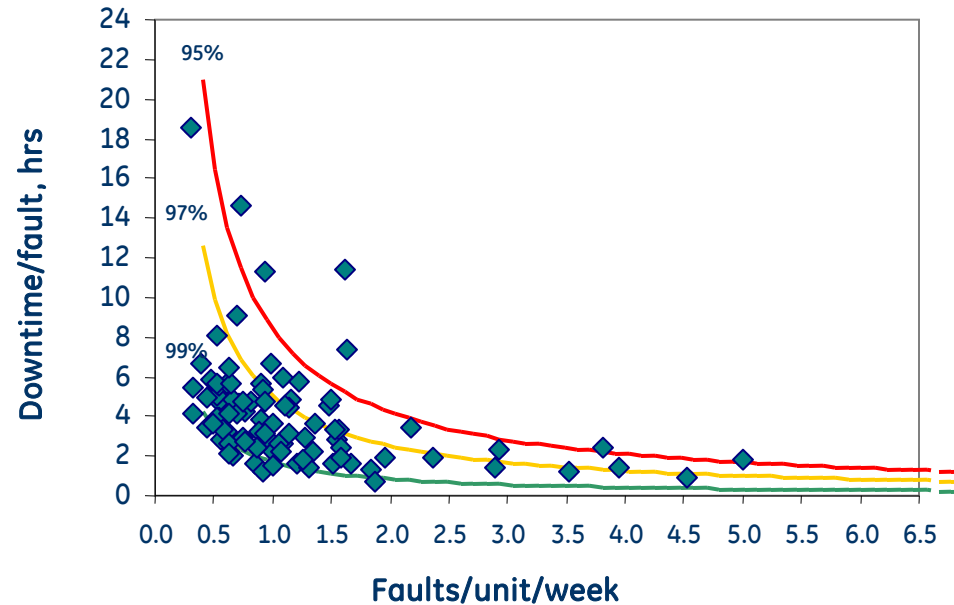
GE Onshore Wind Products*	'02	'10	
AEP (GWh/yr)	6.0	11.6	+94%
Capacity Factor (%)	45	52	+16%
Availability (%)	85	98	+15%

(* @8.5m/s AMWS)

GE Onshore Wind Products ... *Proven Performance and Reliability*

“World’s best running fleet” ... quantified

- Definition of availability is same as customer’s definition
- Designed for quality... component testing
- GE’s 14,200+ fleet (as of Oct 2010)... insight for improvements
- Operational rigor ... weekly fleet review
- Faster Return to Service ... diagnostics, parts fulfillment, technical resources committed to product service

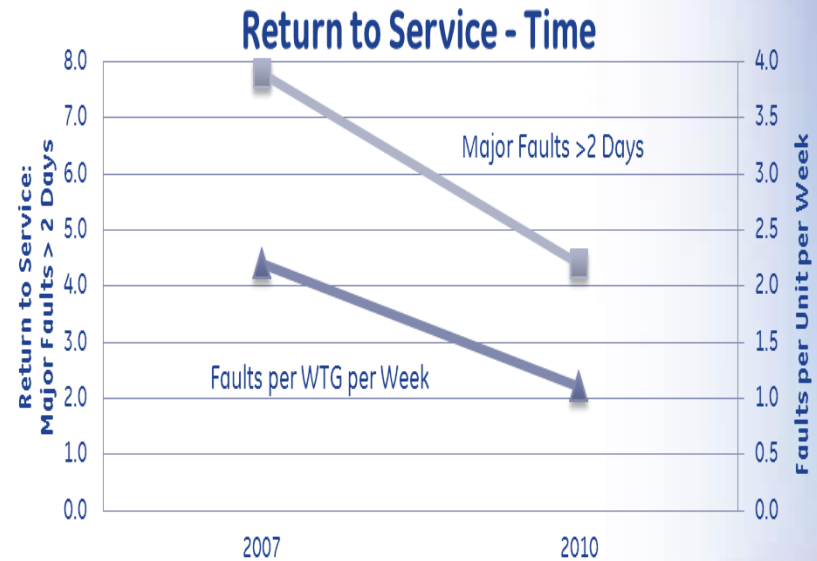
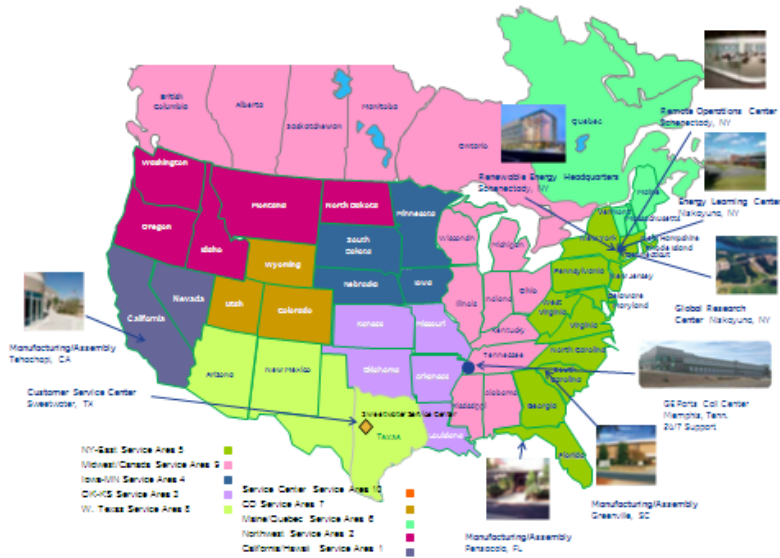


GE Wind Turbine
Model Year

	'06	'07	'08	'09	'10 YTD
2006	95.8%	97.0%	96.9%	97.3%	97.5%
2007		96.2%	97.2%	97.6%	97.0%
2008			96.4%	97.8%	97.8%
2009				96.2%	97.8%
2010					97.9%



GE's North American presence ... second to none



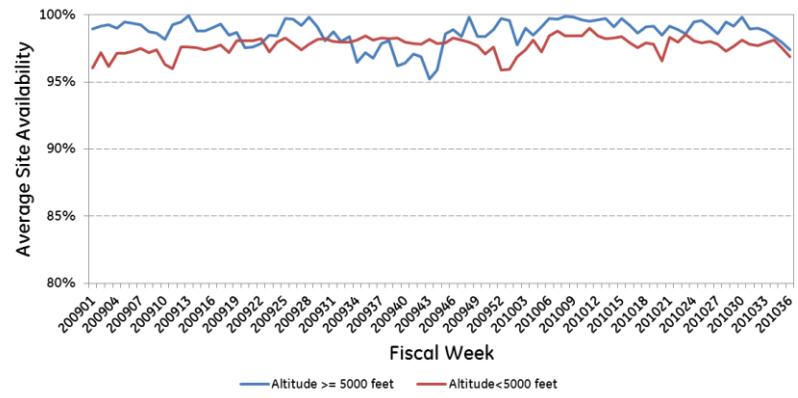
- 24/7 coverage of fleet ... Renewables Operation Centers in New York and Germany
- Improved diagnostics ... GE Mark VIe & CBM
- 300+ technical resources added since 2006
- Parts center in Memphis, TN ... the right part where and when it is needed

- GE's North American capabilities mean greater performance and customer value
- Consistent reduction in fault rate ... 50% reduction since 2007
- Coupled with reduction in down time per fault ... 40%+ reduction in major faults since 2007

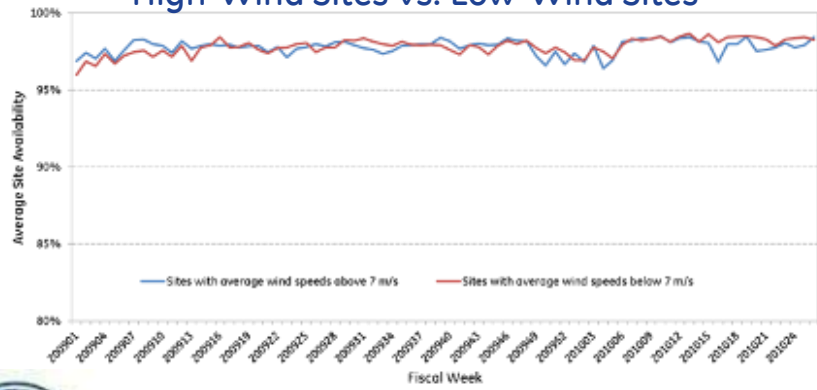
GE's fleet performs in every environment

- GE units perform in the coldest climates, the highest winds, and altitudes ... a perfect fit for Wyoming's unique conditions
- Includes entire Americas fleet in warranty ... >5,000 units from January 2009 to present

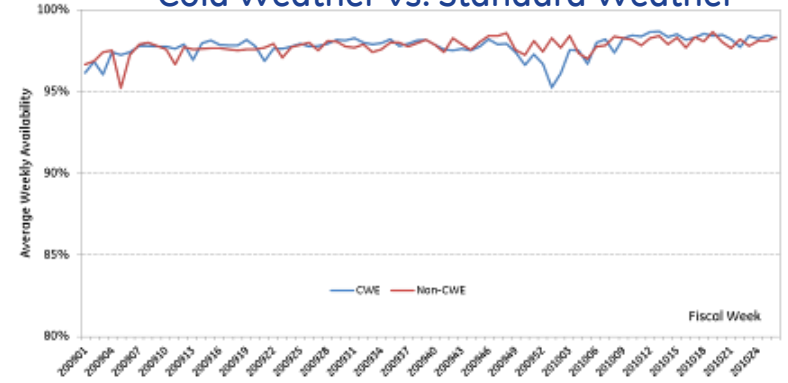
Average Weekly Availability:
High Altitude vs. Low Altitude



High-Wind Sites vs. Low-Wind Sites

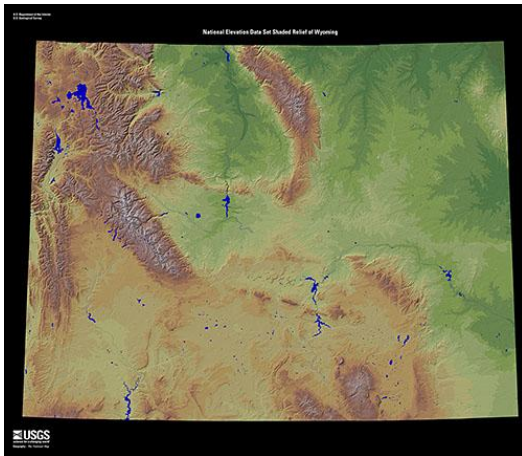


Cold Weather vs. Standard Weather

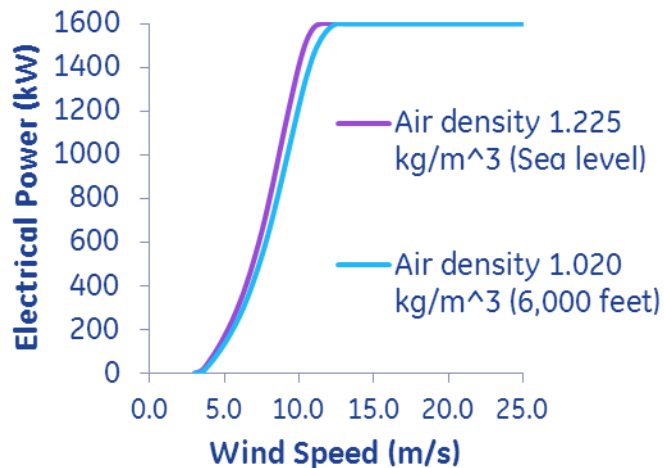


GE imagination at work

Performance issues at high elevation



Issue: high elevation presents challenges in performance



Solution: GE WTGs are optimized to maximize output



Air density decreases at higher elevation

- All turbines lose AEP... GE WTGs designed to maximize output
 - Example: 1.6-82.5... 92% of sea level AEP at 83% standard air density (~6,000 feet).
 - GE publishes air-density adjusted power curves (PC)... no derating in PC at low air density
- Risk of reduced cooling capacity... generally not an issue for GE WTGs
 - Normal operations at or below: 104 °F at 3,281 feet; 86 °F at 6,562 feet; 66 °F at 9,843 feet (all above sea level).
 - In rare cases, GE WTG will control output to protect components from overheating.

GE 1.5 MW series wind turbines



		TC III	TC II	TC I
		1.6-100	1.6-82.5	1.5-77
Rotor Diameter	m	100	82.5	77
Hub Heights	m	80/100	80	65/80
Frequency	Hz	50/60	50/60	50/60
	Vavg; m/s	7.5	8.5	10.0
	Vref; m/s	37.5	40.0	45.0
	Cut-In; m/s	3.5	3.5	3.5
	Cut-Out; m/s	25	25	25
	IEC Wind Class	IEC TC IIIs	IEC TC IIb	IEC TC IIa, Ib
Wind Conditions (CWE)	Vavg; m/s	7.5	8.5	10.0
(T operation > -30°C T survival > -40°C)	Tl; % @ 15m/s	16	16	16

GE 1.5MW series wind turbines ... *The Industry Workhorse*

GE 2.5 MW Series Wind Turbines

		TC III		TC II	
		2.5-103	2.75-103	2.5-100	2.75-100
Rotor Diameter	m	103	103	100	100
Hub Heights	m	75*/85/ 100	85/98	75*/85/98/100	75*/85/98/100
Frequency	Hz	50/60	50/60	50/60	50/60
Wind Conditions (IECs, Standard Climate)	Vavg; m/s	7.5	7.5	8.5	8.5
	Vref; m/s	37.5	37.5	42.5	42.5
	Cut-In; m/s	3.0	3.0	3.0	3.0
	Cut-Out; m/s	25	25	25	25
	IEC Wind Class	IIIa	IIIa	IIb	IIb
Wind Conditions (CWE) (T operation > -30°C T survival > -40°C)	Vavg; m/s	7.5	7.5	8.5	8.5
	TI; % @ 15m/s	18	18	16	16

*50 Hz only

GE 2.5MW series wind turbines ... *The Industry's most experienced 100m+ rotor wind turbine*

GE 1.6-100 ... TCII performance with TCIII Fuel

**Built on proven technology & performance ...
combines strengths of GE 1.x and 2.x WTGs**

- Capacity Factor of 52% @ 7.5 m/s ...
TCII CF in TCIII wind regime
- Greater energy capture ... 47%+
more swept area over 1.6-82.5
- Product evolution strategy ensures proven
performance and reliability ... integrates
technology from GE's proven 1.x and 2.x
product platforms



**Evolutionary design drives greater customer value
while maintaining reliability**



GE imagination at work

GE 2.75-103 ... increasing customer value through product evolution



Increase customer value

- 6% more swept area for greater AEP
- Building on uprate experience of 1.5MW platform
- AEP increase of 9%+ over the 2.5-100

Minimize sound emissions

- Sound Power Management to meet strict sound requirements

Maintain bedrock of reliability

- Proven technology ... 103m rotor operating since January 2010
- Evolutionary product ... built to maintain GE's proven performance and reliability

Total Value Proposition

Optimized Wind Plant Performance

- Grid-friendly features reduces BOP / O&M costs
- Maximizes energy capture through advanced turbine layout



Flexible Wind Service Solutions

- Ensures that your wind turbine assets are operating at peak performance



On-time Project Execution

- Offers customers schedule certainty and avoids costly delays



High EHS Standards

- Maintains a safe and healthy work environment

GE's Combined Strength

- Results a more reliable product with proven, bankable technology



GE Power & Water

Questions?

