Additional Information on Wind Model

Idaho Power Wind Workshop

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Owyhee Plaza Hotel
Boise, ID

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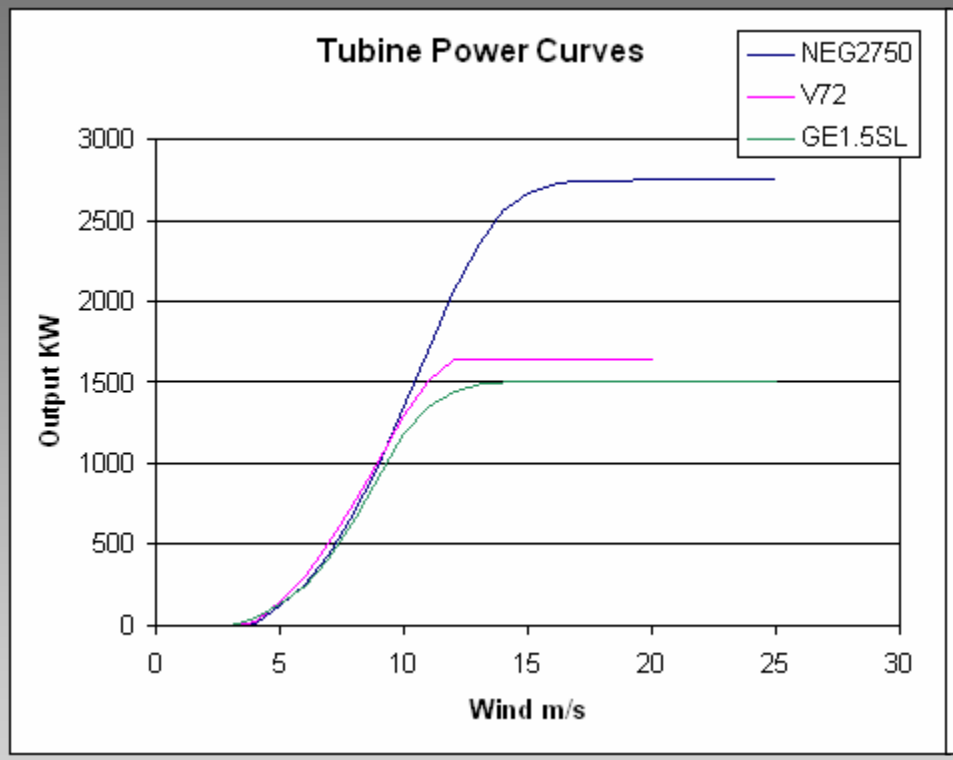
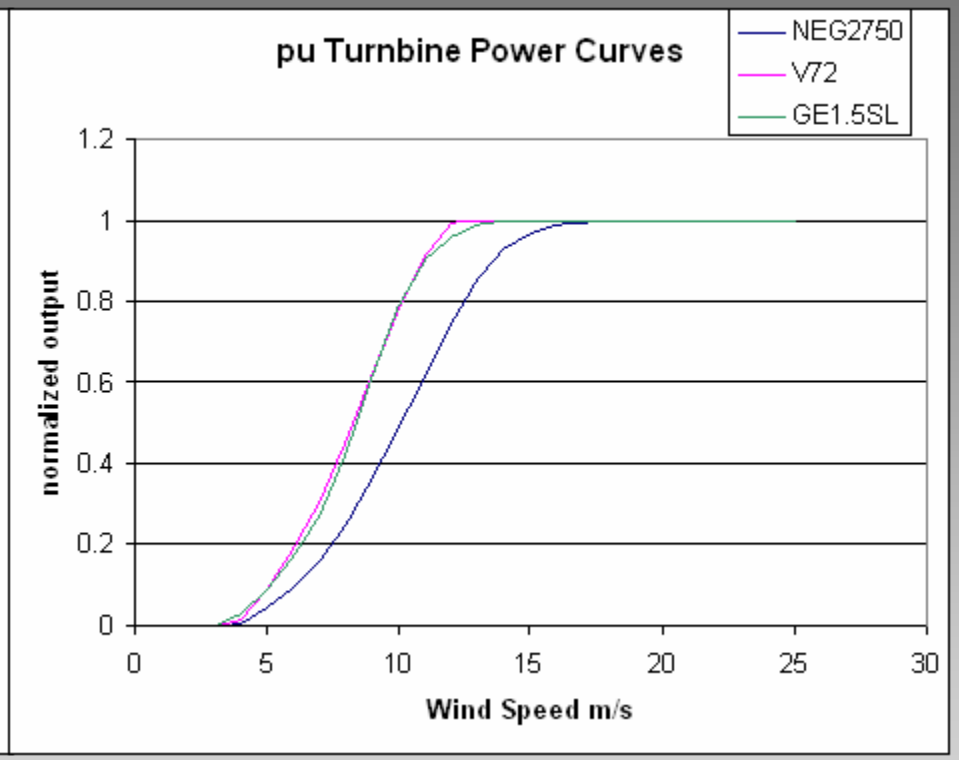
Power Curve Comparison





- V82 curve used for model (V72 label shown in chart legend is incorrect)
- Compares well with GE 1.5 SL low wind speed performance

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Capacity Factor Comparison

Year	V82	Nameplate (MW)	Total Wind Annual Wind Energy (GWh)	Capacity Factor
1998	Case 1	300	673	25.6%
	Case 2	600	1549	29.5%
	Case 3	900	2265	28.7%
	Case 4	1200	3007	28.6%
2000	Case 1	300	702	26.7%
	Case 2	600	1585	30.2%
	Case 3	900	2286	29.0%
	Case 4	1200	3013	28.7%
2005	Case 1	300	617	23.5%
	Case 2	600	1450	27.6%
	Case 3	900	2140	27.1%
	Case 4	1200	2835	27.0%

Year	GE 1.5 SL	Nameplate (MW)	Total Wind Annual Wind Energy (GWh)	Capacity Factor
1998	Case 1	300	656	25.0%
	Case 2	600	1514	28.8%
	Case 3	900	2211	28.0%
	Case 4	1200	2935	27.9%
2000	Case 1	300	686	26.0%
	Case 2	600	1550	29.4%
	Case 3	900	2232	28.2%
	Case 4	1200	2941	27.9%
2005	Case 1	300	601	22.9%
	Case 2	600	1414	26.9%
	Case 3	900	2085	26.4%
	Case 4	1200	2764	26.3%

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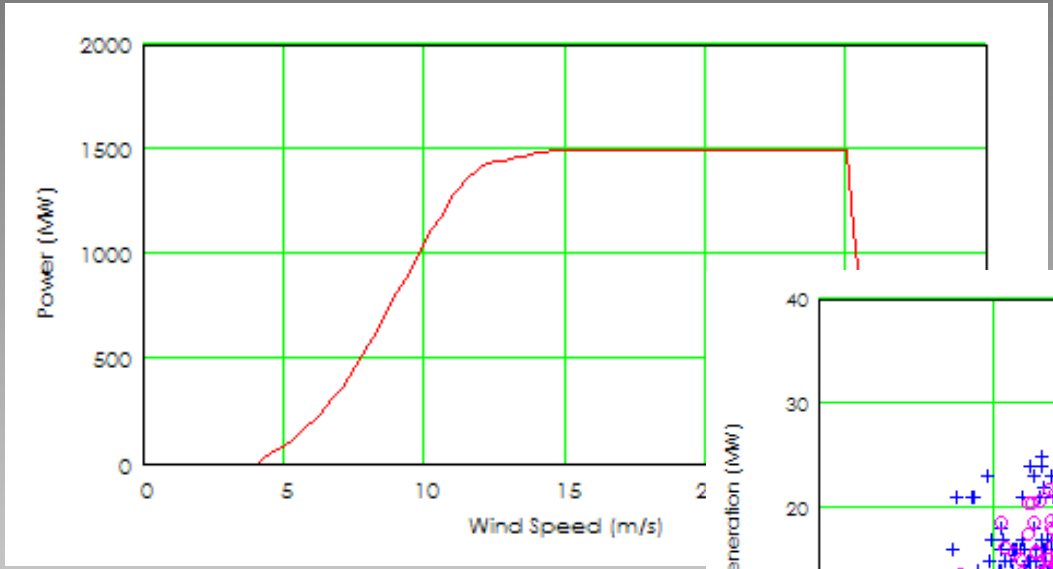
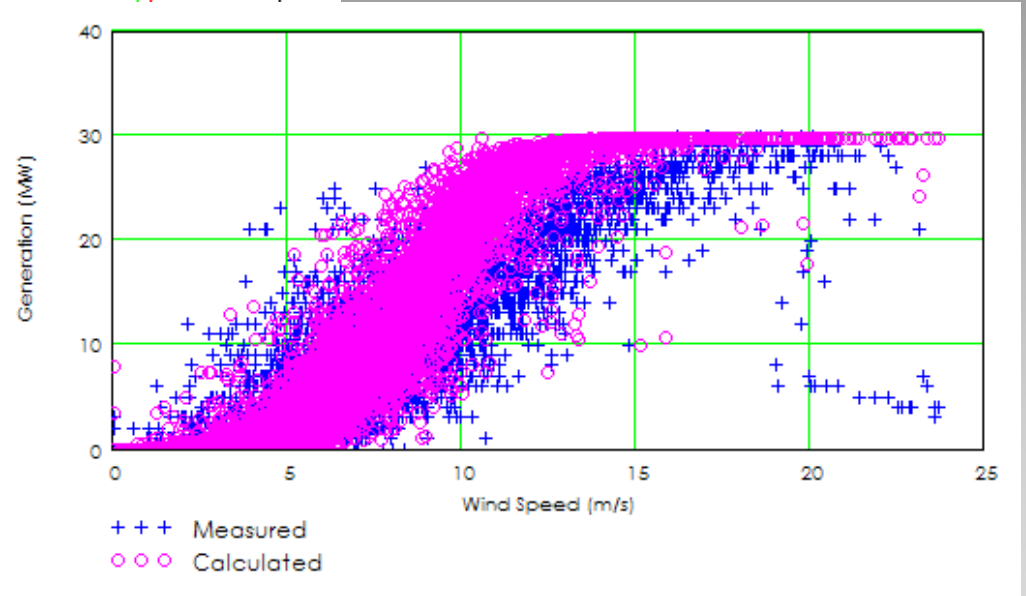
What about low capacity factors?





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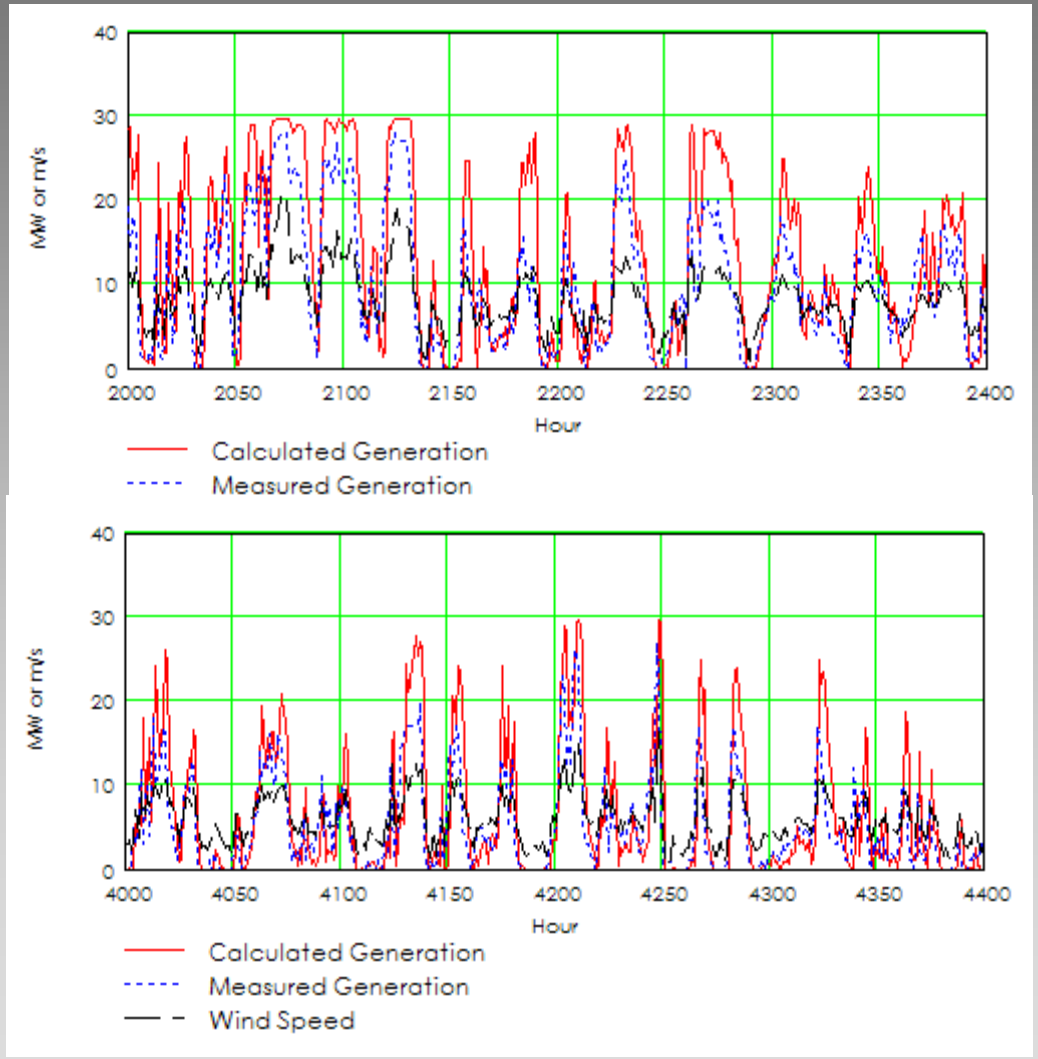
Wind Speed to Wind Generation

- Single turbine power curve does not provide good match to measured hourly data
- Overestimates production, especially at higher wind speeds



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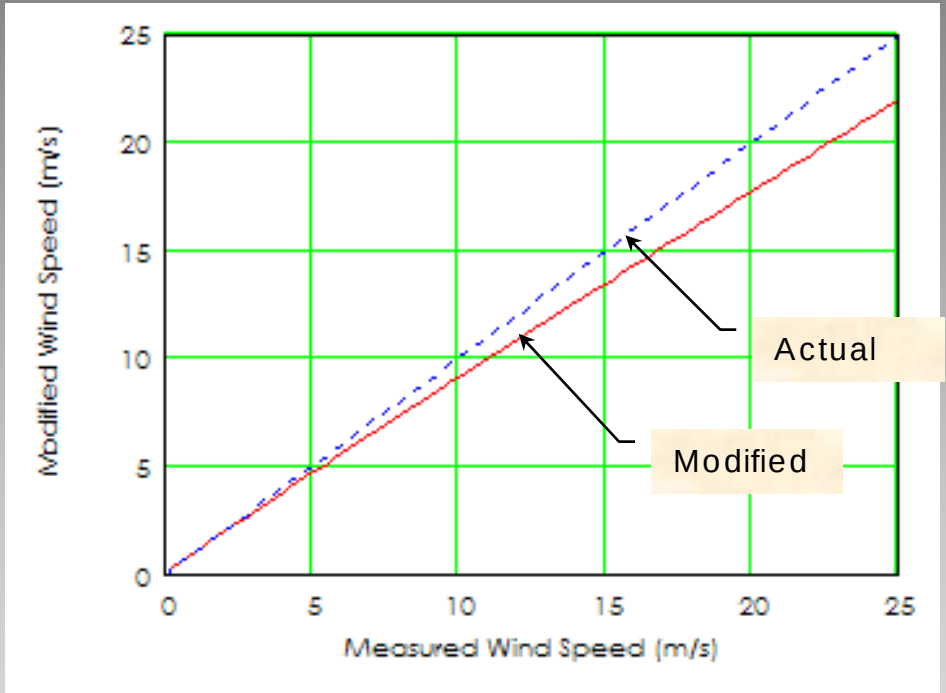
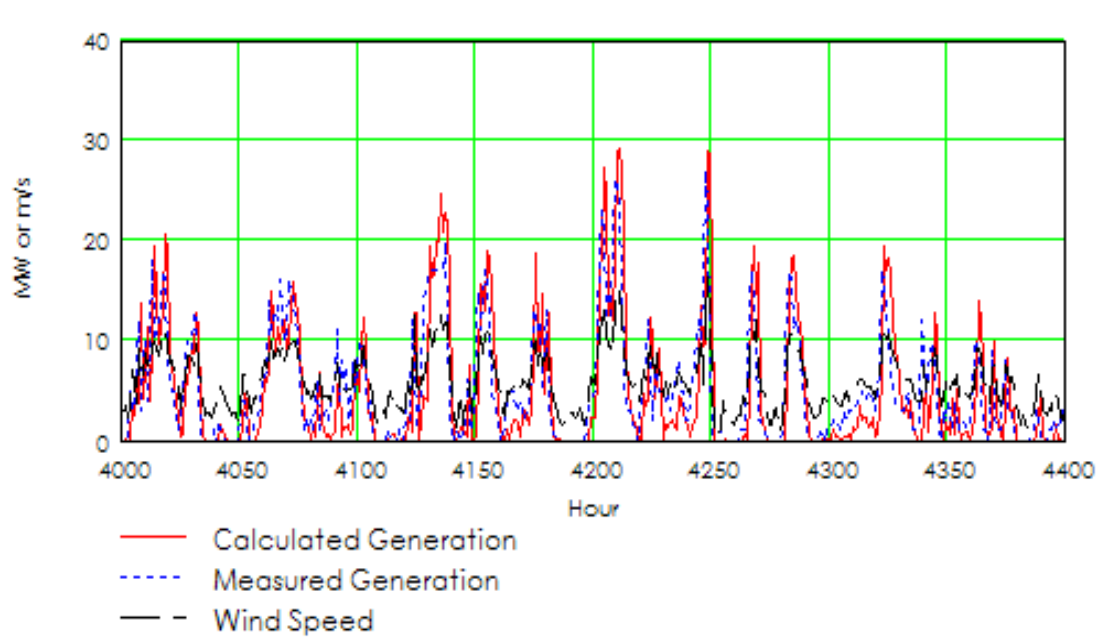
Accounting for Array Losses

- Algorithmic “trick” provides for better match at hourly level
- Wind speed is “discounted” slightly to account for array effects at high production levels



Hourly Production Comparison

- Much better correspondence to measured data, especially at higher wind speeds
- Hourly variability is captured well



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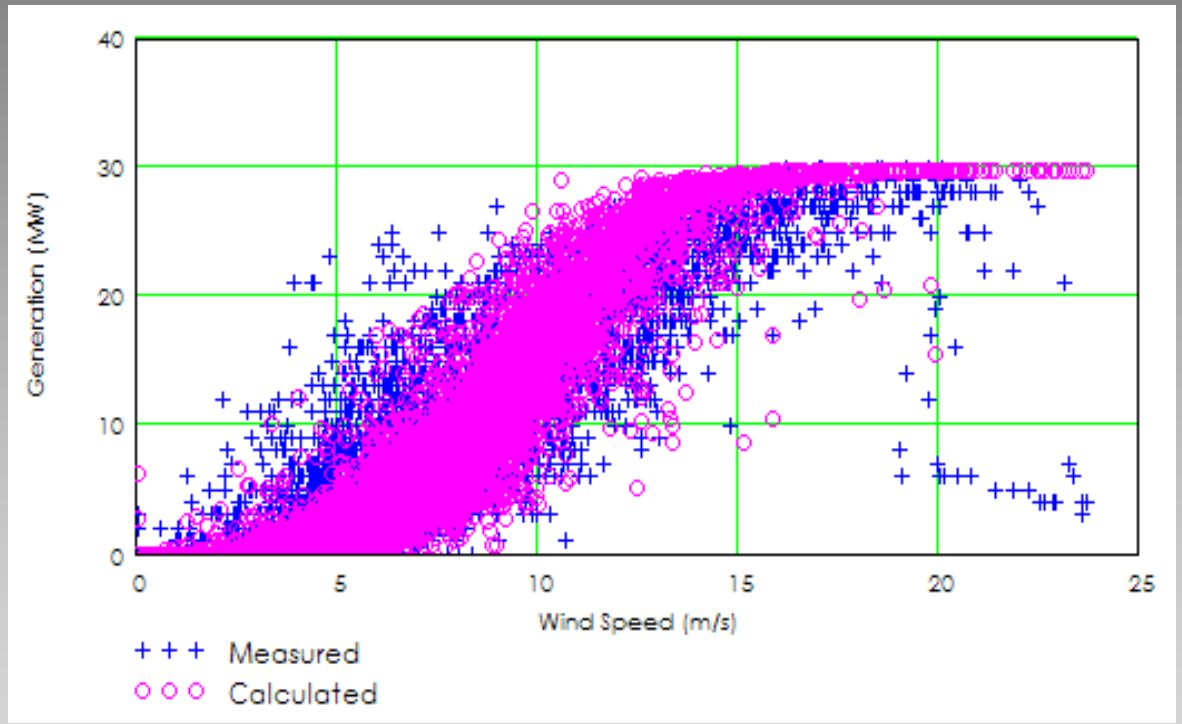
Calculated vs. Actual

- Calculated "Plant" power curve better match with empirical
- Calculated energy is lower at lower wind speeds



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