

SONI Wind Farm MW Availability and High Wind speed Shutdown

Chris McCorry

Near Time Engineer

NI System

- Working towards a Renewable target 40% energy by 2020
- 27 Wind Farms connected
- Total Installed Wind Generation capacity 450 MW
- Maximum Demand 1766 MW
- Equates to **25%** of peak system demand
- Minimum Demand 534 MW
- Equates to **85%** of Summer Night Valley
- 17 Controllable Wind Farms (358 MW)

REMOTE

(NOT YET COMMISSIONED)

Control / Indication

MW Output	0.82
MVAr Output	-0.10
Voltage (kV)	116.5
Wind Speed (m/s)	2.8
Wind Direction (deg)	68.0
MW Availability	1.21
% High Wind Speed Shutdown	0.00
Ambient Temperature	13.55
Wind Farm Active Set Point	27.54

CB



PF Control

Ramp Allowed

Curtail Ctrl OFF

Emgcy Action OFF

Setpoints

kV	109.99	Control
PF	-17.99	Control
Reserve Provision		
% Curtailment (50-100%)	50.10	Control
Emergency Action		
MW Setpoint	27.67	Control
Time to reach MW Setpoint (mins)	2.01	Control

WIND FARMS

WIND LOCATION

Why is MW Availability important to SONI?

- Operationally important real time information
- A controllable wind farm above 10 MW must be registered in the SEM as a VPTG.
- A VPTG will be compensated based on its MW Availability signal during periods of curtailment, by **SONI**. Therefore it is critical that MW Availability signal is **accurate**.

MW Availability Definition

*“The amount of **Active Power** that the **Controllable WFPS** could produce based on current wind conditions, network conditions and **System** conditions. The **MW Availability** shall only differ from the **MW Output** if the **Controllable WFPS** has been curtailed, constrained or is operating in a **Curtailed Frequency Response** mode, as instructed by SONI via the SCADA interface.”*

MW Availability Issues

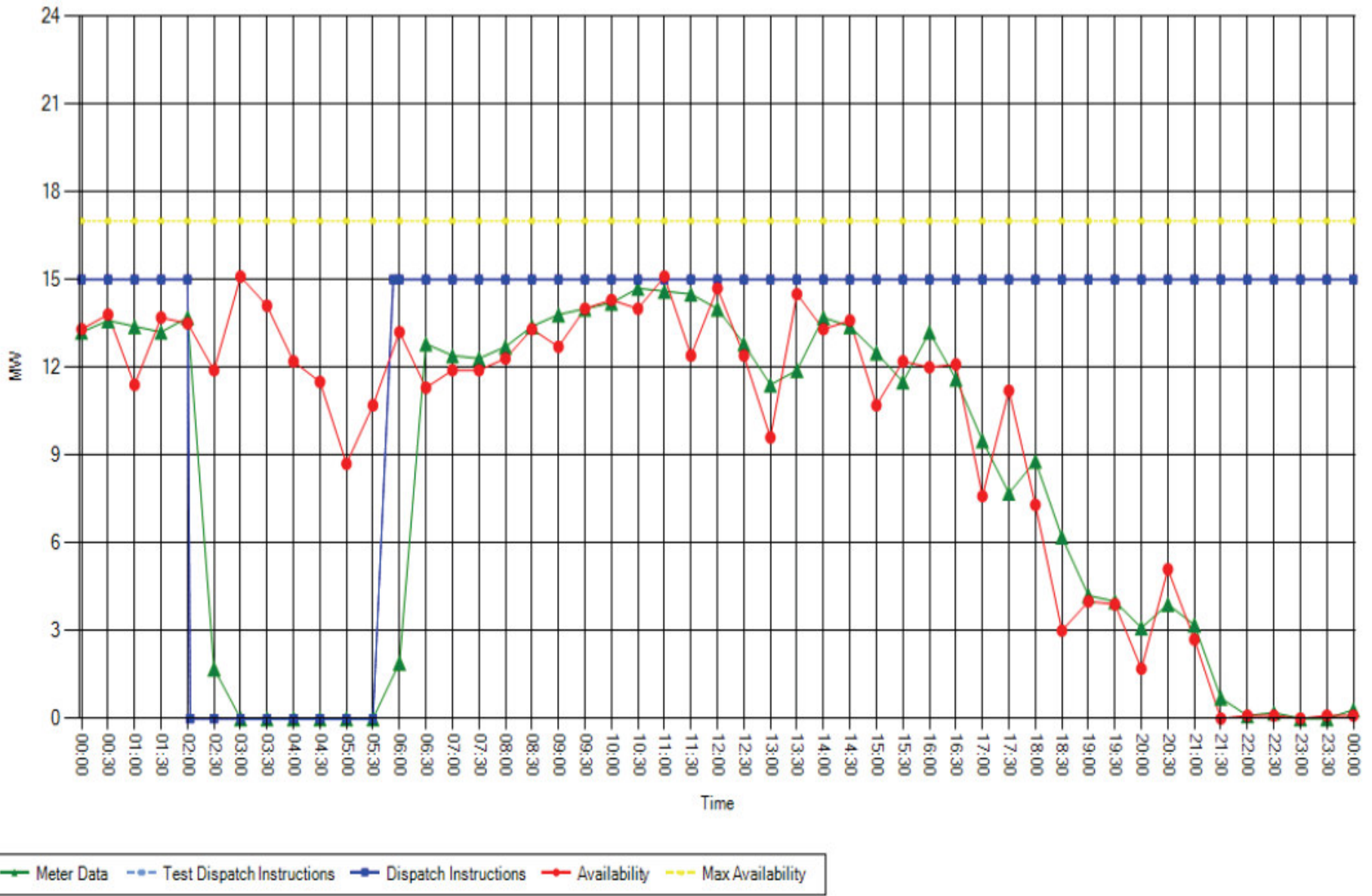
- The **MW Availability** signal should accurately reflect the wind resource level available.
- If **Generating Units** shut down due to high wind speeds, they are not available and the “**MW Availability**” should be reduced accordingly;
- If **Generating Units** are out of service for maintenance, repair, placed in a ‘Pause’ mode etc. they are not available and the “**MW Availability**” should be reduced accordingly;
- If **Generating Units** have entered into any form of error mode e.g. ‘Safety Chain Activation’ etc. they are not available and the “**MW Availability**” should be reduced accordingly;
- If the **Generating Units** are responding to a setpoint other than that received by SONI SCADA e.g. a temperature dependent dynamic line rating (TDLR) setpoint or SPS setpoint, the “**MW Availability**” should be reduced accordingly to reflect the **MW Output** level the **WFPS** is controlling to;
- Only actions by **SONI** to reduce the **WFPS MW Output** (as described in the **MW Availability** definition above) should result in a difference between actual **MW Output** and the **MW Availability** signals.

Continuous Monitoring

Standard

A normalised root mean square deviation (NRMSE) for a WFPS for a given day will be calculated. This will use one minute MW Availability data averaged over the half hour period recorded in Castlereagh House Control Centre CHCC and the 30 minute metered Output for the Generator under analysis.

Daily Market Check Graph - 01/08/2012



Other Instructions
 CURL 02:03, CRLO 05:53,

Assessment Criteria

- The rolling 14-day NRMDS must be less than or equal to 8%, excluding periods where the **WFPS was Dispatched away from its MW Availability by SONI.**
- The daily NRMDS values are to be calculated. The number of days where the daily NRMDS exceeds the 5% standard must not exceed 2 days in any 14-day period, except for periods where the **WFPS was Dispatched away from its MW Availability by SONI.**

Monthly Monitoring

15		Number of Failures		0	0
		≤ 5%	≤ 2 Days	≤ 8%	
Date_time	(Availability-Metered Output)^2	Daily NRMSD %	14 Day Rolling Count	14 Day Rolling NRMSD %	
01/08/2012 00:00	0.0000	2.80%	1	2.35%	
02/08/2012 00:00	0.0219	6.82%	2	2.95%	
03/08/2012 00:00	0.1171	2.48%	2	2.99%	
04/08/2012 00:00	0.0090	1.76%	2	3.01%	
05/08/2012 00:00	0.1103	2.87%	2	3.06%	
06/08/2012 00:00	0.0008	1.82%	2	3.07%	
07/08/2012 00:00	0.0000	0.65%	2	2.56%	
08/08/2012 00:00	0.0788	1.40%	1	2.57%	
09/08/2012 00:00	0.0000	1.97%	1	2.57%	
10/08/2012 00:00	0.0000	0.13%	1	2.53%	
11/08/2012 00:00	0.3059	1.03%	1	2.51%	
12/08/2012 00:00	0.0071	2.12%	1	2.54%	
13/08/2012 00:00	0.0977	2.31%	1	2.58%	
14/08/2012 00:00	0.4719	2.34%	1	2.64%	
15/08/2012 00:00	0.3291	2.88%	1	2.65%	
16/08/2012 00:00	0.0843	6.35%	2	2.56%	
17/08/2012 00:00	0.0161	2.36%	1	2.55%	
18/08/2012 00:00	0.0855	1.70%	1	2.55%	
19/08/2012 00:00	0.1900	2.76%	1	2.54%	
20/08/2012 00:00	0.3183	2.57%	1	2.59%	
21/08/2012 00:00	0.1609	1.90%	1	2.63%	
22/08/2012 00:00	0.0218	2.10%	1	2.67%	
23/08/2012 00:00	0.0274	2.01%	1	2.67%	
24/08/2012 00:00	0.0925	1.56%	1	2.70%	
25/08/2012 00:00	0.1377	1.91%	1	2.73%	
26/08/2012 00:00	0.0066	2.76%	1	2.77%	
27/08/2012 00:00	0.0013	1.76%	1	2.75%	
28/08/2012 00:00	0.2025	1.56%	1	2.71%	

High Windspeed Shutdown Events

EMS Historical Data



Alarm History	
TIME	TEXT
03-01-2012 00:11:00 s	DUN 033_PC WIND FARM A TURBINE SHUTDOWN HIGH WIND SPEED OPERATED
03-01-2012 00:11:06 s	DUN 033_PC WIND FARM A TURBINE SHUTDOWN HIGH WIND SPEED RESET
03-01-2012 00:26:02 s	DUN 033_PC WIND FARM B TURBINE SHUTDOWN HIGH WIND SPEED OPERATED
03-01-2012 00:26:20 s	DUN 033_PC WIND FARM B TURBINE SHUTDOWN HIGH WIND SPEED RESET
03-01-2012 00:27:16 s	DUN 033_PC WIND FARM C TURBINE SHUTDOWN HIGH WIND SPEED OPERATED
03-01-2012 00:27:26 s	DUN 033_PC WIND FARM C TURBINE SHUTDOWN HIGH WIND SPEED RESET
03-01-2012 00:38:16 s	DUN 033_PC WIND FARM D TURBINE SHUTDOWN HIGH WIND SPEED OPERATED
03-01-2012 00:38:19 s	DUN 033_PC WIND FARM D TURBINE SHUTDOWN HIGH WIND SPEED RESET

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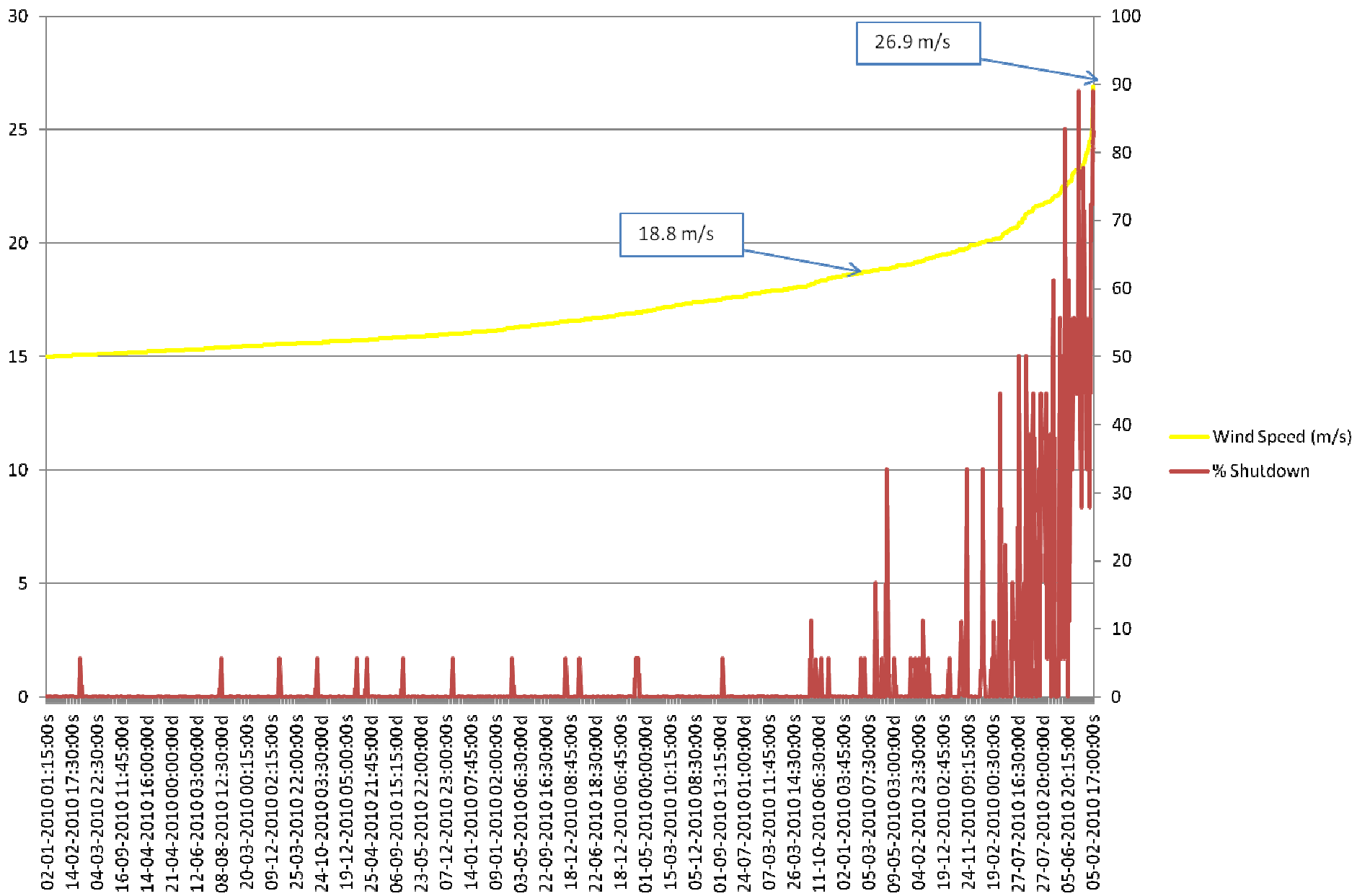
Emergency Action

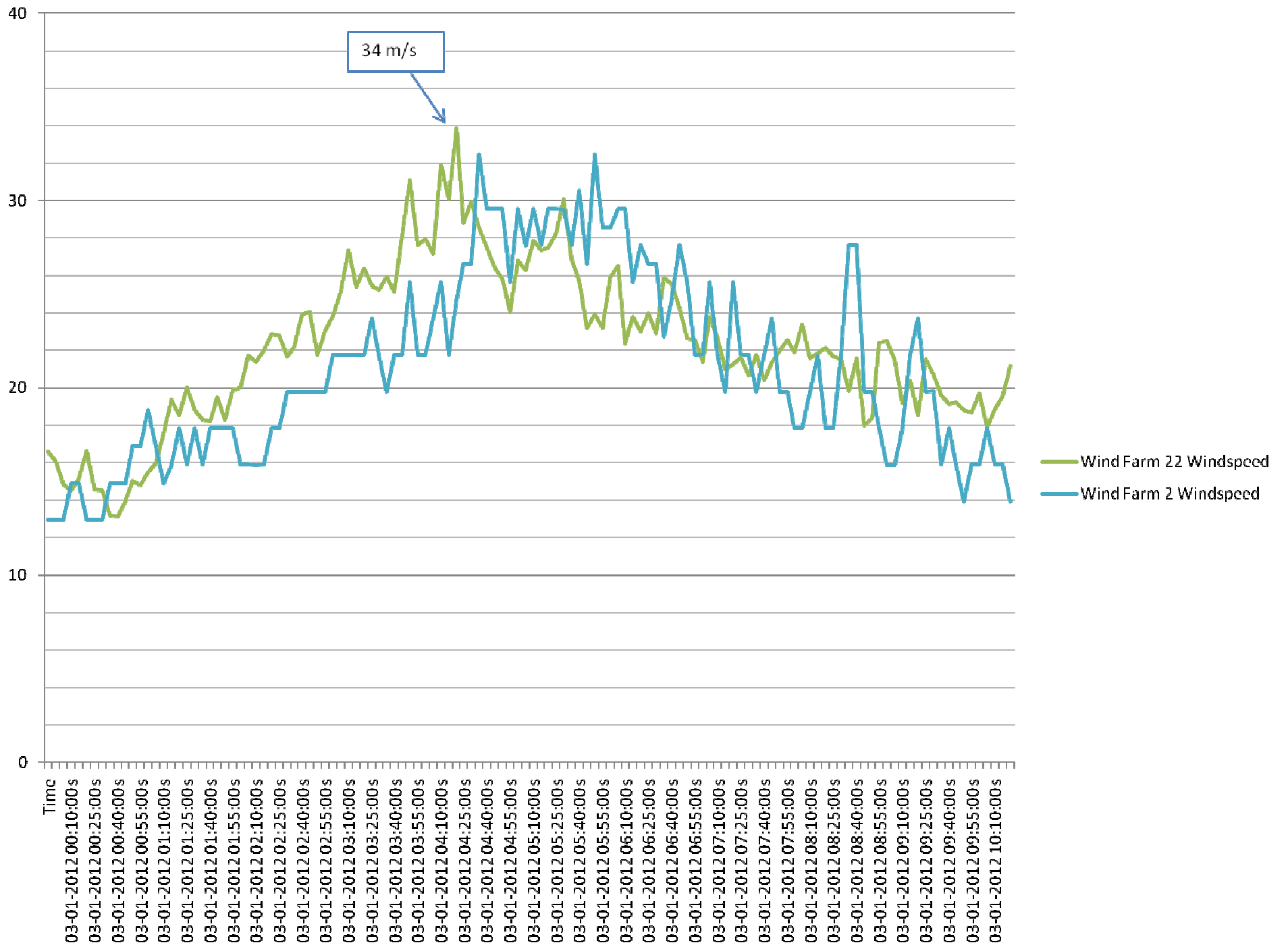
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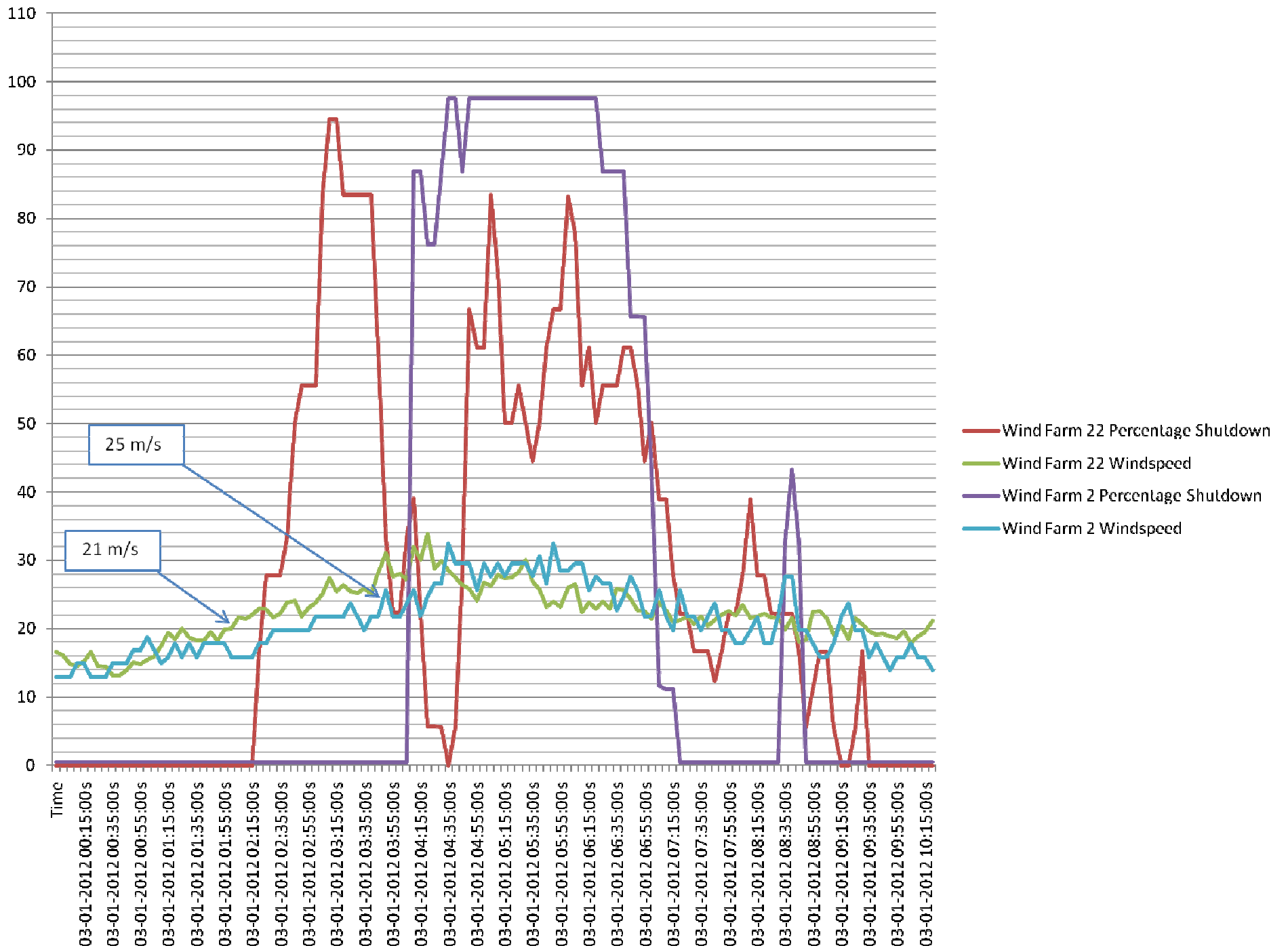
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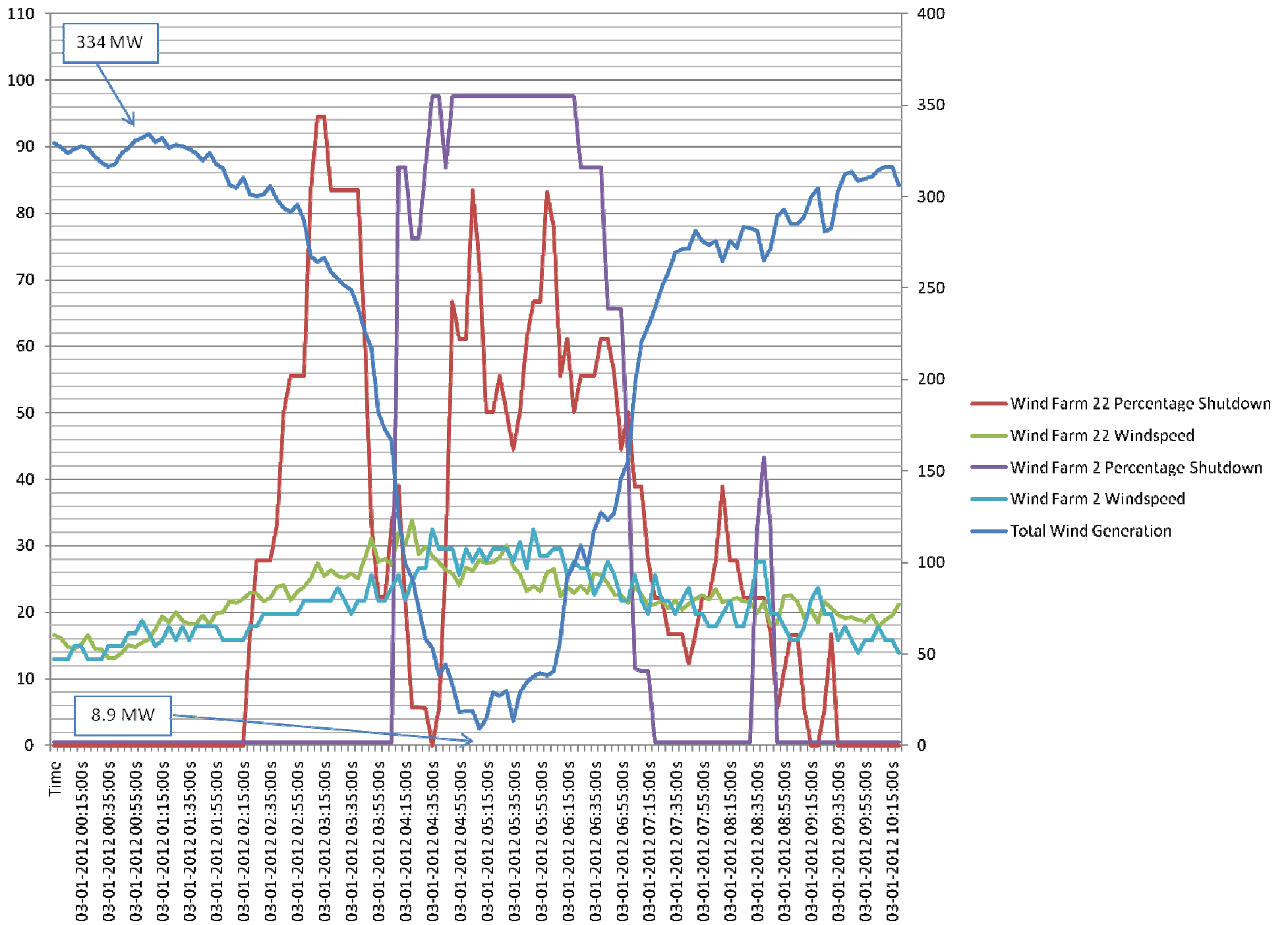
WIND FARMS

WIND LOCATION









Please send enquiries for further
information etc to:

zGRP-SONI-Neartime-Operations@soni.ltd.uk