

NYISO WIND INTEGRATION ACTIVITIES

IPSAC07

December 11, 2008

John Adams, NYISO

Overview

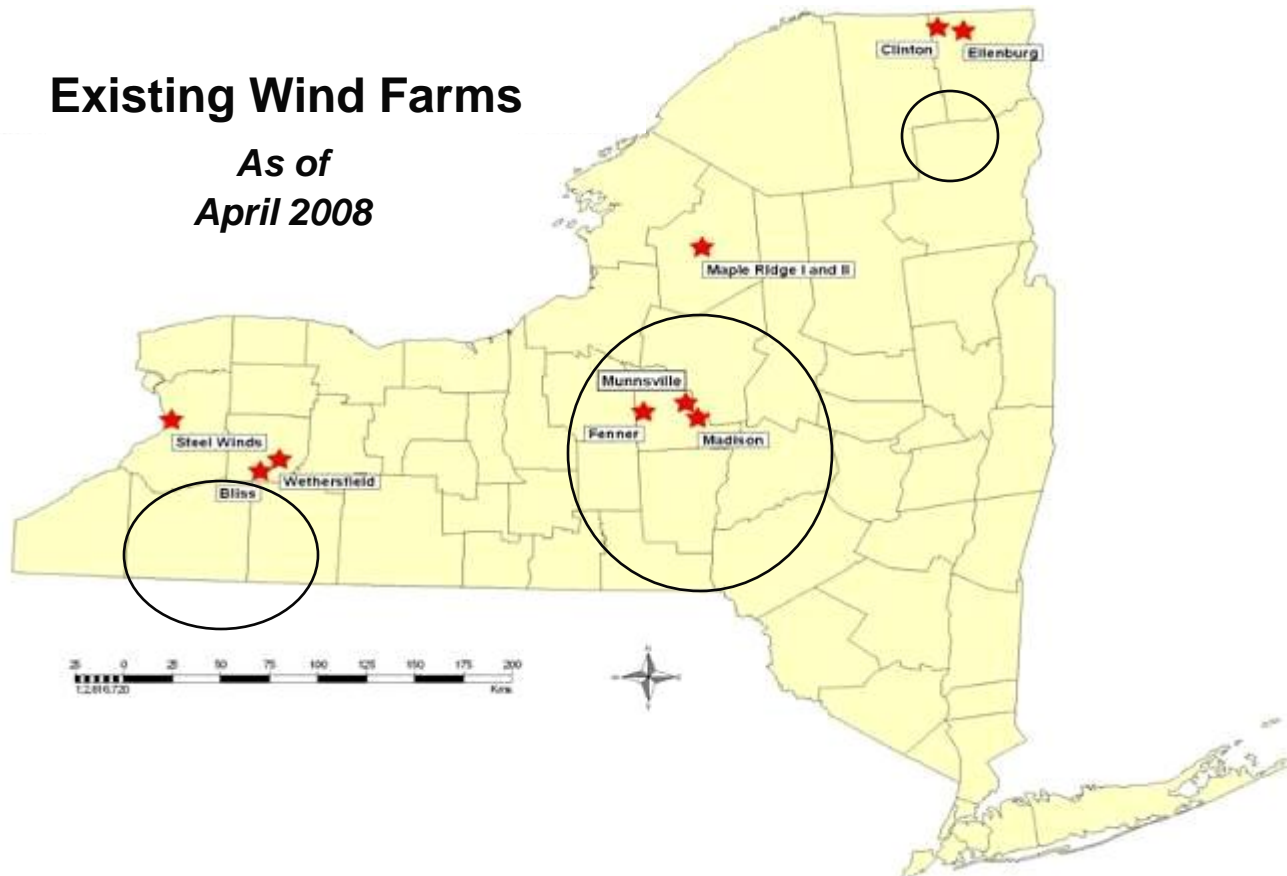
- New York has approximately 700 MW of wind plants in operation.
- Approximately 8,000 MW in interconnection queue, including 1,200 MW of off-shore wind.
- Additional 500 MW expected in service by the summer of 2009.
- In 2004, the NYISO studied the impact of the 3,300 MW of potential wind generation. The potential is now much greater.
- NYISO actions to address wind potential include:
 - ◆ Implementing a performance tracking system for existing wind plants.
 - ◆ Initiating a centralized forecasting process for wind plant output.
 - ◆ Developing, in conjunction with stakeholders, a wind energy management proposal.
 - ◆ Updating the original study for wind generation potential by studying installed wind plants ranging from 3,500 to 8,000 MW.
 - ◆ Participating in Regional and National wind study initiatives.

Wind Plant Performance Report

- Tracks the performance of wind plants by months on a daily basis for key metrics such as maximum coincident wind plant output, total output at the time of the system peak, MWh generated, capacity factor, etc.

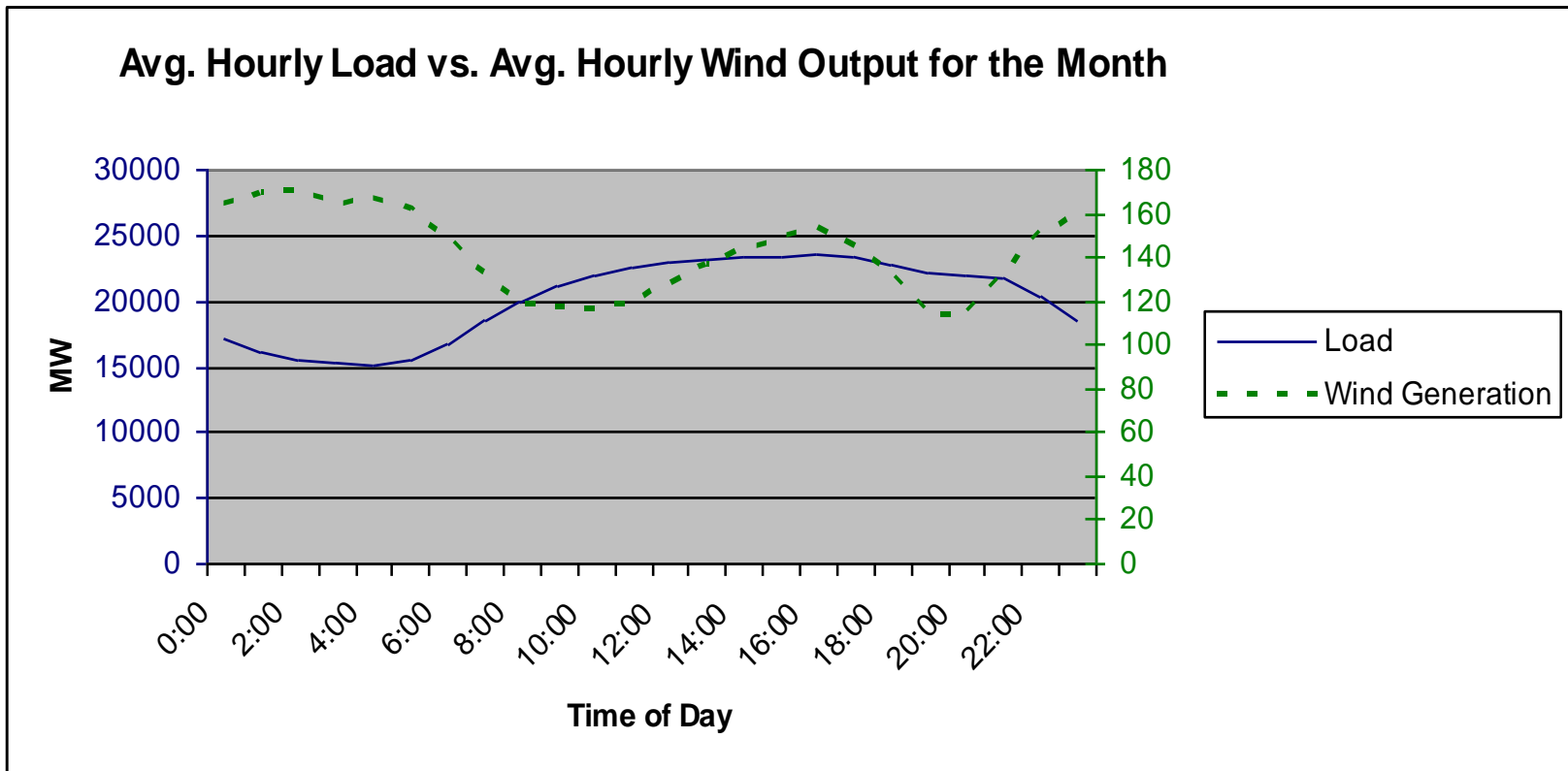
Existing Wind Farms

As of
April 2008



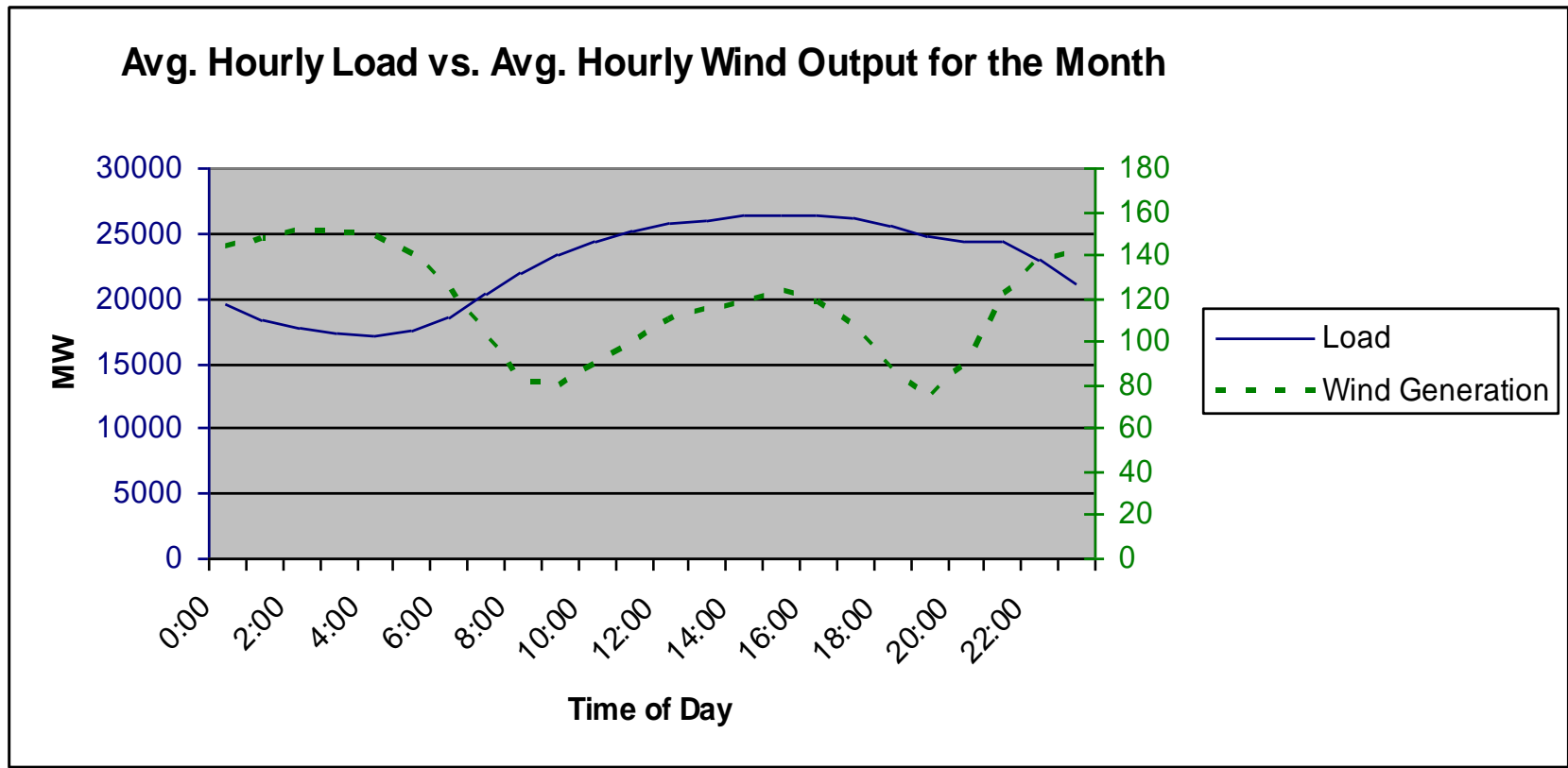
Performance Report (cont.)

Average Day - June



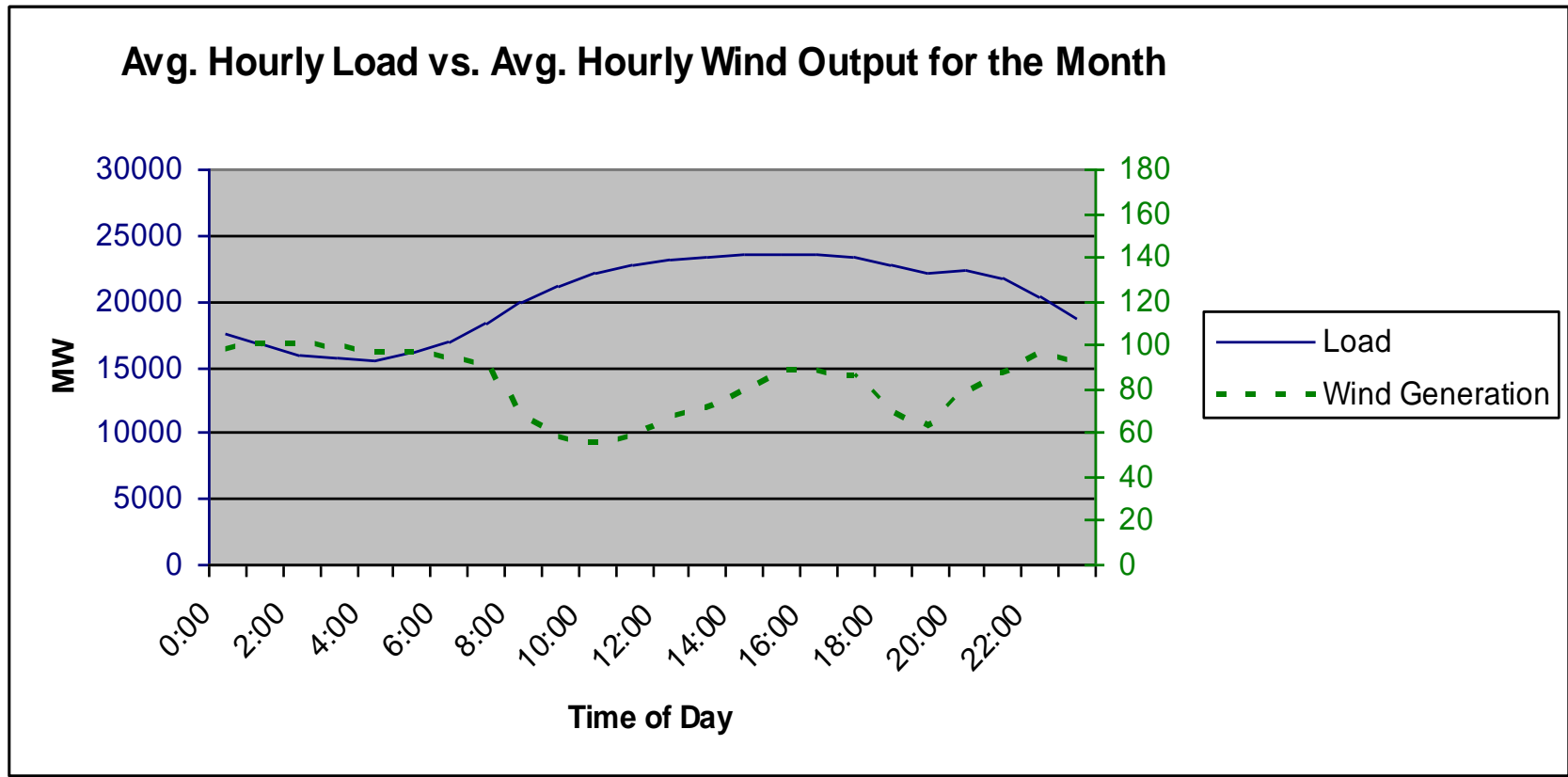
Performance Report (cont.)

Average Day - July



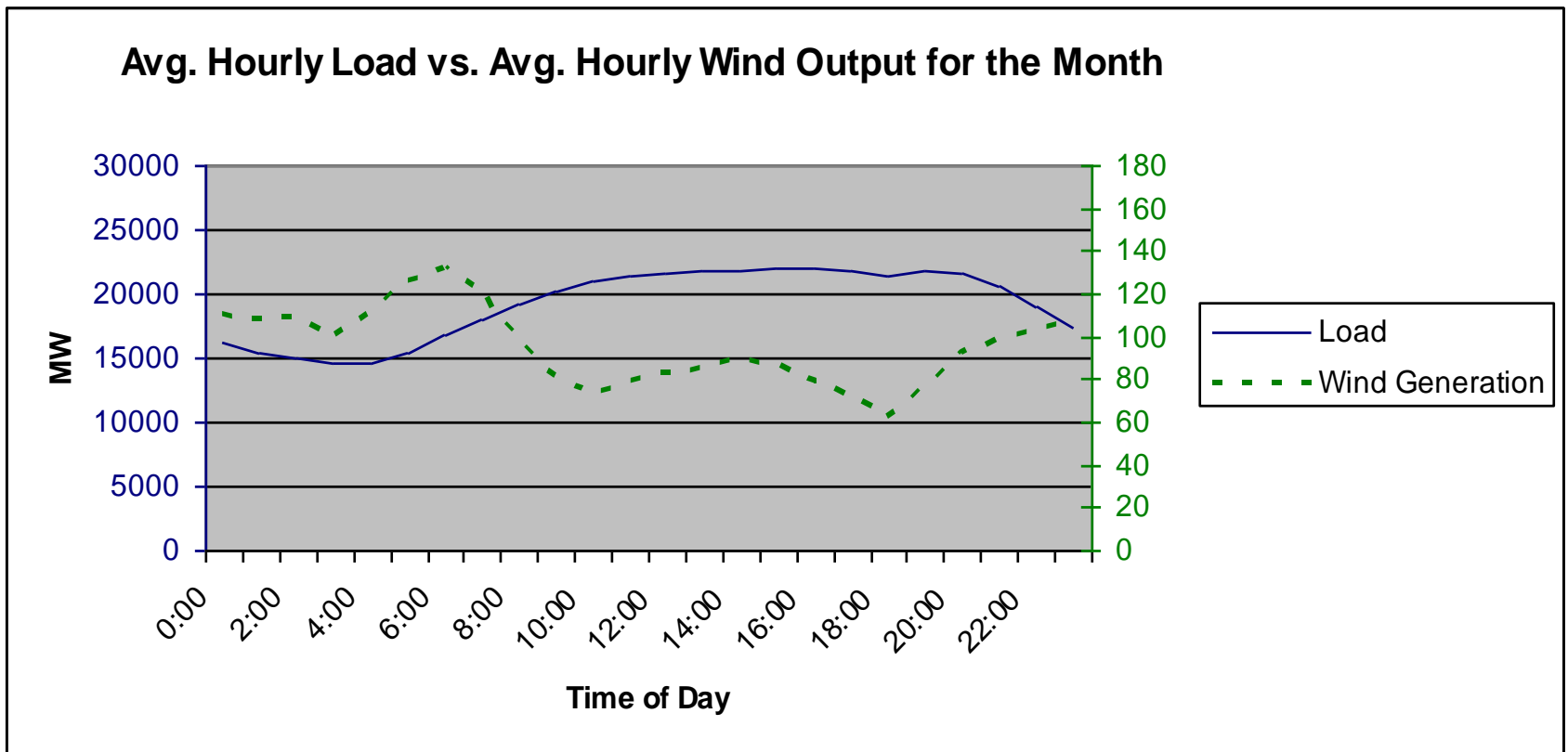
Performance Report (cont.)

Average Day - August



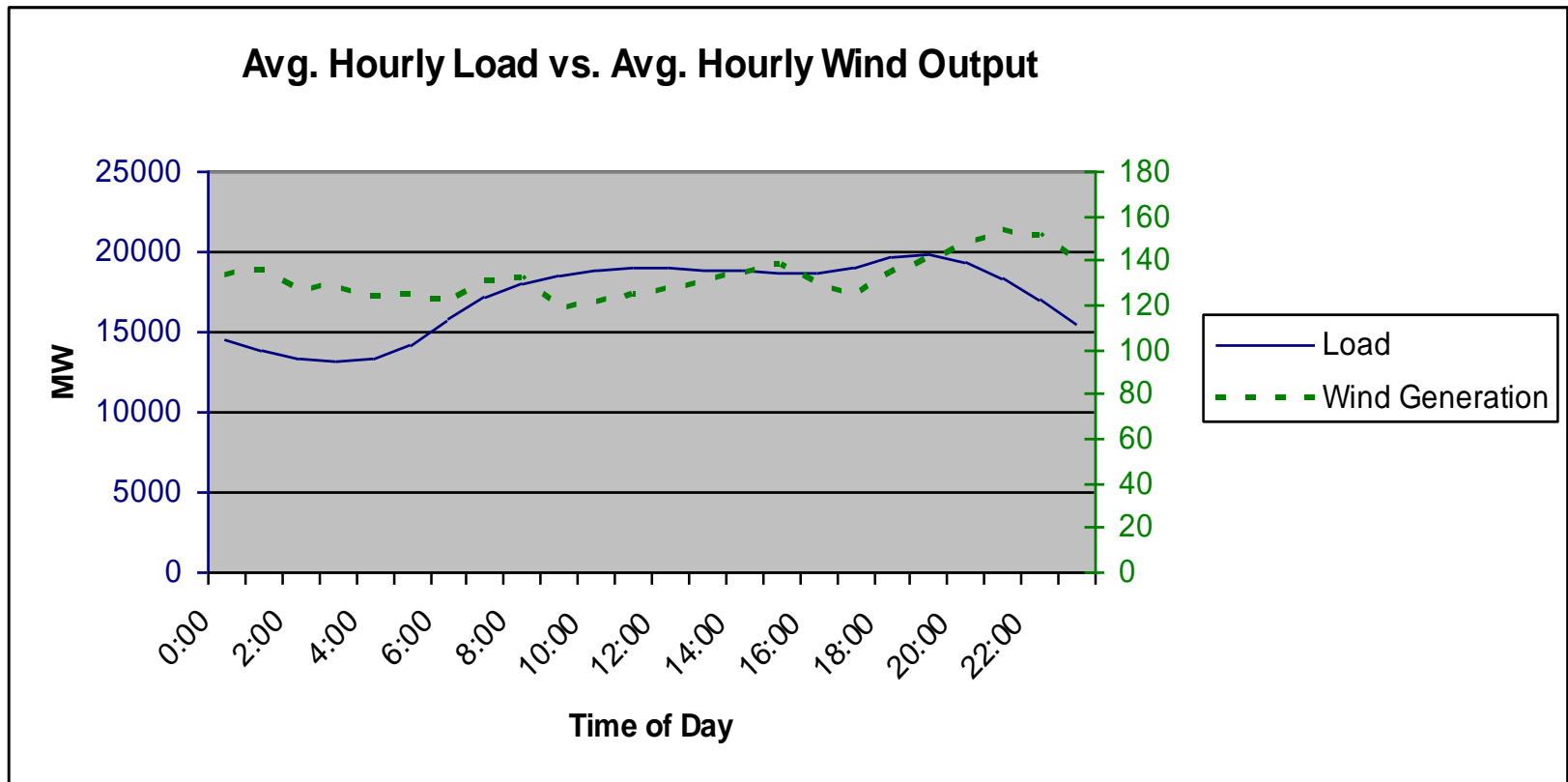
Performance Report (cont.)

Average Day - September



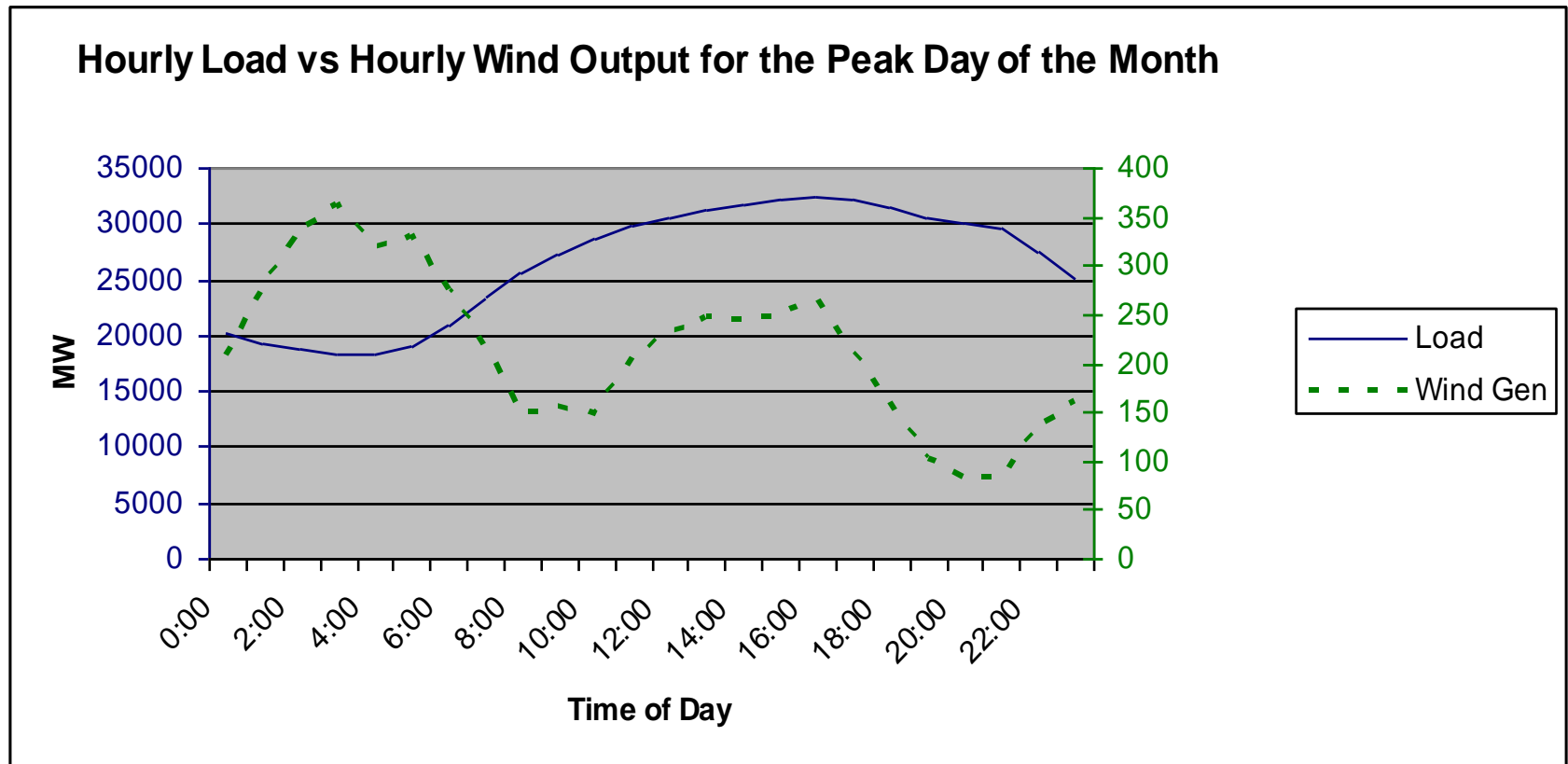
Performance Report (cont.)

Average Day - October



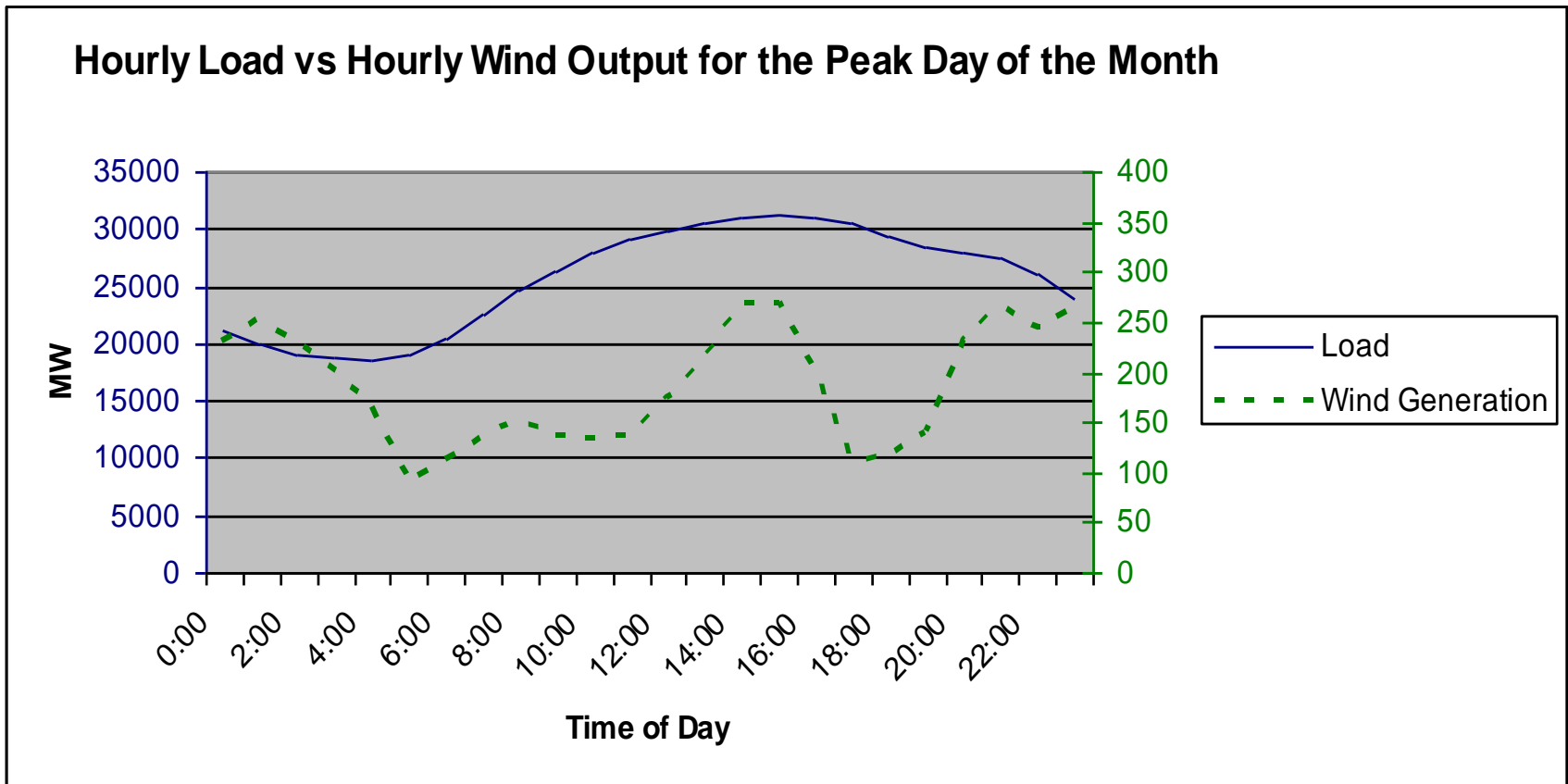
Performance Report (cont.)

Peak Day - June



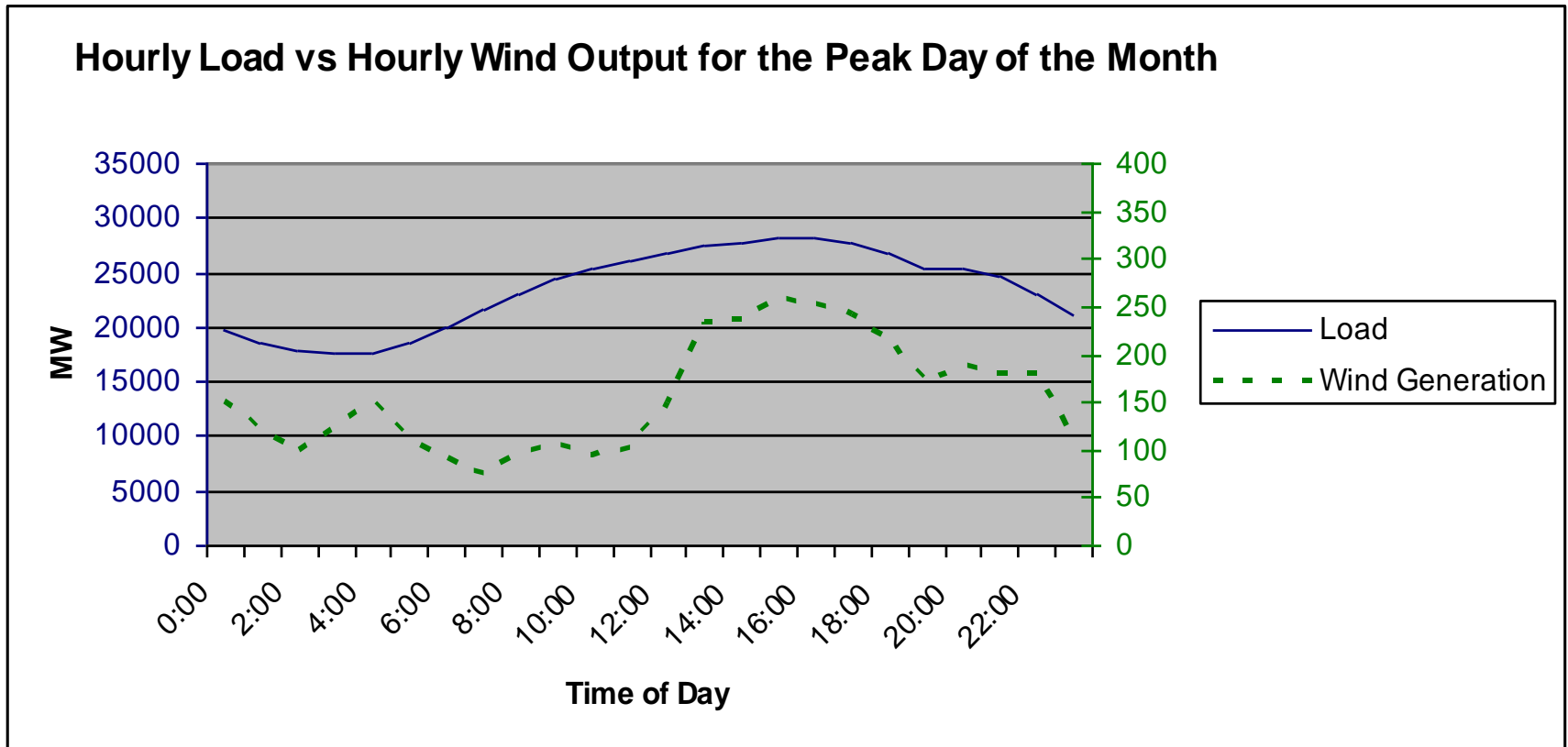
Performance Report (cont.)

Peak Day - July



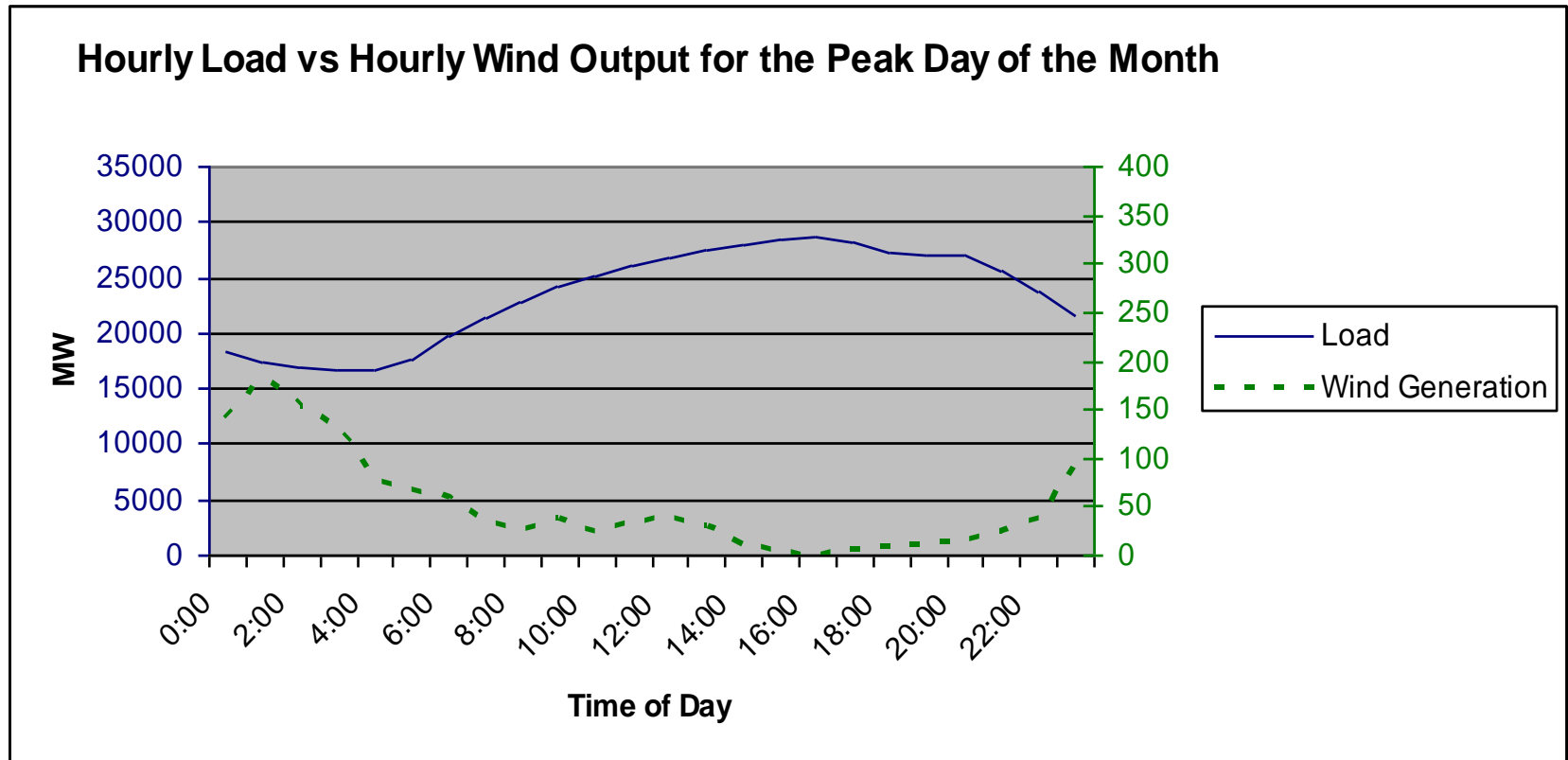
Performance Report (cont.)

Peak Day - August



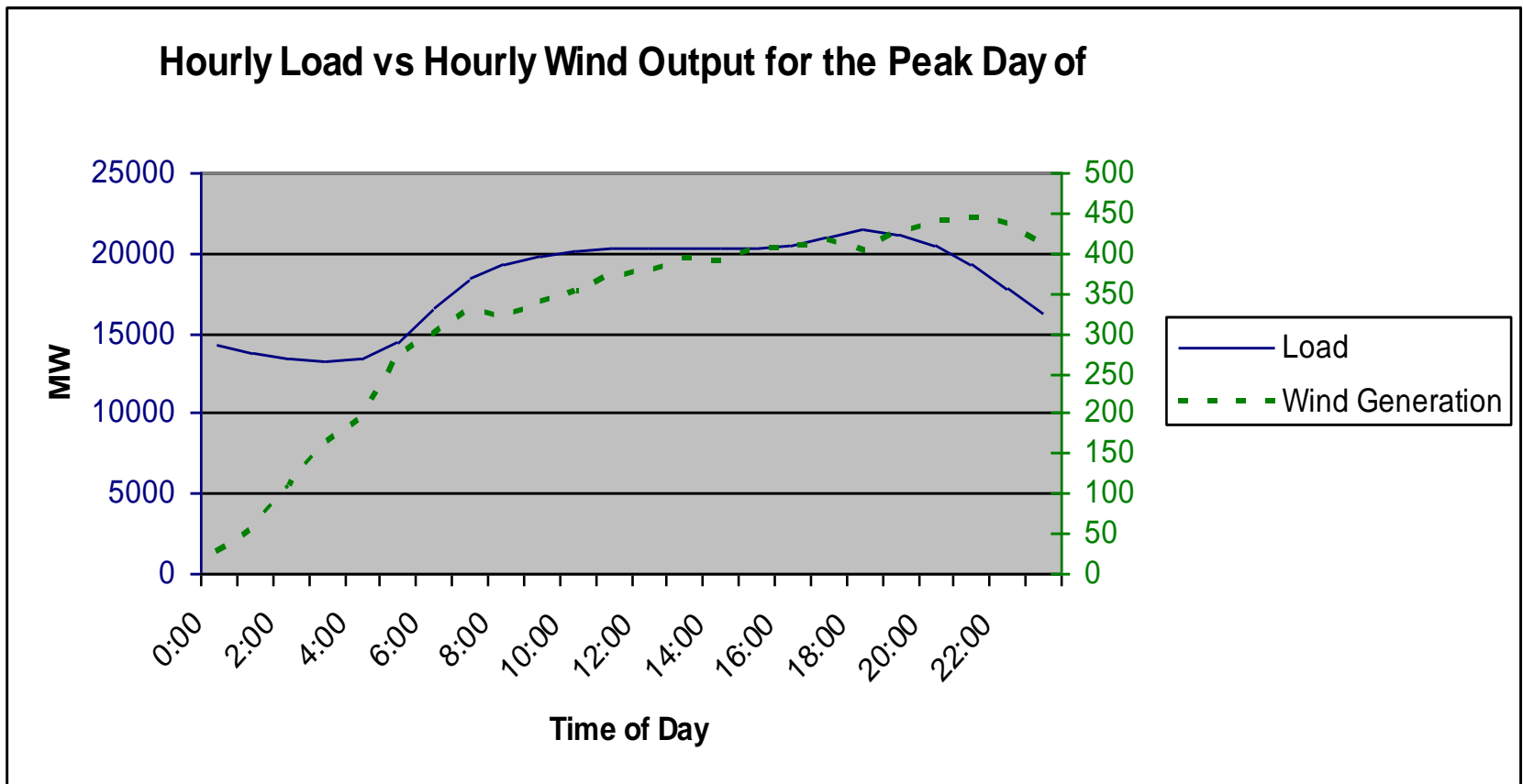
Performance Report (cont.)

Peak Day - September



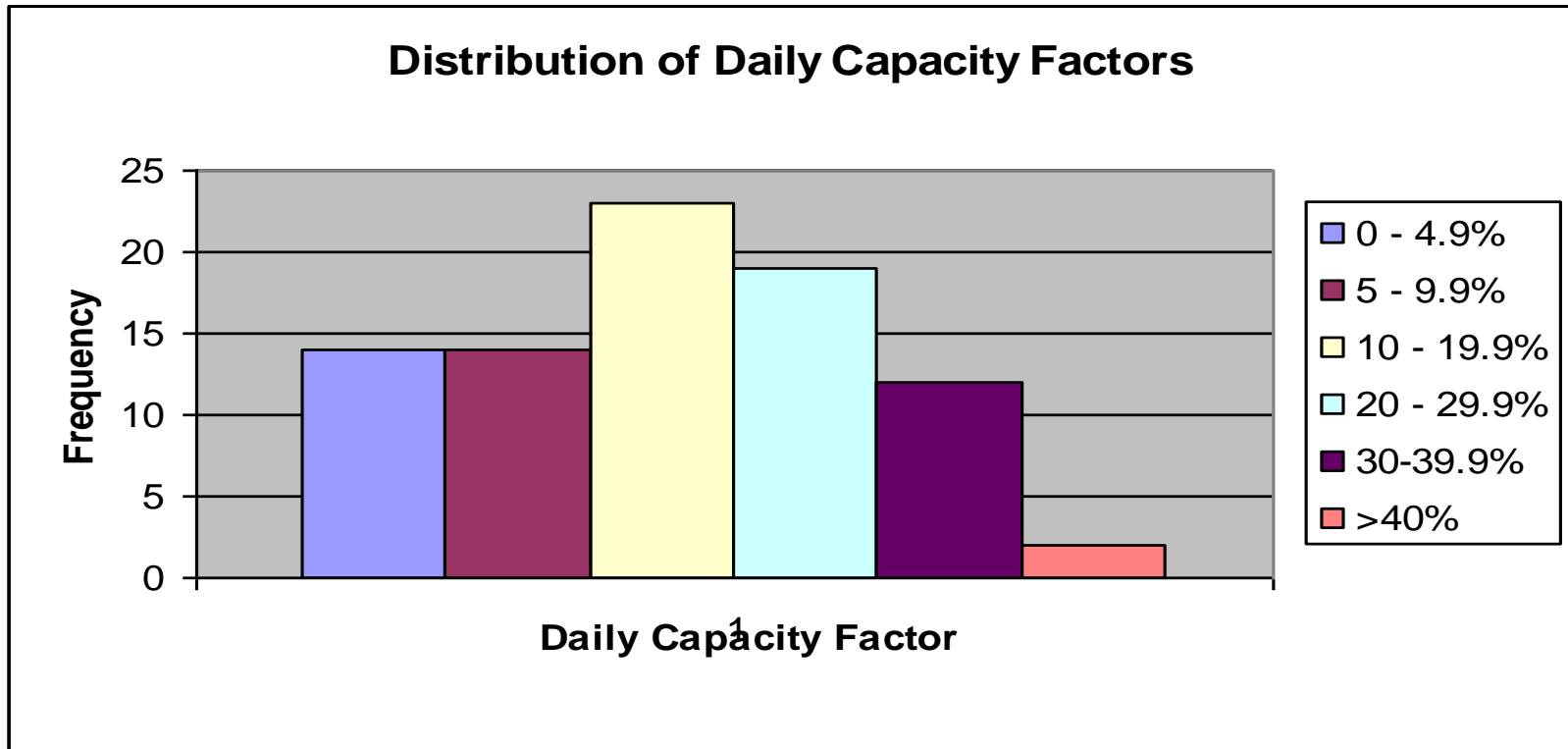
Performance Report (cont.)

Peak Day - October



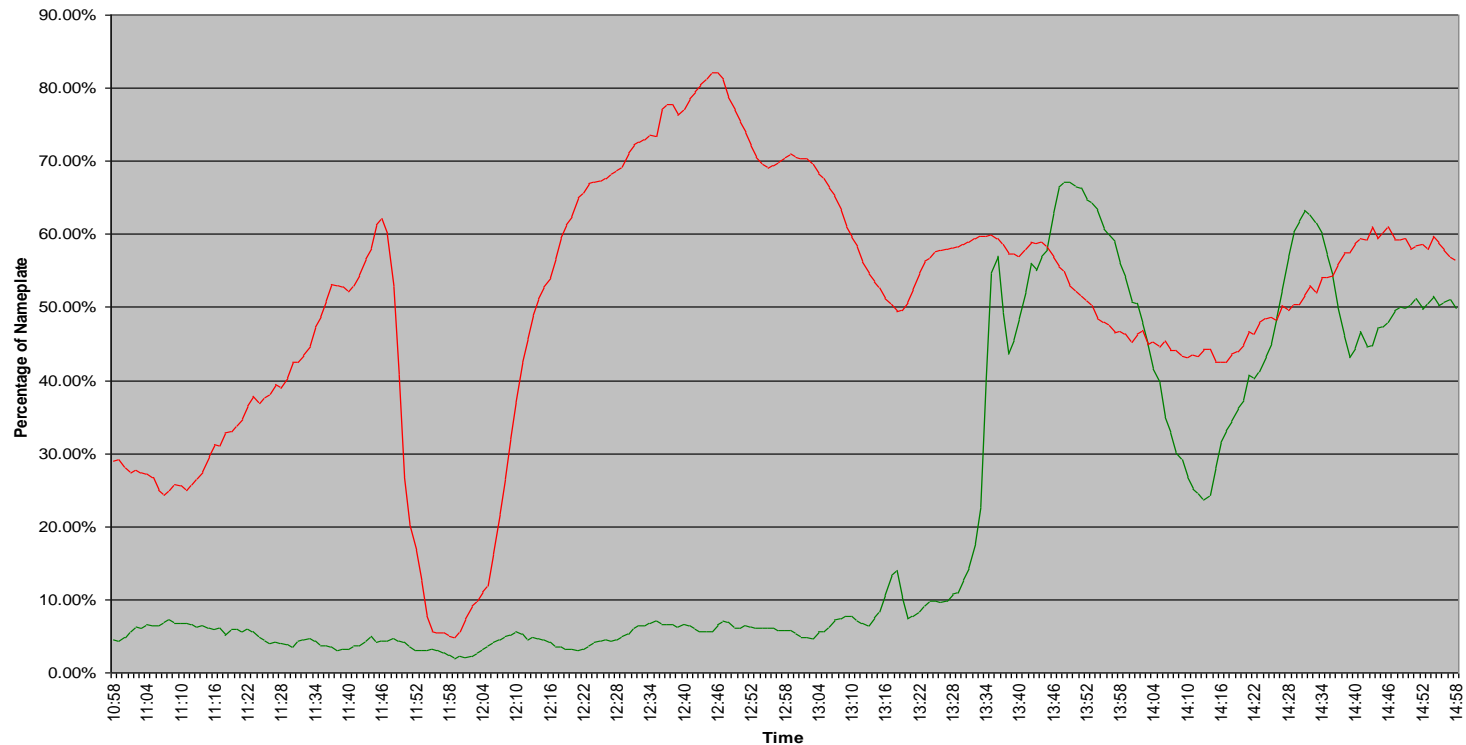
Performance Report (cont.)

Distribution of June Through September Daily Capacity Factors



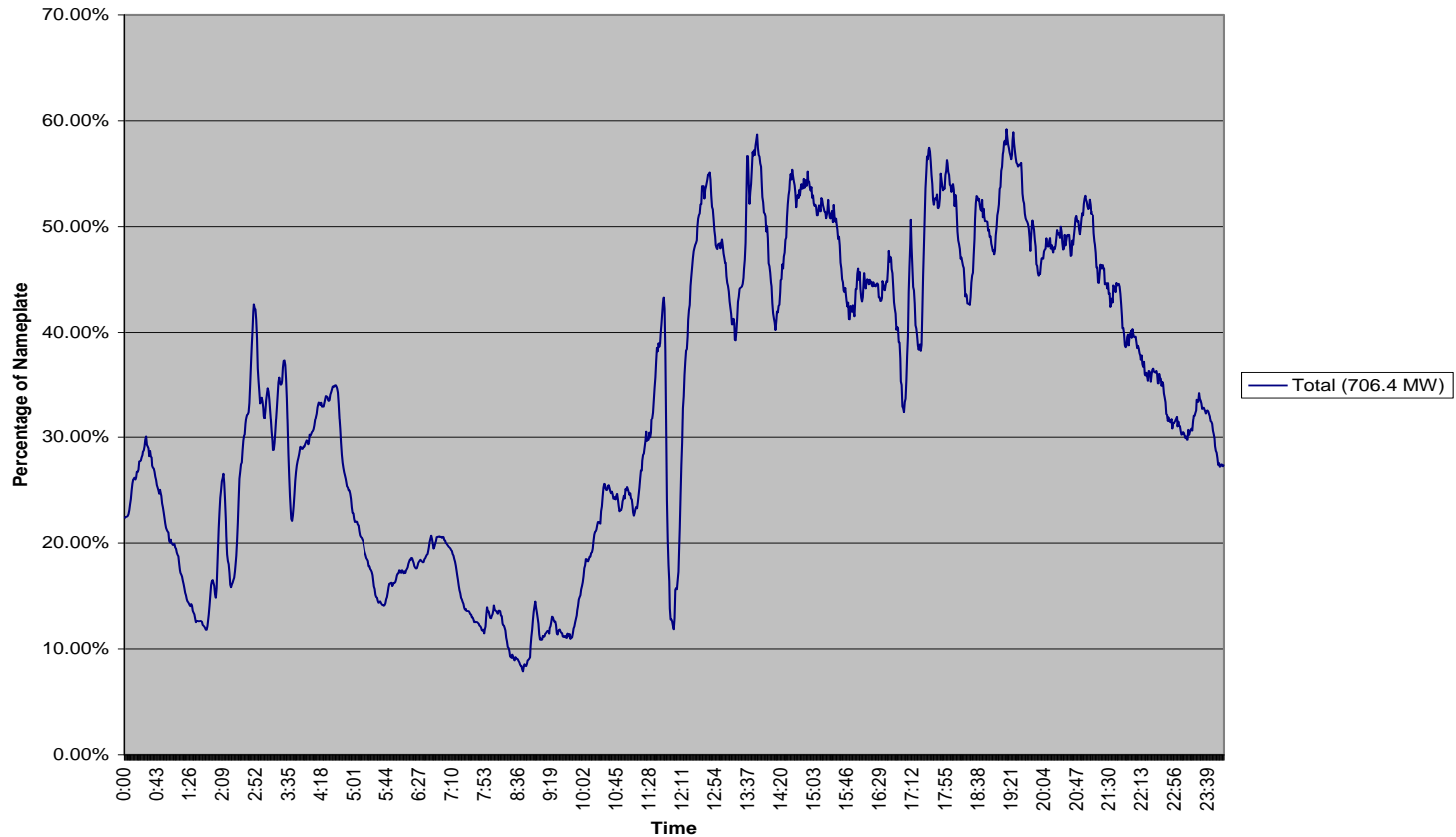
Performance Report (cont.)

- High Speed Cutout Event approx. 12 noon on 6/10/08 – Ramp up preceding the cutouts: 26% of nameplate to 61% of nameplate over 30 minutes. Ramp down from cutouts: To 5% of nameplate over 10 minutes. Ramp up after cutout event cleared: To 82% of nameplate over 45 minutes.



Performance Report (cont.)

System View for Full Day 6/10/08



Wind Plant Integration Issues

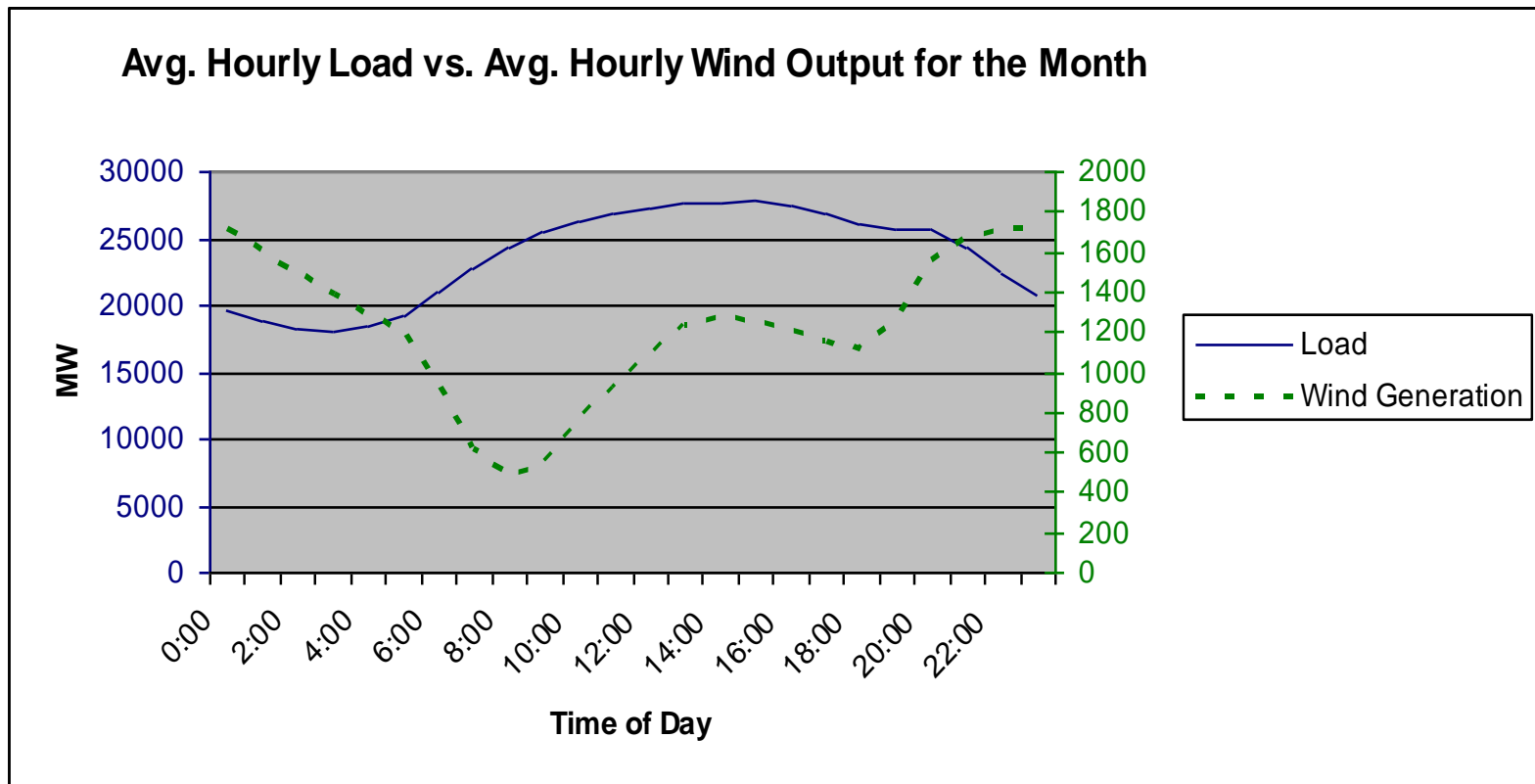
- **Transmission**
- **System Flexibility**
- **Operator Awareness and Practices**
 - Forecasting
- **Wind Generation Plant Performance & Standards**
 - System Models

Wind Plant Performance - 2013

- An example of simulated wind plant output (*6000 MW of nameplate capacity/month of July/ based on AWS data*).
 - Simulated July capacity factor 20.2% based on 2005 wind data vs. 2008 actual of 16.5%
 - Simulated July system peak hour coincidence factor based on 2006 wind data 51.5% vs. 38.2% in July 2008
 - Max one hour wind output simulated based on 2005 wind data was 4330.8 MW
 - This represents 72% of nameplate compared with an actual 70% of nameplate in July 2008.

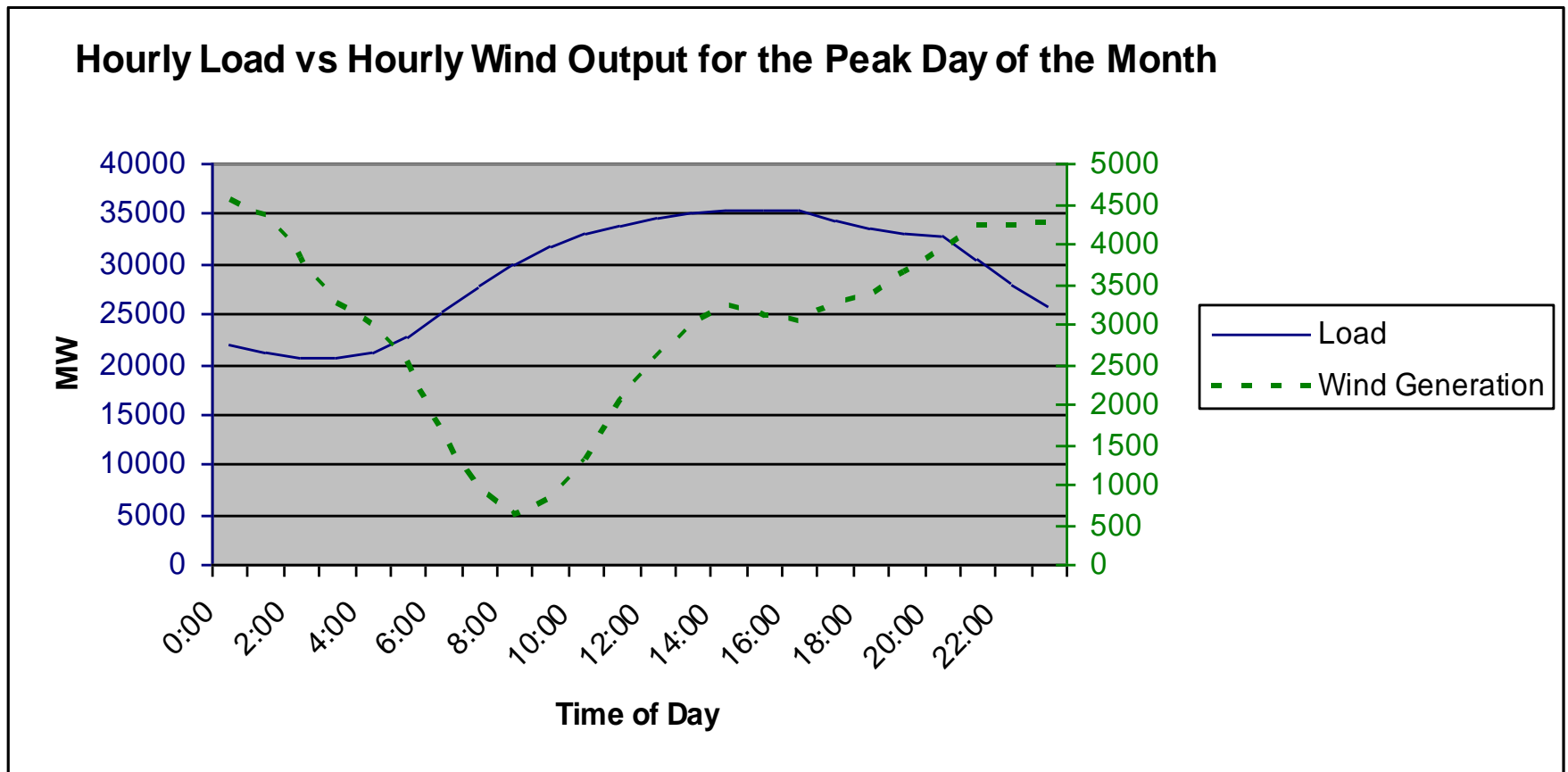
Performance Report (cont.)

Simulated Average Day – July 2013 (2005 wind data)



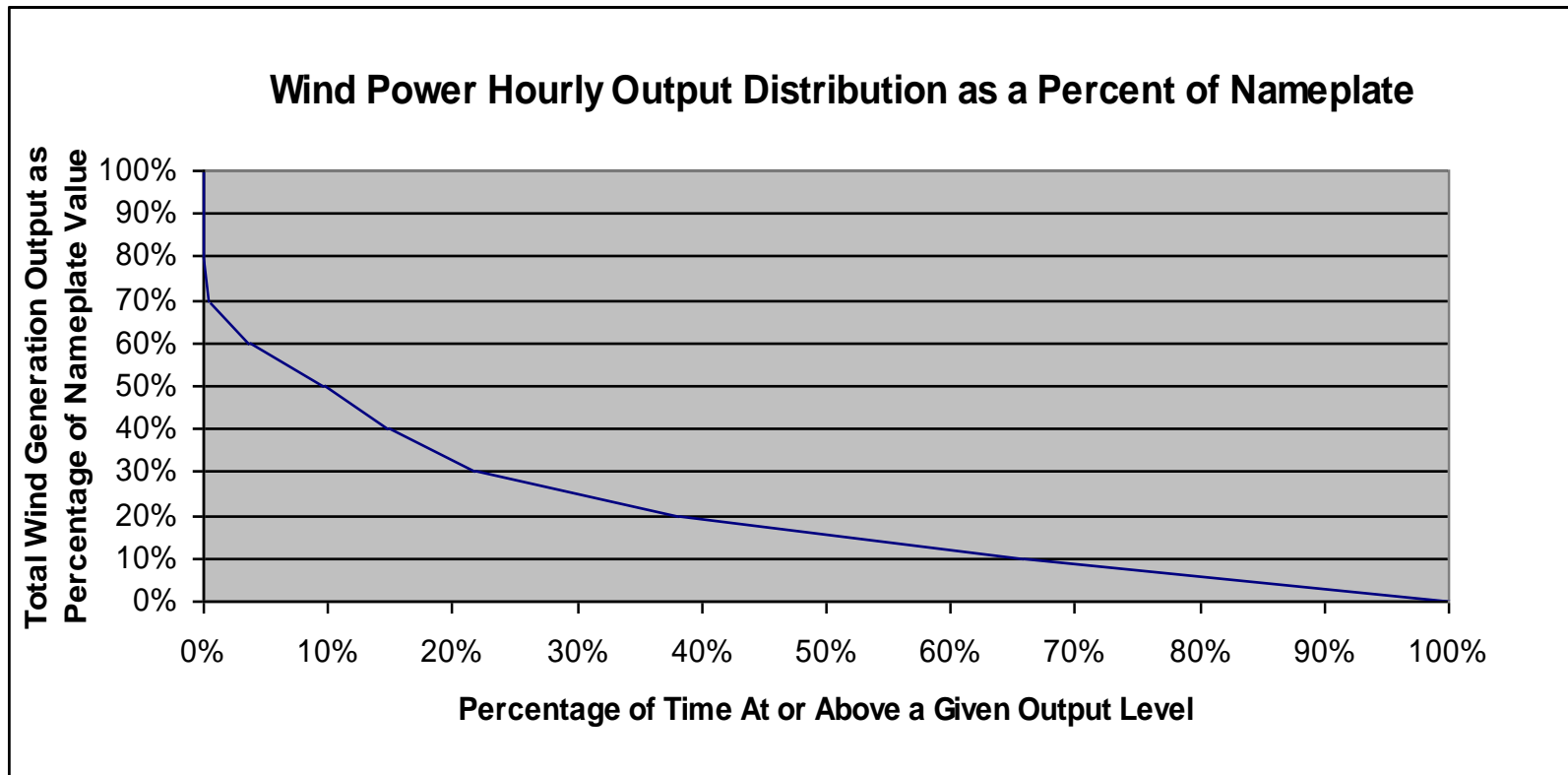
Performance Report (cont.)

Simulated Peak Day – July 2013 (2006 wind data)



Performance Report (cont.)

Hourly Output Duration Curve – July 2013 Simulated



Other Wind Study Activities

- **Eastern Interconnection Wind Integration Study Activities**
 - Through their **Joint Coordinated System Planning** process **MISO, PJM, SPP and TVA** are conducting a study of transmission needs for a reference and 20% wind penetration scenario.
 - **The Eastern Wind Integration and Transmission Study (EWITS)** being lead by **DOE/NREL (National Renewable Energy Lab)** is focusing on the costs and operating impacts of wind penetration scenarios up to 30%.
- **North America Electric Reliability Council's Integration of Variable Generation Task Force.**
 - In anticipation of the growth of wind and other variable generation, NERC's Planning and Operating Committees created the Integration of Variable Generation Task Force in December 2007.