



Electric Vehicles...

Energy storage and energy security!

West Philly High PHEV



Terry Boston
President & CEO
PJM Interconnection
Alternative Fuel Vehicles Forum
May 31, 2012

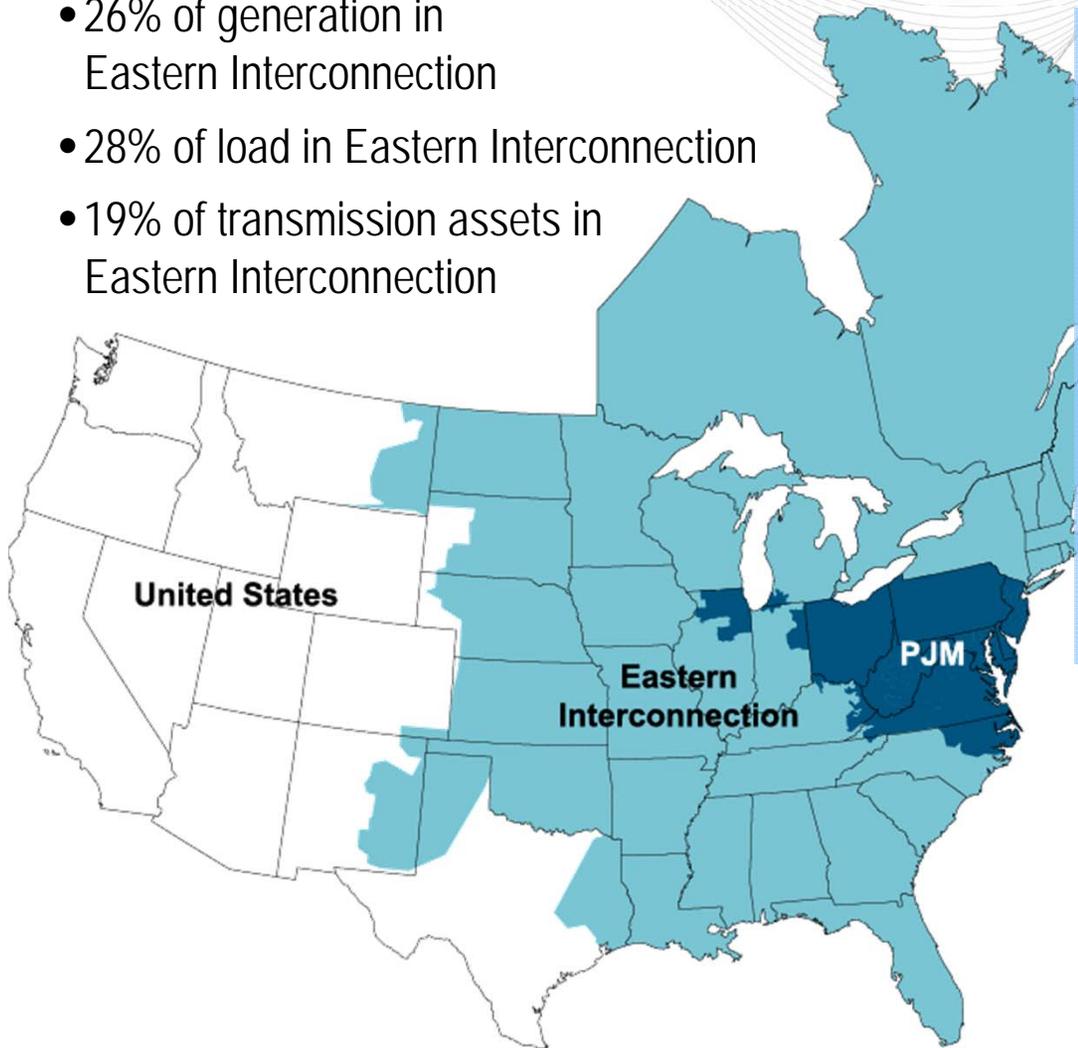


PJM as Part of the Eastern Interconnection

- 26% of generation in Eastern Interconnection
- 28% of load in Eastern Interconnection
- 19% of transmission assets in Eastern Interconnection

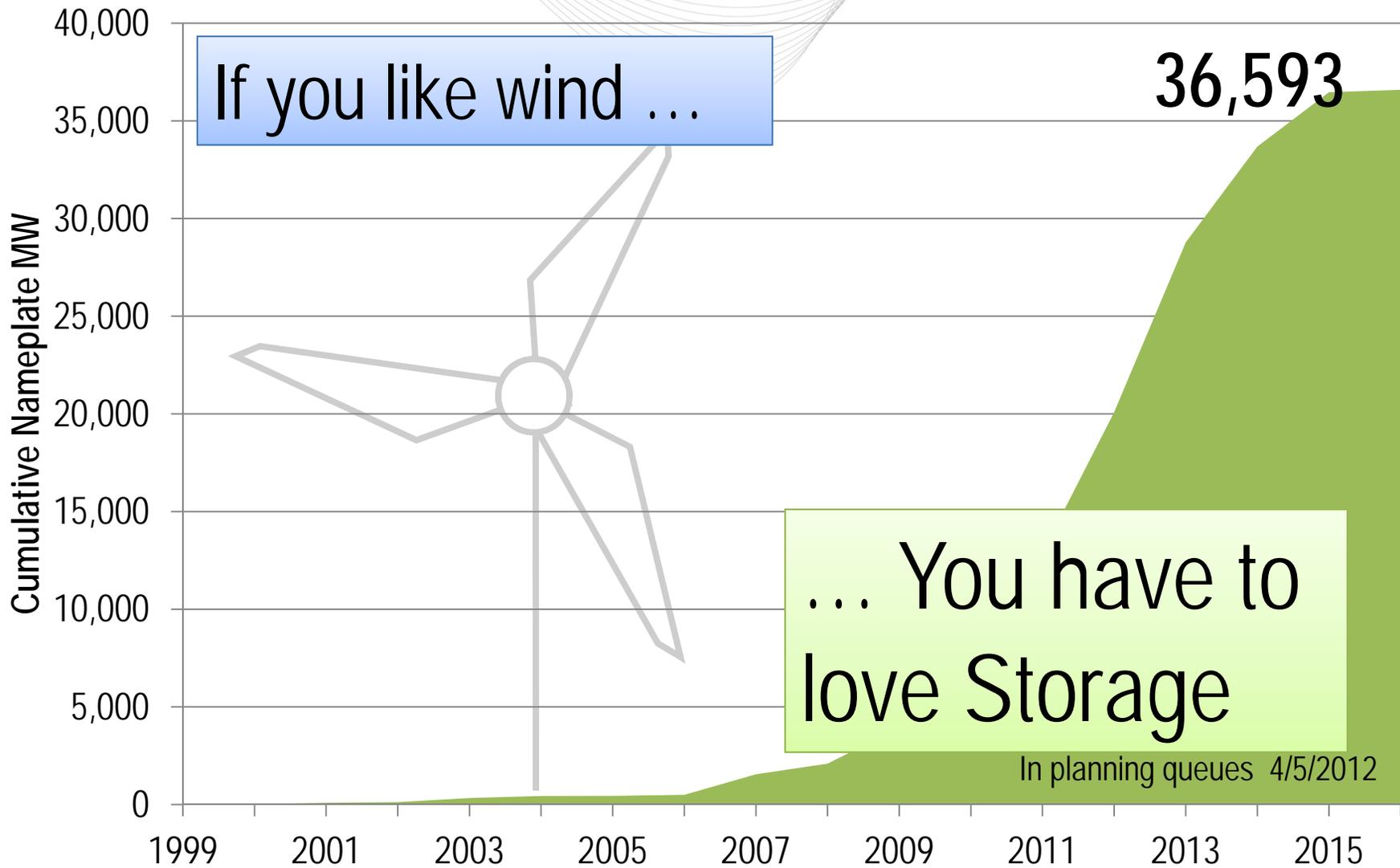
KEY STATISTICS

PJM member companies	750+
millions of people served	60
peak load in megawatts	163,848
MWs of generating capacity	185,600
miles of transmission lines	65,441
GWh of annual energy generation	832,331
generation sources	1,365
square miles of territory area served	214,000
Internal/external tie lines	13 states + DC
	142

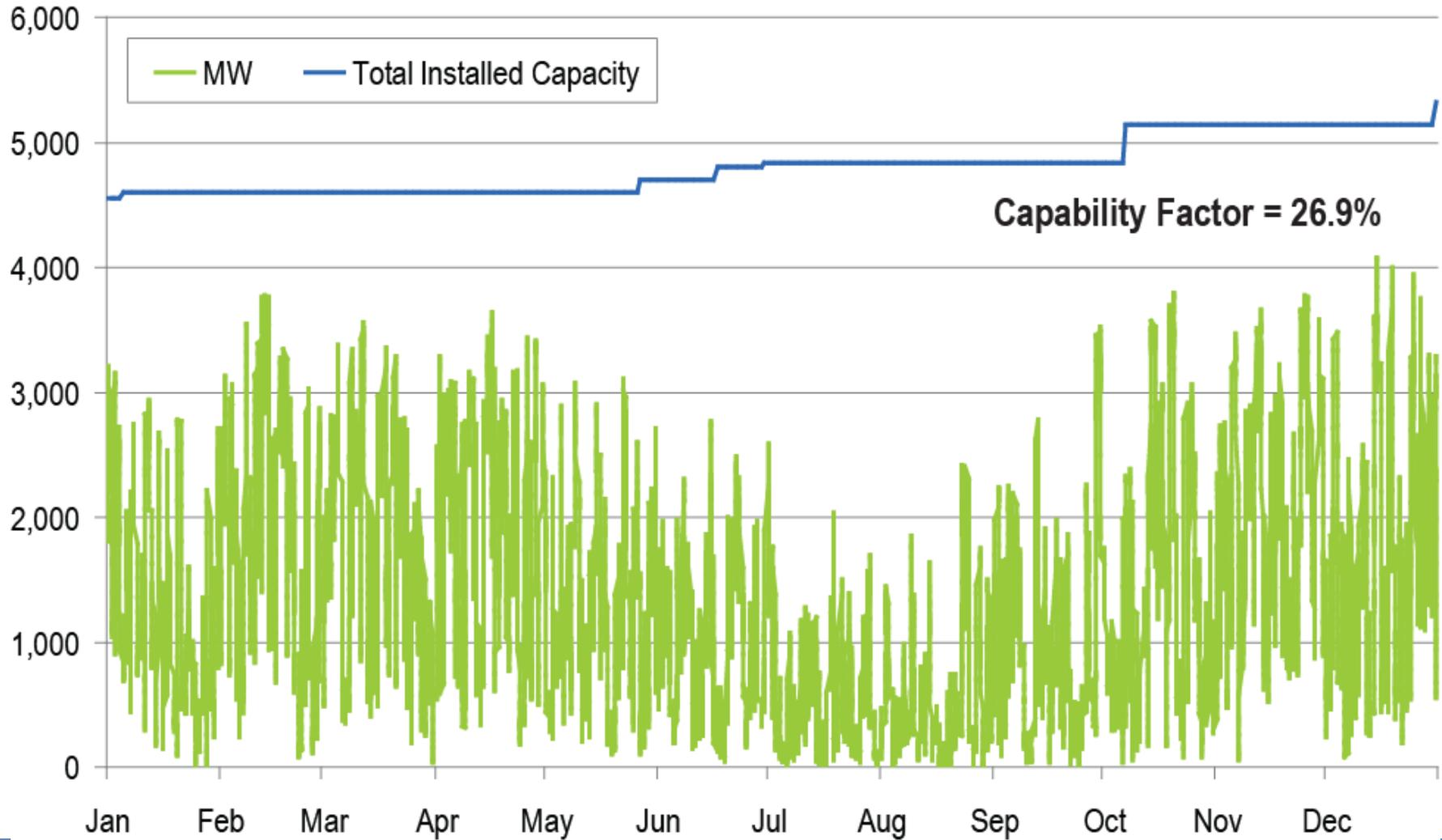


**21% of U.S. GDP
produced in PJM**

As of 1/4/2012

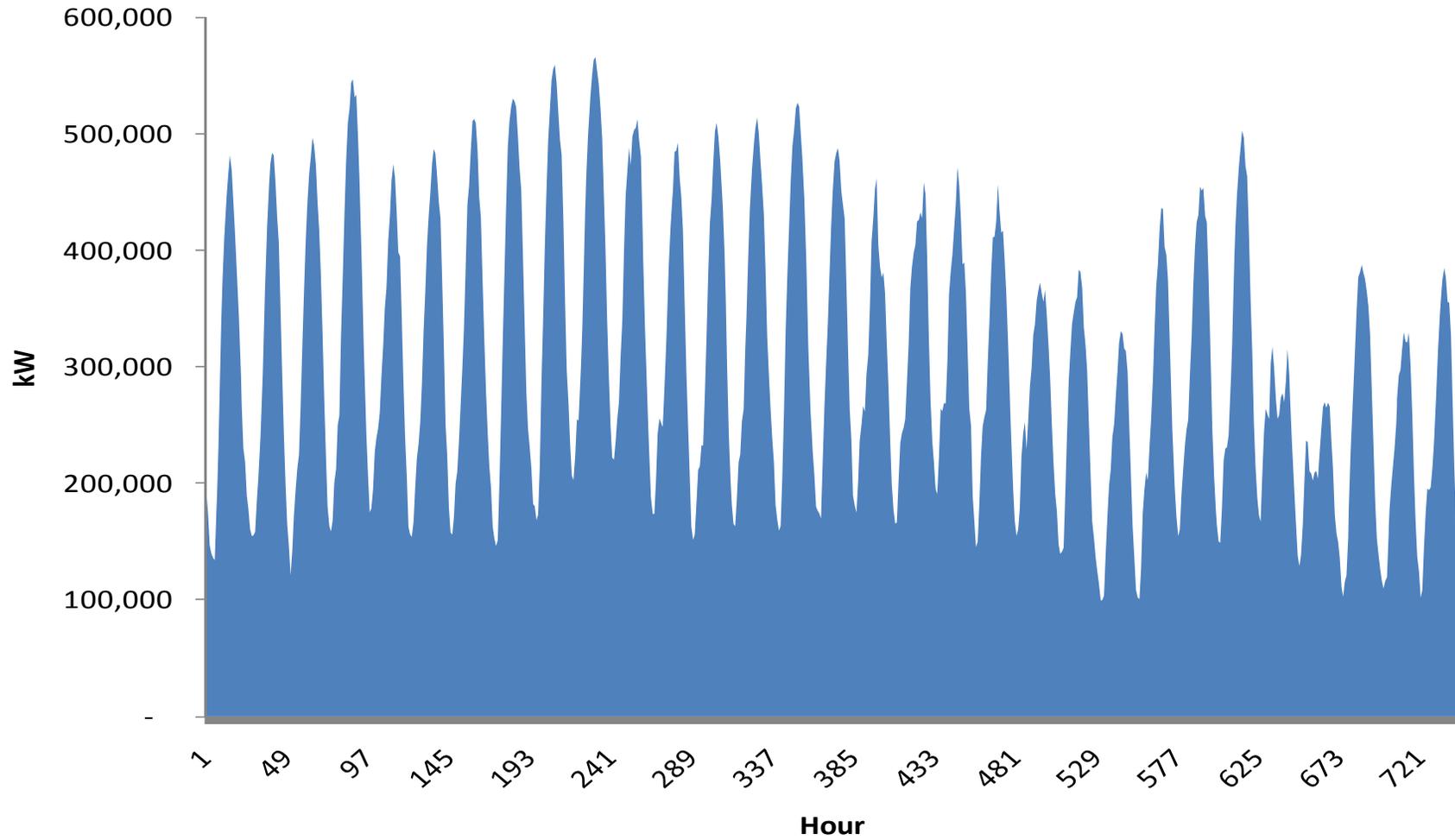


PJM Wind Output vs Installed Capability 2011

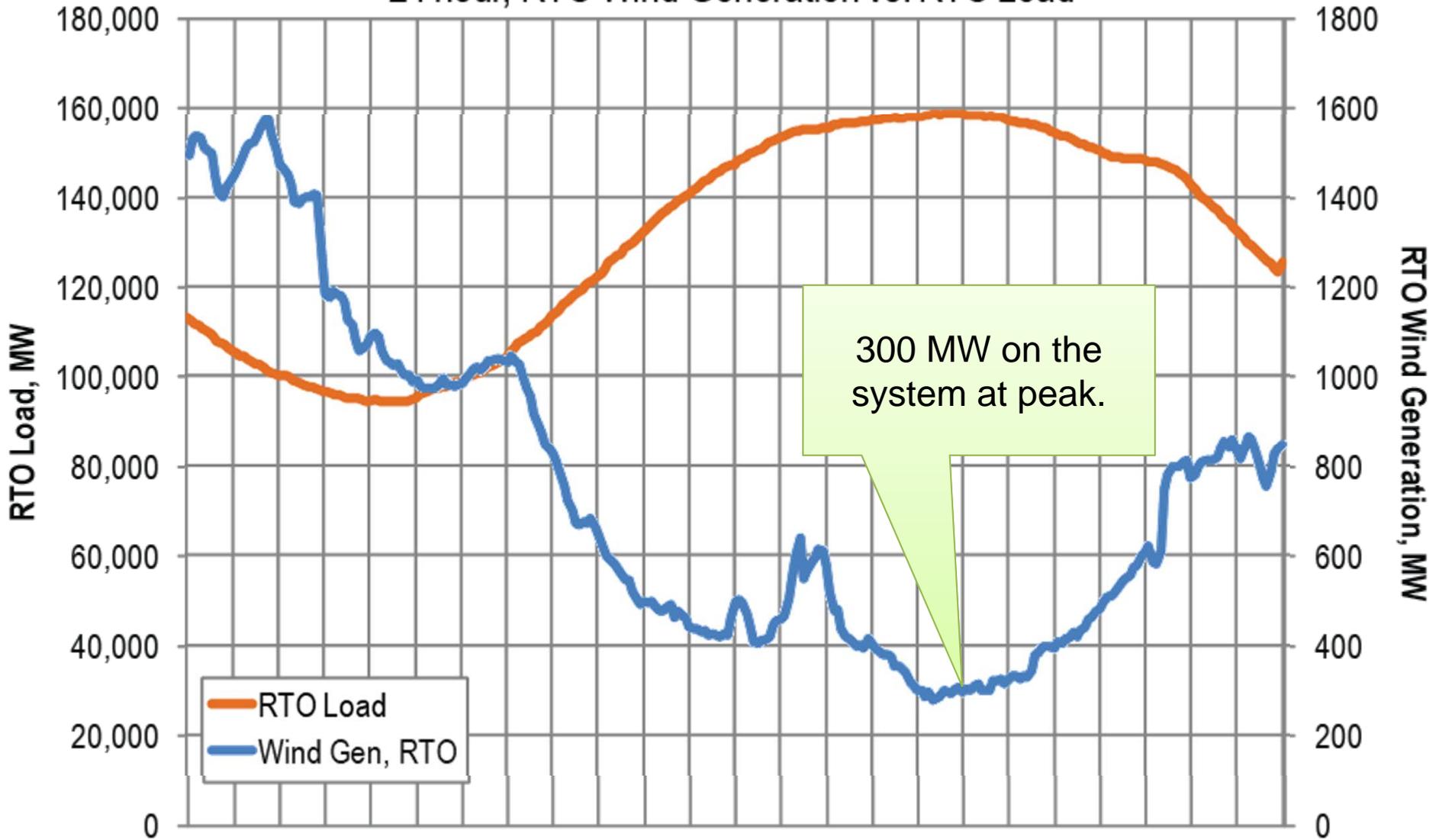




Chattanooga EPB Residential August Hourly Load



24 hour, RTO Wind Generation vs. RTO Load





MAGICC – PJM's PHEV Demonstration Project

With funding support from: google.org



- **Mid-Atlantic Grid Interactive Car Consortium (MAGICC)**
- **Over three years experience**
- **5 aggregated vehicles**
- **Using Power Line Carrier (PLC) to send AGC signal to the vehicles via the SAE J1772 communication standard.**





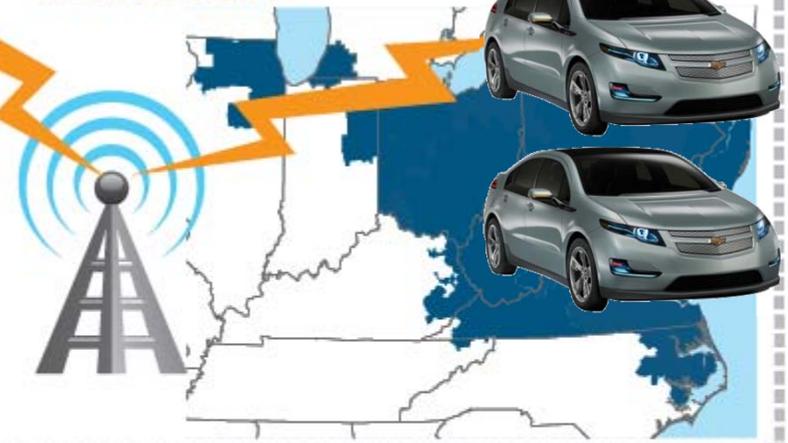
General Motors OnStar / PJM Pilot



Frequency Regulation
Percent Renewables
Locational Marginal Prices



PHASE 2
Additon of Residential
Owned Volts



Managed
Charging

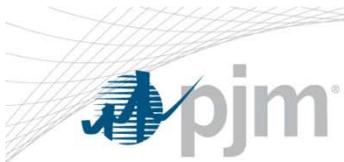
PHASE 1
1,000 Volt OnStar
Laboratory Simulation

Frequency
Response

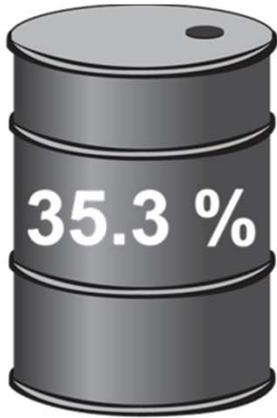




Available for full-time Summer job.



Why PHEV and CNG Fleet



35.5 % of U.S. Energy use is oil



8.8 of 10 Americans commute using cars

Shale gas can power PHEVs and CNG





Pony Under the Christmas Tree?

60¢ (PJM Off-peak Price)

~~75¢ per "Gallon"~~





“Unleash us from the tether of fuel” — Lt. Gen. James Mattis, USMC



Price of fuel on the battlefield: ~\$400/gal

Total # Non-Tactical Vehicles: ~194,710

Project Focused on Four Areas:

1. Volume Pricing
 - 10,000 units annually
2. Battery Right-sizing
 - 6,000-3,000 miles/year
3. Infrastructure Planning
4. **Ancillary Services**

Vehicle Type	% of Fleet	Ave. Annual Miles
MD Trucks*	22%	6251
LD 4x2 Trucks	15%	7690
LD Pass. Vans	11%	9043
Compact Sedans	9%	~16325
Midsize Sedans	9%	~16325
HD Trucks	9%	3516

*Largest fuel consumer in non-tactical fleet: 43M gallons of petroleum/year

- Prices to devices or time-of-use rates
- Utility load impact studies need to change with the vehicles (3kW, 6kW, 9kW...)
- Managed charging networks
 - Third party aggregators willing to control vehicle charging to the benefit of consumers and the bulk power system should be encouraged.

