

The 21st Century Grid "The Future Ain't What it Used to Be"

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www.pjm.com



PJM as Part of the Eastern Interconnection



21% of U.S. GDP produced in PJM

KEY STATISTICS

Member companies	940+
Millions of people served	61
Peak load in megawatts	165,492
MWs of generating capacity	183,604
Miles of transmission lines	62,556
2013 GWh of annual energy	797,461
Generation sources	1,376
Square miles of territory	243,417
States served	13 + DC

As of 6/1/2014



Greatest Engineering Achievements of the 20th Century

- 10. Air Conditioning/ Refrigeration
 - 9. Telephone
 - 8. Computers
 - 7. Agricultural Mechanization
 - 6. Radio and Television

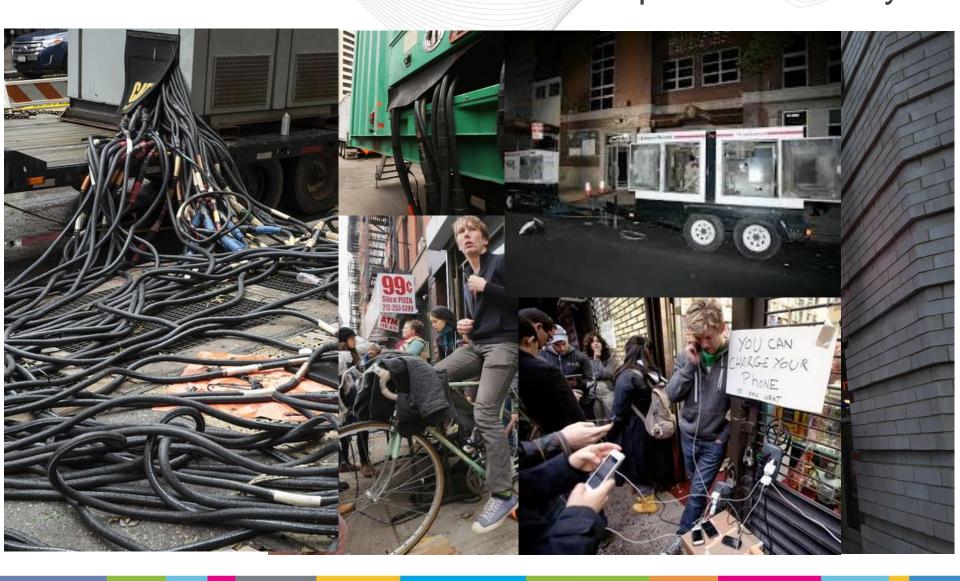
- 5. Electronics
- 4. Water Supply and Distribution
- 3. Airplane
- 2. Automobile(PHEVs Someday)

1. The Grid/ Electrification

Source: National Academy of Engineering



Microgrids ... New York City After Superstorm Sandy



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"Resilience is the ability to reduce the magnitude and/or duration of disruptive events."





Resilience: How We Define It

PRIOR TO AN EVENT

The ability to absorb shocks and keep operating

ROBUSTNESS

DURING AN EVENT

The ability to manage a disruption as it unfolds

RESOURCEFULNESS

AFTER AN EVENT

The ability to get back to normal as quickly as possible

RAPID RECOVERY

POST-INCIDENT LEARNING

INCIDENT-

FOCUSED

ADAPTABILITY/LESSONS LEARNED

The ability to absorb new lessons after a disaster



Prevention

- Build security into the design
- Implement traditional controls
- Improve security controls

Collaboration

- Coordinate response plans
- Develop and maintain government relationships
- Leverage industry relationships
- Share best practices

Cyber Security with... Eyes Wide Open



Resilience

- Focus on incident response
- Enhance scenario planning
- Plan and drill restoration scenarios









Cyber Threat Landscape



NATION STATES

Phishing, malware, APT, network scans



Phishing, malware, drive-by attacks



eData







iSCADA

SAP



Exchange **INSIDERS**

Cooperation with outside actors, policy abuse, disgruntled

SCED



EMS



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eMKT

TERRORISTS

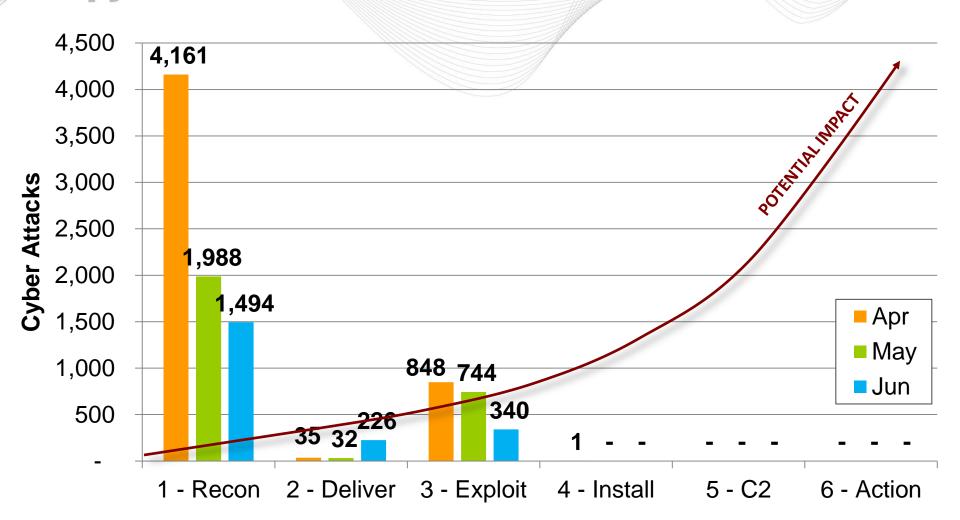
Denial of service, electronic jihad



HACTIVISTS

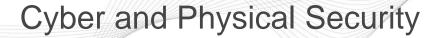
Distributed denial of service, defacement

Cyber Attack Metrics – 2Q 2015

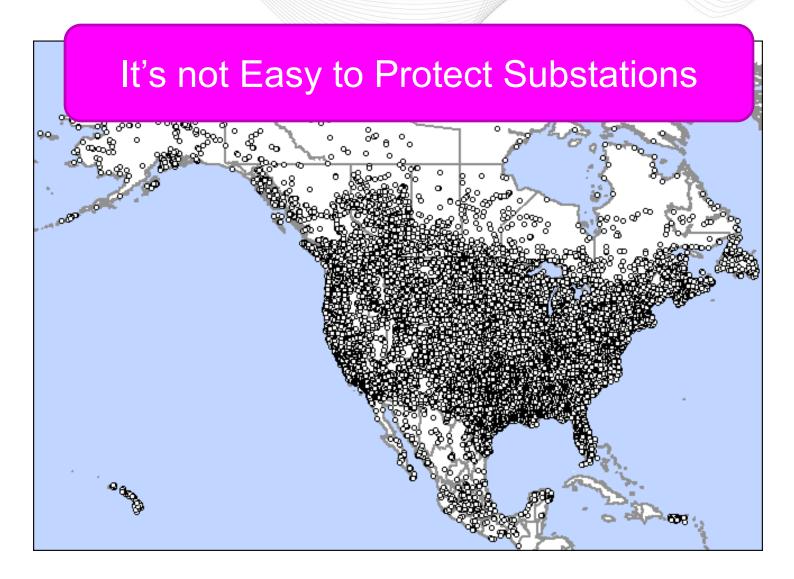


PJM's security posture continued to push attacks to earlier in the attack life cycle.

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Gates & Guards & Guns



