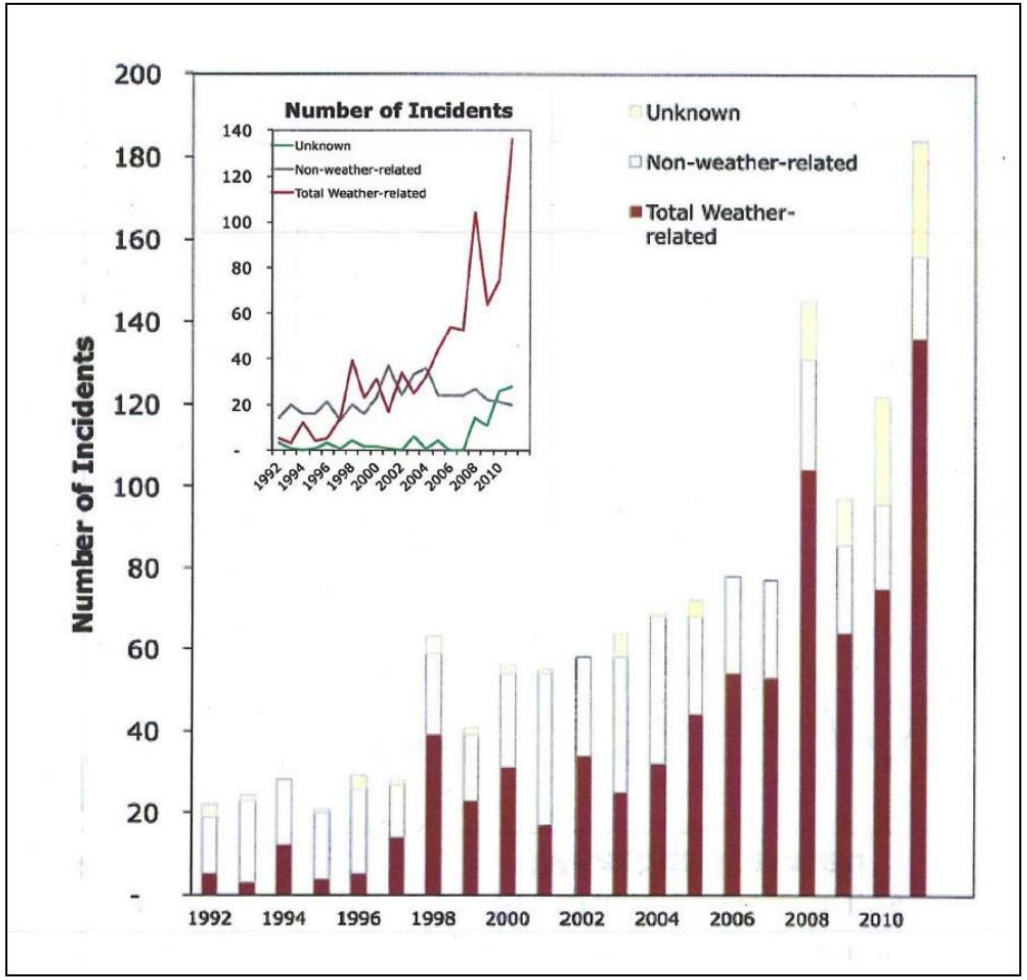
MOTIVATION

- Ability to evaluate national power grid vulnerability & resilience to major coastal storms
- The ability to provide non-proprietary data on the power grid to communities and stakeholders
- Requires building an outage prediction model on non-proprietary data

Figure 2. Significant U.S Grid Weather-Related Grid Disturbances
With Inset of Non-Weather- vs. Weather-Related Outage Comparison



Source: *Electric Grid Disruptions and Extreme Weather*. See http://evanmills.lbl.gov/presentations/Mills-Grid-Disruptions-NCDC-3May2012.pdf.

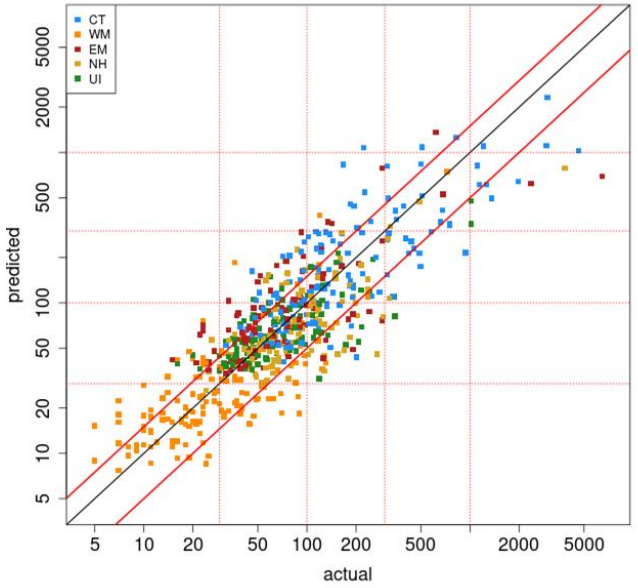
Notes: Historical "Grid Disturbance" data from the U.S. Department of Energy, Energy Information Administration. Form OE-417, "Electric Emergency Incident and Disturbance Report" (and before 1978 from the National Electric Reliability Council, Disturbance Analysis Working Group).

Figure from: Campbell, R. J. (2012, August). *Weather-Related Power Outages and Electric System Resiliency* [PDF]. Congressional Research Service.

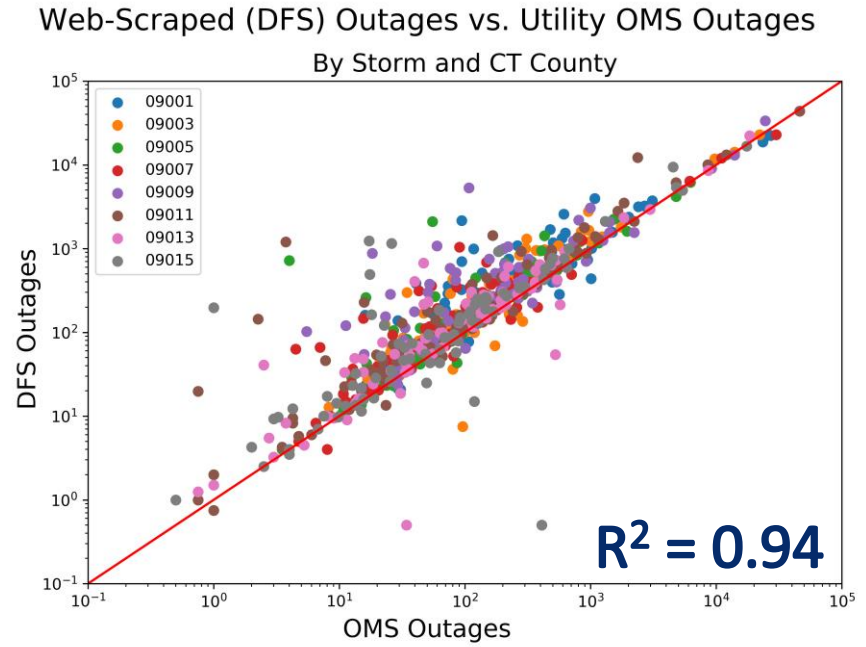
TAKEAWAYS

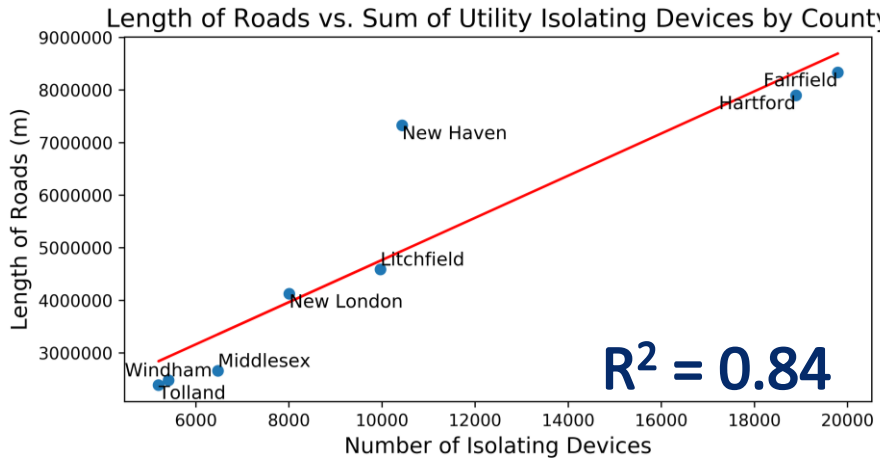
- With good correlations for proxies and outage data, similar performance to UConn Outage Prediction Model (OPM) is expected

UConn OPM Rain-Wind System Cross Validation

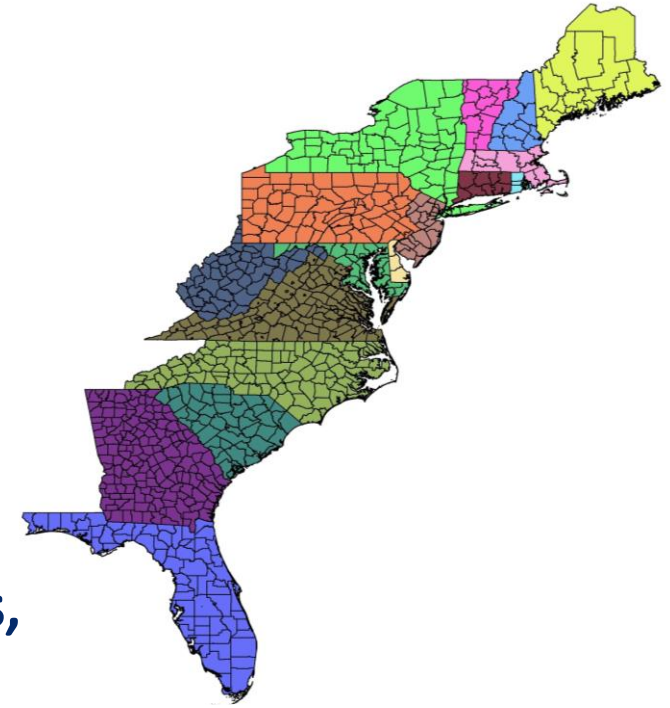


MdAPE	MAPE	NSE
38%	47%	0.32





SIGNIFICANCE



Extent

Creating OPM system that can cover large domains ranging from the Eastern Seaboard to the contiguous US

Situational Awareness

Awareness of large storm tracks in terms of total impact and spatial distribution of outages (hurricanes, Nor-easters, mesoscale convective systems)

Vulnerability/ Resilience

Evaluate the national distribution grid vulnerability/resilience to storms

- Data mine return period of resilience events
- Evaluate climate change impacts through incorporation of climate impacts
- Analyze insurance risk & potential grid resilience updates