



Idaho National Laboratory

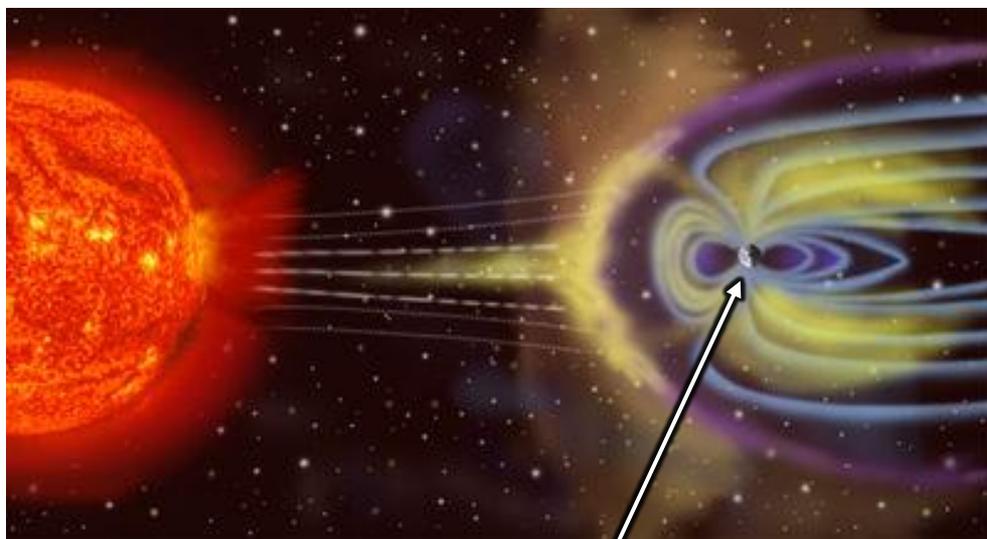
*GMD Workshop
Idaho Falls
April 7-8, 2015*



The Maine Experience

The Honorable
Andrea Boland

Geomagnetic storms (GMD) and electromagnetic pulses (EMP) can take down the grid for months or years, and damage or destroy electronics. Stunning.



Earth



Key Points of this Presentation

GMD and EMP are existential threats we can meet.

State legislatures are leading the way.

Independent national experts are helping.

Regulatory capture is blocking progress.

Protections exist. Political will is needed.

LD131: Challenging Maine Electric Utilities

My original legislation limited requirements for protection against GMD and EMP to current or future transmission line construction, in order to:

- Not overwhelm the committee and discourage action;
- Leave space for the committee to invest;
- Allow expert testimony to paint the bigger picture;
- Limit power companies' need to respond to too many issues;
- Focus on the grid expansion that was then underway.

LD131: Challenging the Maine Electric Utilities

The Energy, Utilities and Technology Committee listened in awe to testimony from a variety of national experts, and determined that the scope of the bill needed to be expanded to include the entire Maine transmission system, so they amended it and passed it out of committee as emergency legislation.

Committee amended LD 131 to a model study

Public Utilities Commission (PUC) was to examine GMD and EMP and report back Jan. 20, 2014 on:

- the most vulnerable components of the system;
- potential mitigation measures;
- estimates of costs – low, medium, and high costs;
- allocation of costs
- time frame for adoption of mitigation measures;
- policy implications

Outcome of Legislation

LD 131 passed unanimously in committee and in the House, 32-3 in the Senate, and became law June 11, 2013.

Problems in PUC process:

- PUC dragged its feet, assigned minimal staff to study,
- Declined offers of expert help, including FERC's,
- Declined to investigate EMP,
- Did not complete its study; shunted it to the power company,
- Remains out of compliance with the law.

Outcome of LD 131

Result:

- **Two reports:** one by CMP, one by R&D Firm Emprimus
- **We learned a lot;** (available on the online docket)
- **Maine** has what it needs to move forward.
- We took a Panel to NCSL, the National Conference of State Legislatures to tell the story that media was ignoring.

Key Points from NCSL

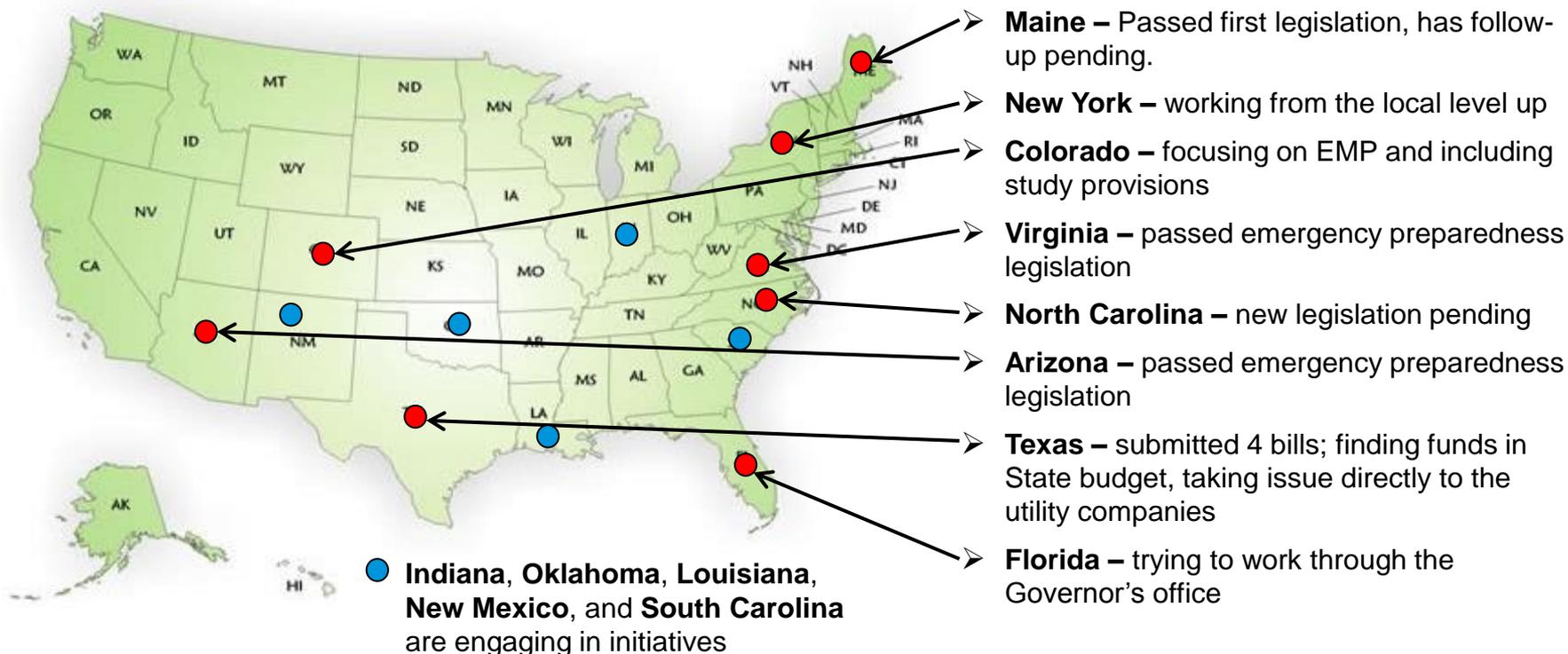
- **Legislators were shocked**, but got it. Several other states are now introducing legislation.
- **National and international experts** are assisting.
- **Insurance companies are seeking limits to coverage.**
Zurich Insurance study finds increased business claims closely correlate with heightened solar activity in normal times, billions of dollars annually.
- **NERC, electric utilities, system operators, and regulatory bodies, with few exceptions, frustrate efforts** at protection, risking public safety, passing costs to ratepayers and taxpayers.

Peter Pry, long-time expert:

“This is a war of the people and their representatives against the negligence of the utilities to protect the grid.”

NCSL Update

Several states are introducing legislation and taking various approaches to assure state protections



Industry Resistance: The Arguments They Make

- We have everything under control;
- We don't need protective equipment; manual operations work.
- Protecting one state could damage another state;
- We have to follow NERC guidelines;
- We might get penalized by FERC if we get ahead of them;
- It is too costly; (Quebec was costly; 9 hours down – cost \$2B)
- We must figure probabilities. (GMD probability 100%; EMP likely).

NONE of that is true.

Critical Problem: Industry Resistance

- **NERC**, the North American Electric Reliability Corporation, which represents the interests of the private electric utility owners (about 70% of all utilities), has sole authority to set electric grid reliability standards that govern their operations. **They set low standards that shelter their liability, but do not protect the public.**
- **FERC**, the Federal Energy Regulatory Commission, can only order standards, and then either approve them or not, resulting in more delay.

John Kappenman & Curtis Birnbach Comments to NERC on Draft Standard TPL-007-1, Oct. 10, 2014

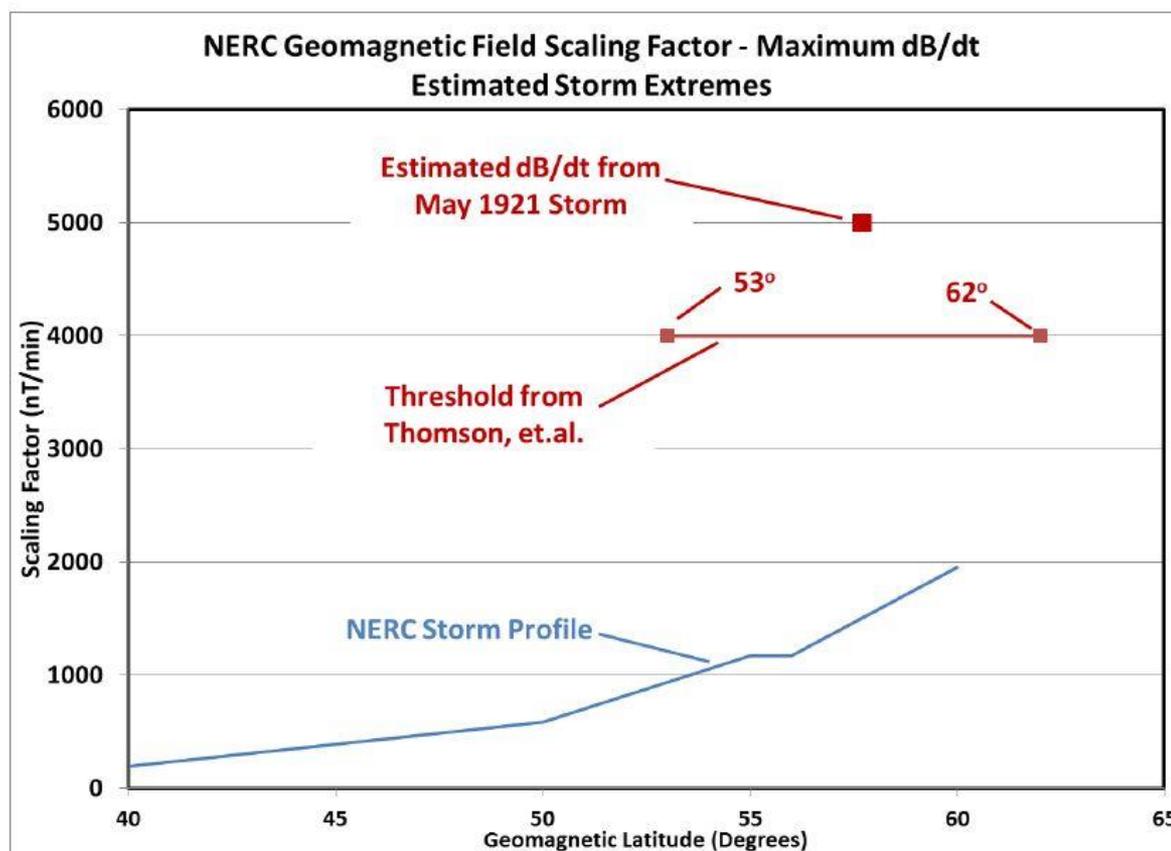


Figure 6 – Scientific Estimates of Extreme Geomagnetic Storm Thresholds compared to Propose3d NERC Draft Standard Profile

Chester, Maine Modeled Geomagnetically Induced Current (GIC)

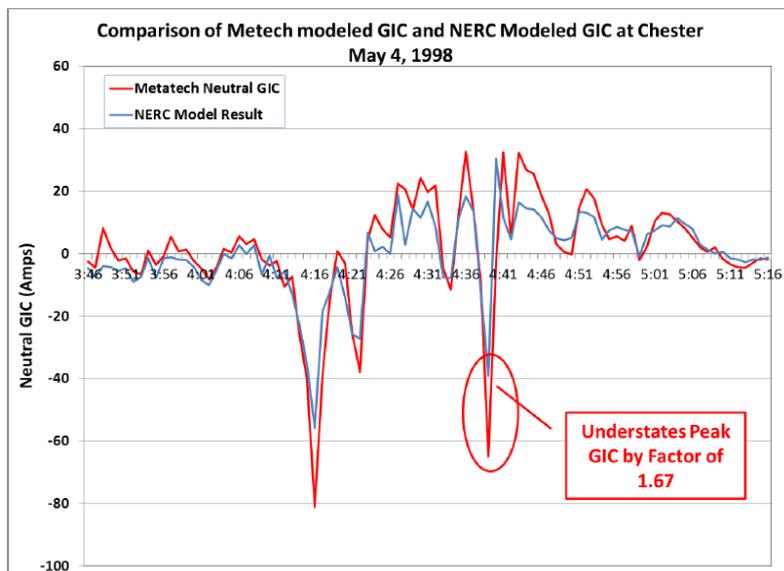


Figure 17 – Comparison of Metatech model GIC to NERC model GIC at Chester.

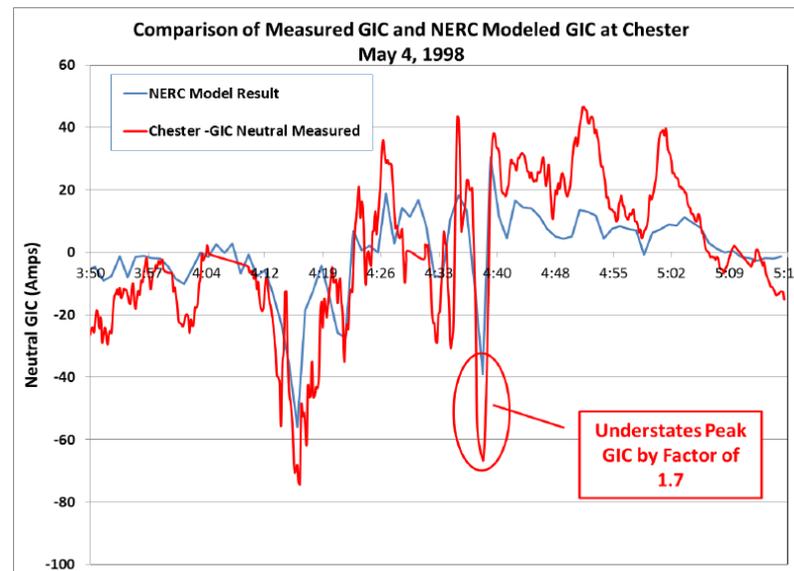


Figure 18 - Comparison of NERC model GIC to observed GIC at Chester.

From John Kapenman & Dr. William Radasky White Paper
On NERC GMD Standard, July 30, 2014

Locations of Electric Utility GIC Monitors

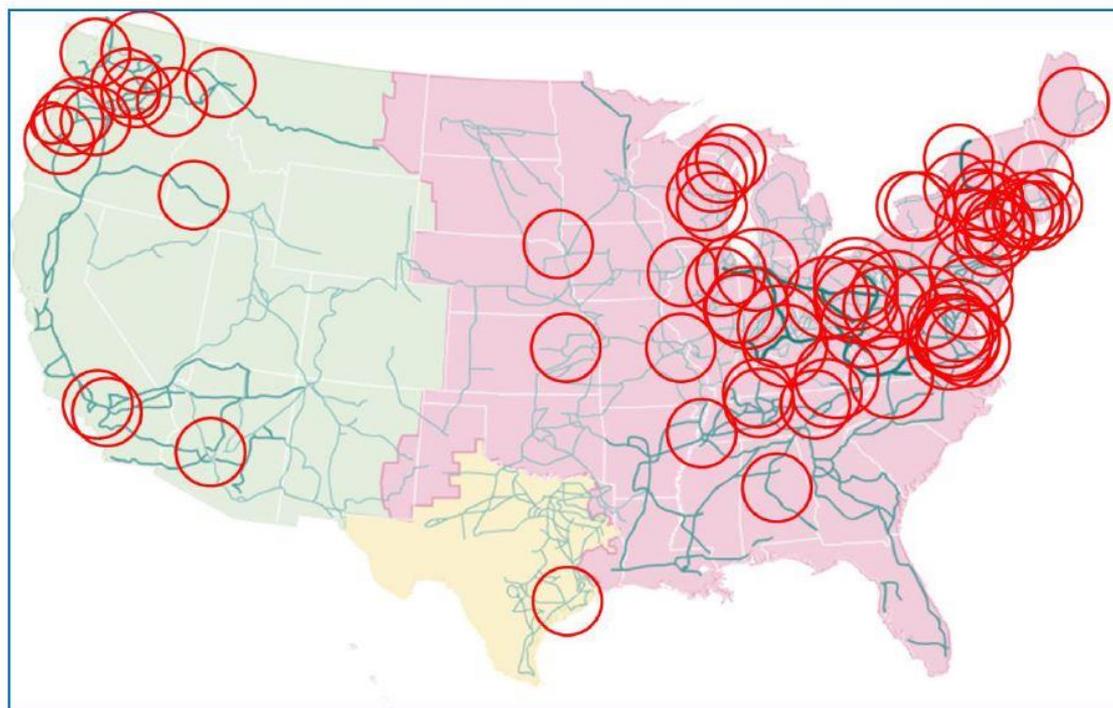


Figure 9 – GIC Observatories and US Grid-wide validation regions.

From Kappenman–Birnbach Comments to NERC

NERC does not use readings from GIC monitors to set benchmarks for grid reliability.

Conclusion from Kappenman – Birnbach Comments to NERC on Draft Standard TPL-07-1 for GMD

“In conclusion, **the NERC Standard has been defectively drafted** because the Standard Drafting Team has chosen to use data from outside the United States and which excludes important storm events to develop its models instead of better and more complete data from within the United States or over more important storm events. **GIC data in particular is in the possession of electric utilities and EPRI but not disclosed or utilized by NERC for standard-setting** and independent scientific study. The resulting NERC models are systemically **biased toward a geomagnetic storm threat that is far lower than has been actually observed** and could have the effect of exempting United States electric utilities taking appropriate and prudent mitigation actions against geomagnetic storm threats.”

Issues

- Conflicts in law complicate paths to accountability.
- State Laws in Maine offer certain avenues to support the public good.
- Power company tariff indemnifies them against public responsibility, liability.

MRSA Title 35-A, S3195, 4:

- 4. Ratepayer protection.** In determining the reasonableness of any rate-adjustment mechanism, the commission shall consider the transfer of risks associated with the effect of the economy and the weather on the utility's sales. To the extent these risks are transferred from the utility to its customers, the commission shall consider in a rate proceeding the effect of the transfer of risk in determining a utility's allowed rate of return.

MRSA 35-A, Section 17 PUC Reports

“If the commission determines that there exists insufficient independence on the part of the independent system operator ...or if it determines any other problem threatens regional transmission reliability, the commission shall provide a report to the joint committee of the Legislature having jurisdiction over utility matters with a recommendation as to what actions within the authority of the State are available to remedy this problem.”

Central Maine Power's tariff limits its liability

As with other power companies, it challenges ratepayer protection:

“...**In no event shall Central Maine be liable** for any incidental, consequential, multiple, punitive, special, exemplary, or indirect damages, or loss of revenue or profits, attorney's fees or costs arising out of, or connected in any way with the performance or non-performance of this Schedule 21-CMP or any Service Agreement hereunder, **even if such damages are foreseeable or the damaged party has advised Central Maine of the possibility of such damages and regardless of whether any such damages are deemed to result from the failure of inadequacy of any exclusive or other remedy.**”

Key Lessons Learned:

1. GMD and EMP threats present a challenge we can meet.
2. Protections are proven and low-cost.
3. Forgoing protections is irrational and potentially murderous.
4. A secure grid is a commitment to our children, our future.
5. A secure grid deters enemies and fortifies friends and allies.
6. A secure grid is a bulwark against despair and societal collapse.
7. Electric utilities must become relevant or get out of the way.

For Further Information

If you wish to access reports, testimony, and research from our work in Maine:

Call the **Maine Public Utilities Commission**, (207) 287-3831, and ask to be registered to view the online docket of the study **#2013-00415**; -or-

Call the **Maine State Law Library**, (207) 287-1600, and ask for a copy of the **LD131 legislative file** from the 126th legislature to be emailed to you.

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Thank You!

