

CPS: Medium: Collaborative Research: An Actuarial Framework of Cyber Risk Management for Power Grids

Award Number: ECCS - 1739422

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Award Number: ECCS - 1739485

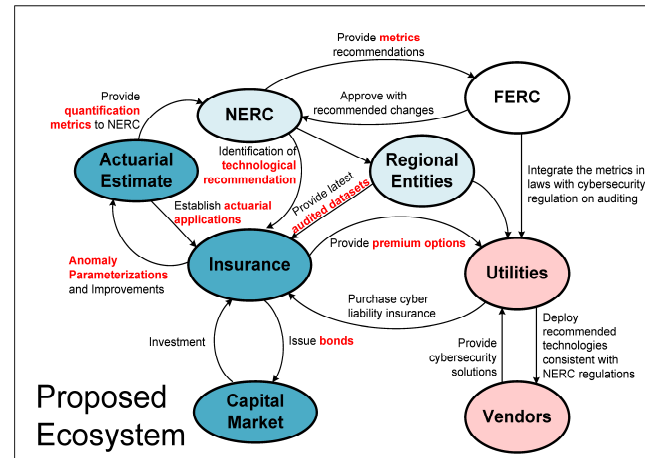
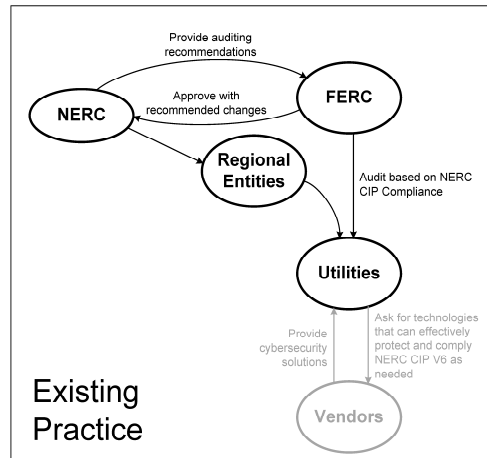
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Challenges:

- The fundamentals of the risk quantification have not yet been established, which should be the quantities that can reflect technological limitations deployed in the electrical network.
- This project is to establish actuarial models of cyberattacks on power grids based on integrated reliability and vulnerability analysis.

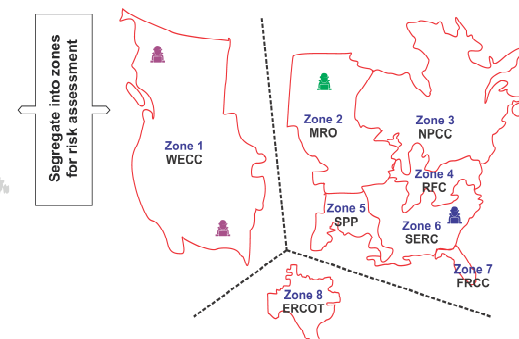
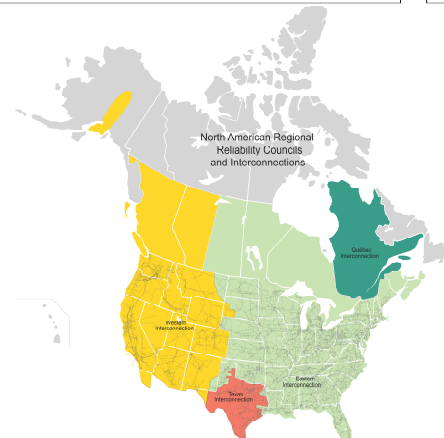


Scientific Impacts:

- The project develops cyber insurance models with a quantitative approach to inform asset owners to plan their investment in enhancing cybersecurity.
- The proposed actuarial model would be beneficial to establishing a sustainable ecosystem of electric utilities.

Solutions:

- Security protection of cyber assets in power infrastructures.
- Quantification of cyber risk with extracted anomalies, including reliability analysis, cascading failure evaluation, and potential monetary losses estimation.
- Establishment of an actuarial framework with the assessment of potential losses and the design of insurance policies



Broader Impacts:

- Increase social welfare, which would eventually facilitate the establishment of a mature market in cyber insurances.
- Inspire and stimulate actuarial research on many much-needed but challenging actuarial models, such as insurances for other high impact, low probability events.
- Promote educational and workforce development activities.