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Challenges of Cyber Security Economics in Distribution Systems

Industry Panel

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Economics Depend on Goal

- Security is the Bond Between Digital and Reality

- Malware is a Software Terrorist
  - So apply DHS principles
    - Avoid fragmented security
    - Recognize increased attack surfaces
  - Resulting in
    - Monitor and distill information
    - Correlate and predict threats
    - Take adaptive and pre-emptive approach
- It is not all cyber

Energy and utilities attacks – impact scenarios

Reliability impacts

a potential brown/black out of a large geographical area/or concentrated at an area where other critical infrastructures depend on power, water treatment plants, transportation centers, etc.

Safety impacts

potential harms to utility personnel and/or customers - re-energize systems where maintenance crews are deployed or exploding transformers with hazardous waste

Productivity impacts

Risks to utilities' capacity, delivery and overall ability to provide a consistent product/service to their customer base

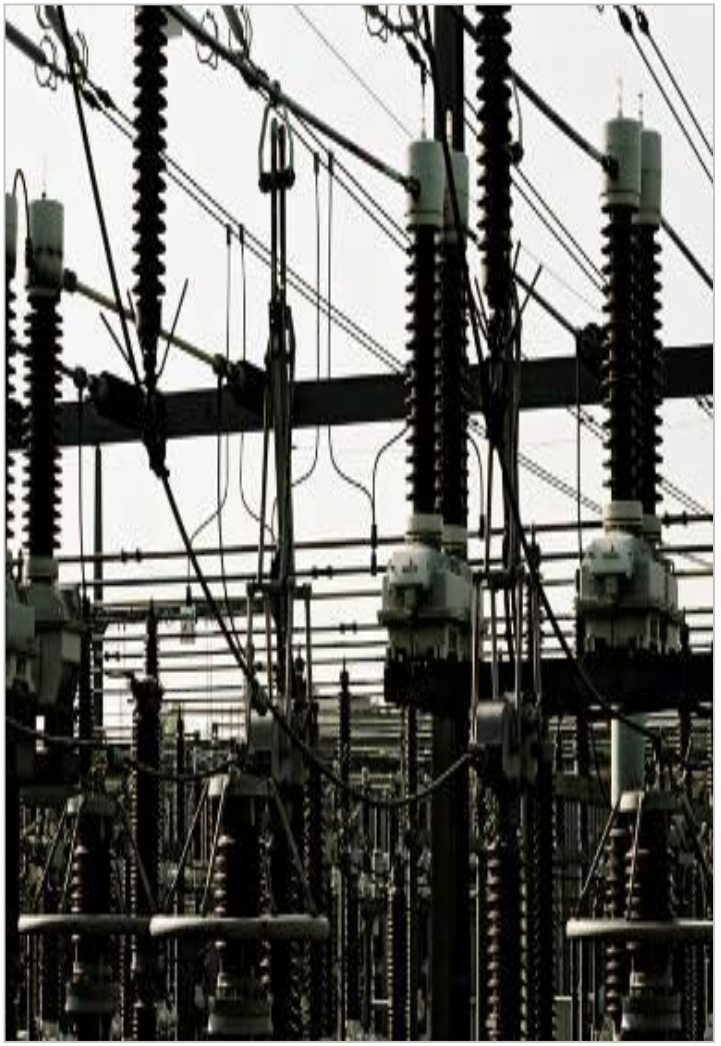
Reputation impacts

exposure of sensitive customer data (e.g., usage info, SSN, credit card, etc.) - extraction of such data, including union employee healthcare data

The balance of risk for energy and utilities organizations is unique, economics of scale and operational capability are real challenges if *"End to End Cyber Security"* is your mandate for distribution networks

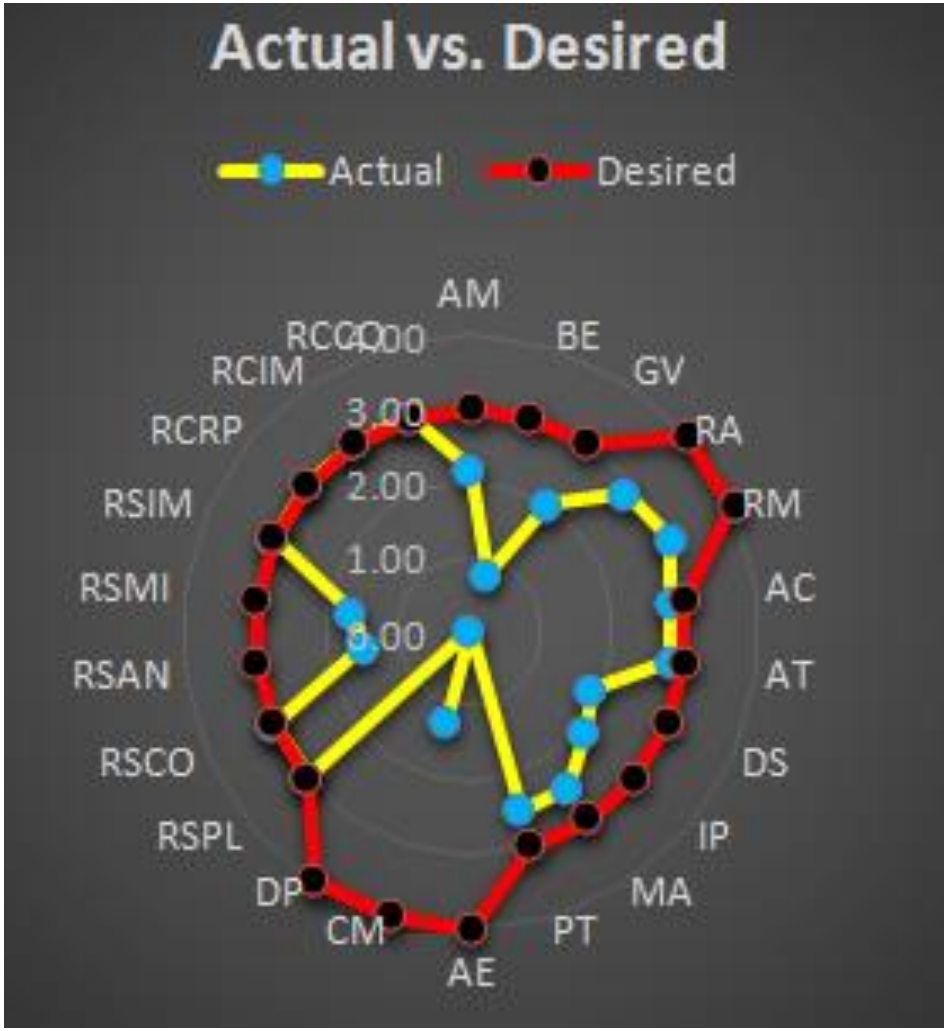
Challenges are not unique to North America

- A Government initiative in the Middle East has a goal of a secure 2020 Smart City grid
- A Utility is considered National Critical Infrastructure
- Scope of Smart City program has 500 transmission stations and 22,000 distribution substations to secure, requiring a threat and risk management approach as numbers and scale too large for a traditional approach.
- Security capability, maturity and threat modeling in use.



NIST CSF Distribution Maturity Roadmap

- Current state of distribution systems and threat modeling show gaps and opportunities for investments in:
  - Cyber security governance (BE)
  - Anomalies and Events (AE)
  - Continuous Monitoring (CM)
  - Detection Processes & Procedures (DP)
  - Respond Analysis (RSAN)
  - Respond Mitigation (RSMI)
- While threat modeling warranted investment into substation and device hardening, increased monitoring and response showed greatest benefits



From NIST CSF v 1.0 of 2-12-14, Appendix A, table 1

Function Unique Identifier	Function	Category Unique Identifier	Category
ID	Identify		
ID.AM	Asset Management		
ID.BE	Business Environment		
ID.GV	Governance		
ID.RA	Risk Assessment		
ID.RM	Risk Management Strategy		
PR	Protect		
PR.AC	Access Control		
PR.AT	Awareness and Training		
PR.DS	Data Security		
PR.IP	Information Protection Processes and Procedures		
PR.MA	Maintenance		
PR.PT	Protective Technology		
DE	Detect		
DE.AE	Anomalies and Events		
DE.CM	Security Continuous Monitoring		
DE.DP	Detection Processes		
RS	Respond		
RS.RP	Response Planning		
RS.CO	Communications		
RS.AN	Analysis		
RS.MI	Mitigation		
RS.IM	Improvements		
RC	Recover		
RC.RP	Recovery Planning		
RC.IM	Improvements		
RC.CO	Communications		

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