What is Cybersecurity and What Should be Included in a Security Program?

Presented By:

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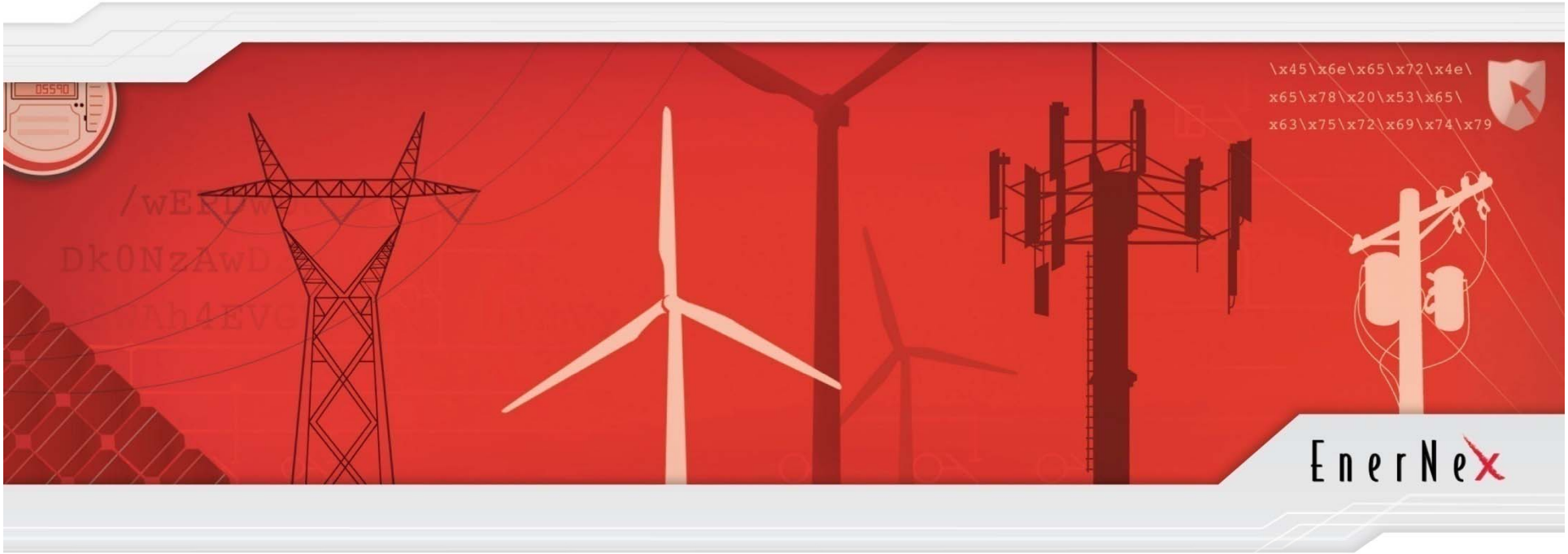

Agenda

- Defining security and safety
- What does security include?
- Overview of what is included in a security program versus an information security program
- Things to consider when building a security program

Information Warfare

"There's a war out there old friend – A world war – and it's not about who's got the most bullets; it's about who controls the information. What we see and hear, how we work, what we think, it's all about the information!"

- Ben Kingsley, Sneakers, 1992

The Enterprise vs. Professional Bad Guys

- Enterprise
  - Laws, Regulations
  - Limited / Tight budgets
  - Limited staff
  - 9-5, M-F, time off
  - Many times, unappreciated
  - Responsible to protect against unlimited attack vectors
- Bad guys
  - No rules
  - Well funded
  - Active 24 / 7/ 365
  - Mostly, motivated “$$$”
  - Take the path of least resistance
  - Bored and looking for a challenge

Energy Sector Industry Challenges

- Security is more ***IMPORTANT*** than ever before as control systems are evolving
  - Increasing use of varied communication methods
    - Lower installation costs
  - Additional connections to external systems
    - Supports changing operational and business needs
  - New and emerging regulatory requirements
- Security is more ***COMPLICATED*** than before
  - *Utilities* are faced with limited security expertise
    - It shouldn't take a security expert to configure a device properly!
  - *Vendors* need alternatives to proprietary solutions
  - *Utilities* and *Vendors* need a straight forward method to communicate user needs, product features, and configuration parameters relating to cyber security functions

A Systems View of the Modern Grid

Key Success Factors

- Reliable
- Security
- Economics
- Quality
- Efficiency/Environmental Quality
- Safety

Characteristics

- Self-healing
- Integrated at all levels
- Distributed
- Predictive
- Empowers/Incorporates Consumer
- Tolerant of Security Attack
- Power Quality for 21st Century
- Wide Variety of Generation Options
- Enables Electricity Markets

Performance

- Emergency Response
- Restoration
- Routine Operations
- Optimization of Assets
- Systems Planning

Metrics

- Congestion Costs
- Massive Blackout Probability
- Restoration Time
- Peak to Average Load Ratio
- Capacity Utilization

Key Technologies

- Integrated Communications
- Advanced Control Methodologies
- Sensing, Metering, and Measurement
- Advanced Grid Components
- Decision Support & Human Interfaces

Source: Overview of the Modern Grid Initiative, S Pullins, MGI Team, NETL, DOE

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Security as Enabler

Security and Safety – the same thing?

Safety

- **Freedom from danger, risk, or injury.**
- A device designed to prevent accidents
- The condition of being safe from undergoing or causing hurt, injury, or loss
- A device designed to prevent inadvertent or hazardous operation

Security

- **Freedom from risk or danger**
- Freedom from doubt, anxiety, or fear; confidence.
- Something that gives or assures safety, as:
  - A group or department of private guards
  - Measures adopted to prevent espionage, sabotage, or attack.

Security and Cybersecurity

Security

- Freedom from risk or danger
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Cybersecurity

- A measure of system's ability to resist unauthorized attempts at usage or behavior modification, while still providing service to legitimate users.
- The protection of data and systems
- Actions required to ensure freedom from danger and risk to the security of information in all its forms (electronic, physical), and the security of the systems and networks where information is stored, accessed, processed, and transmitted (DoD)

Parkerian Hexad

- Six fundamental, atomic, non-overlapping attributes of information that are protected by information security measures
- Defined by Donn B. Parker in 2002, renowned security consultant and writer, they are
  - Confidentiality
  - Possession / Control
  - Integrity
  - Authenticity
  - Availability
  - Utility

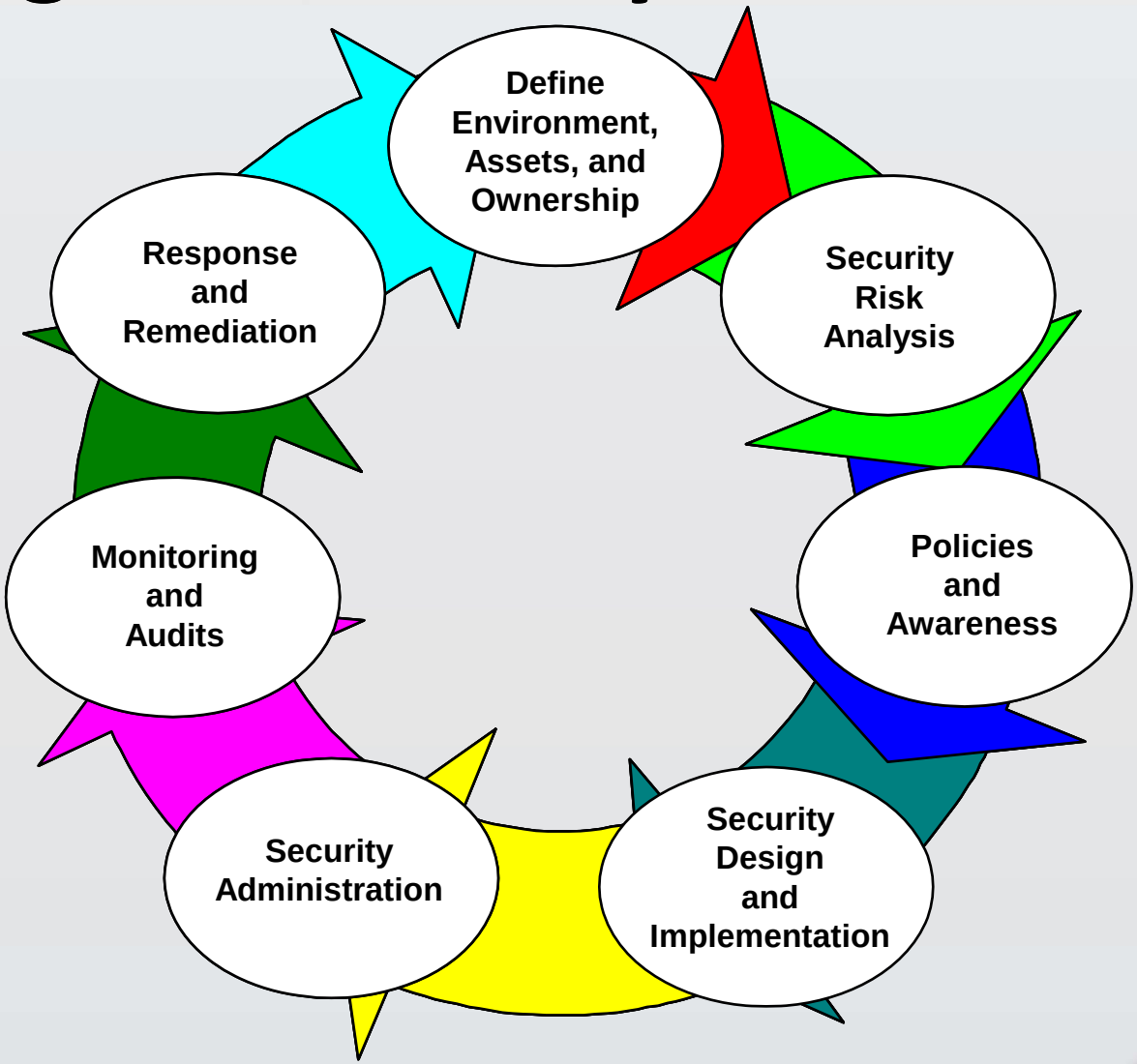
Cybersecurity – IT versus Control Systems

- How we secure IT systems is not the way we can secure control systems
  - Shifting and combining the analog / electro-mechanical and digital environments
- IT focuses on confidentiality and integrity
  - Many cybsersecurity issues
  - Almost a disposable environment
- Control systems focus on integrity and availability
  - Not many cybersecurity issues
  - Equipment lifecycle a few months to a few years

We Know

- If we can persuade you to run something, it's not your machine anymore
- If someone can alter your OS, it's not your machine anymore
- If someone can gain physical access, it's not your area anymore
- If someone can upload to your machine or website, it's not yours anymore
- Weak passwords ruin strong security
- An environment as secure as personnel are trustworthy
- Encryption is only as secure as the decryption key
- Out-of-date virus scanners are only a bit better than no virus scanner
- Anonymity is not practical
- Technology is not a panacea

Information Security Management Lifecycle



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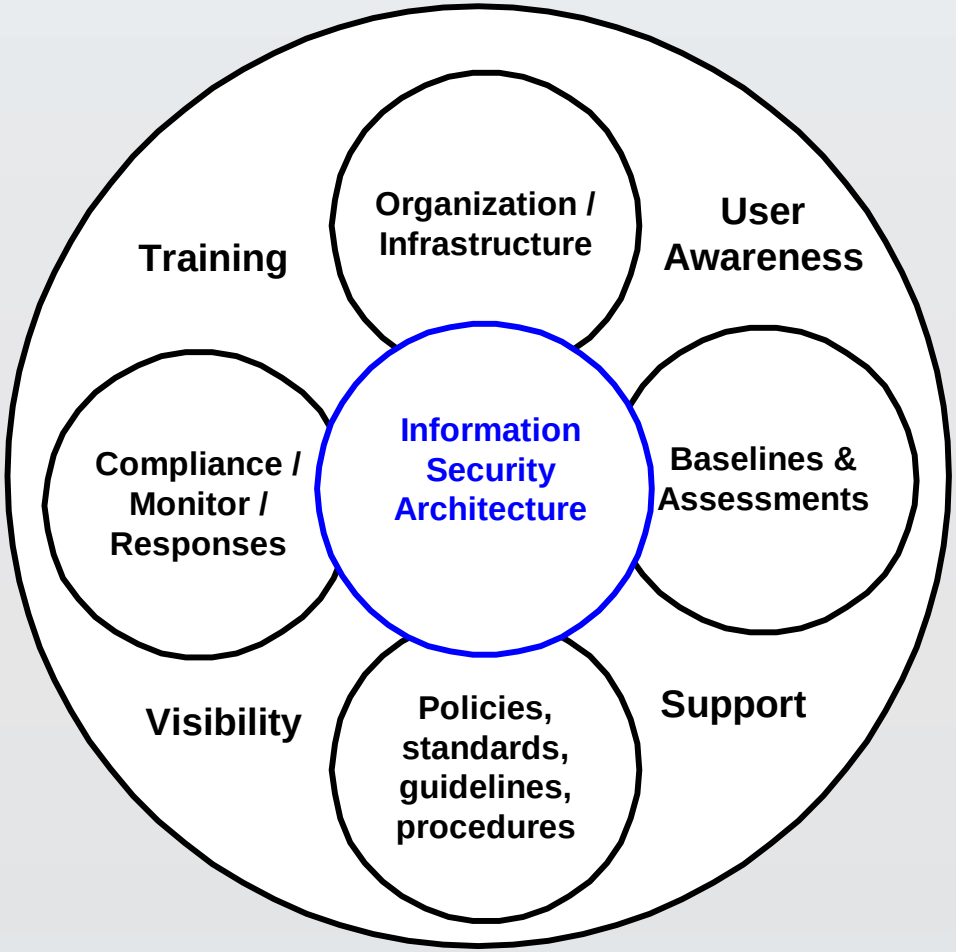
What an Information Security Program Contains



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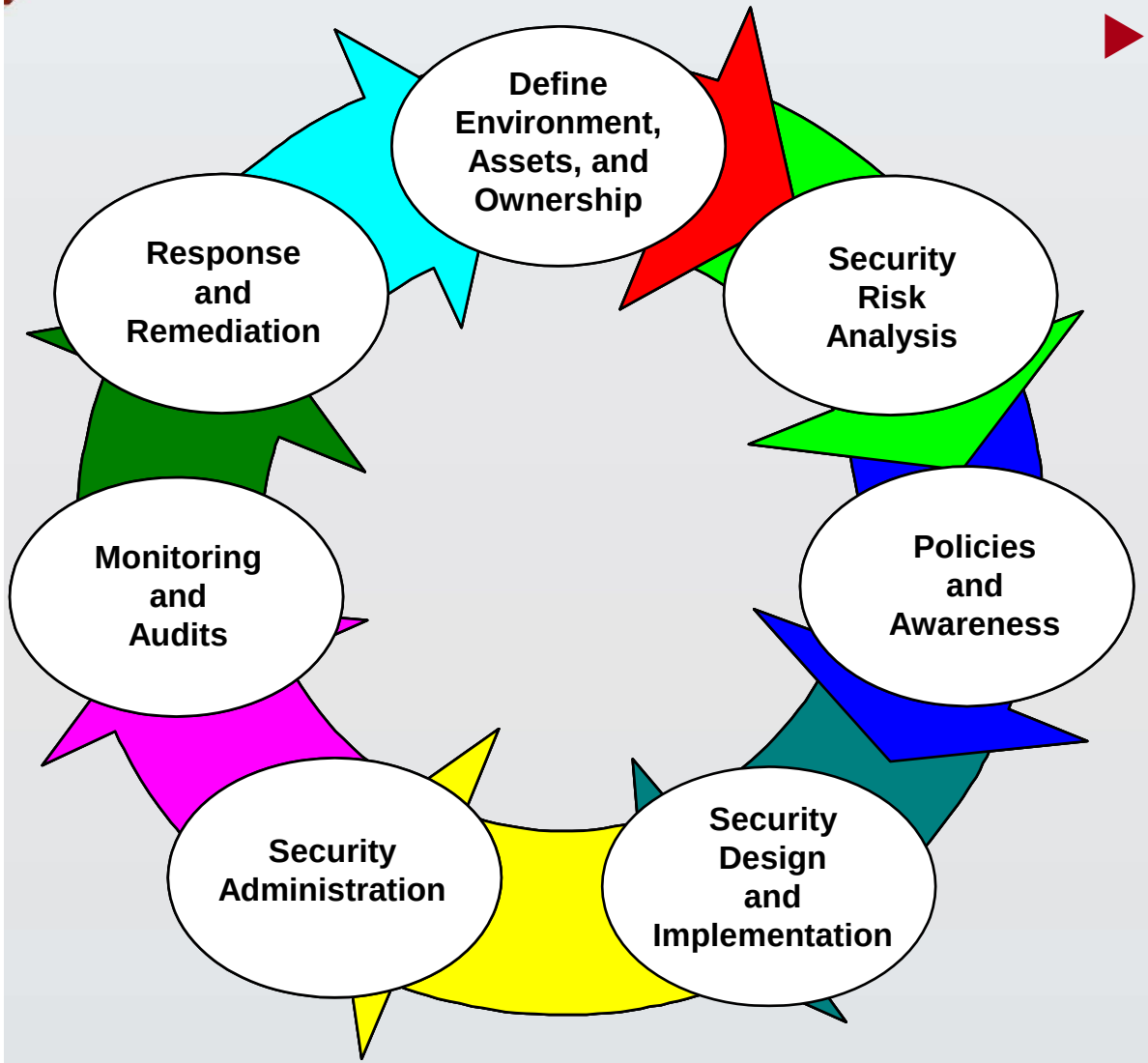
Security Management Lifecycle



- Need to add
  - Personnel Security
  - Facilities / Property / Restricted areas
  - Physical Security Equipment
  - Identification cards / Badges
  - Guards

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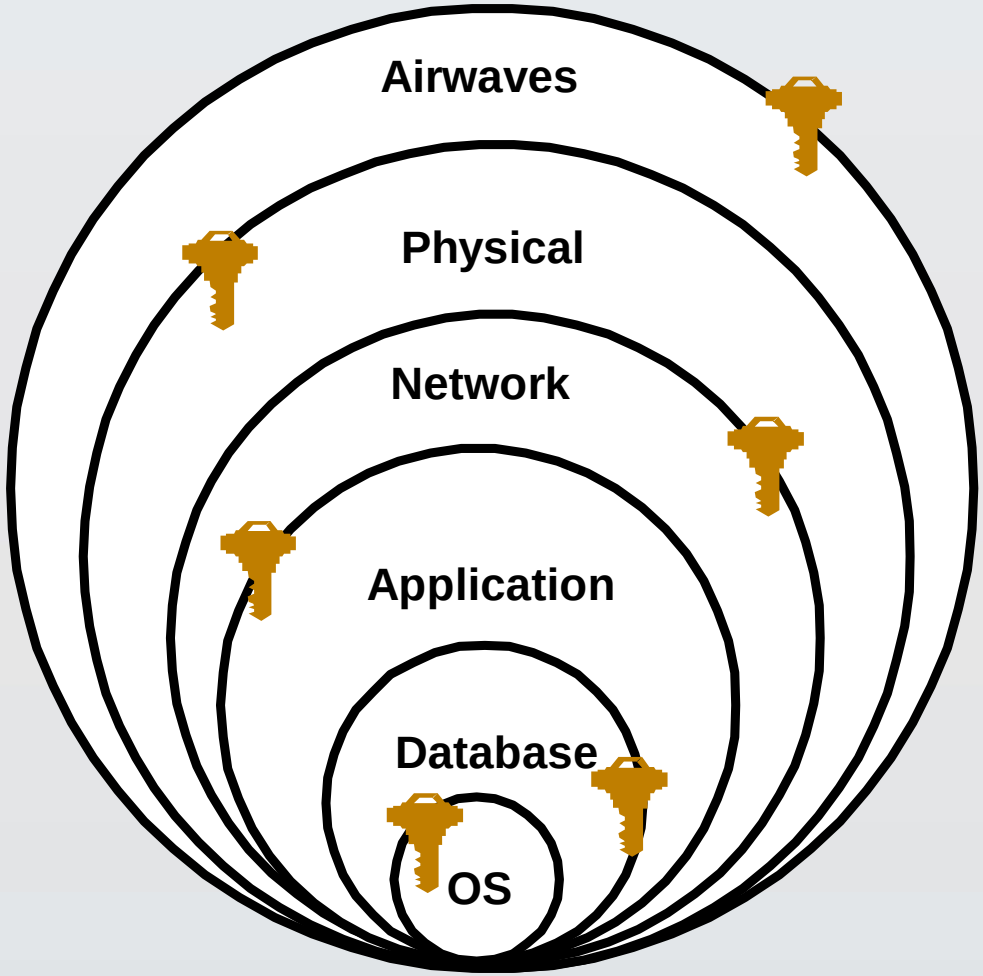
Asset Protection in Layers

- Need to establish depth-in-defense when implementing security



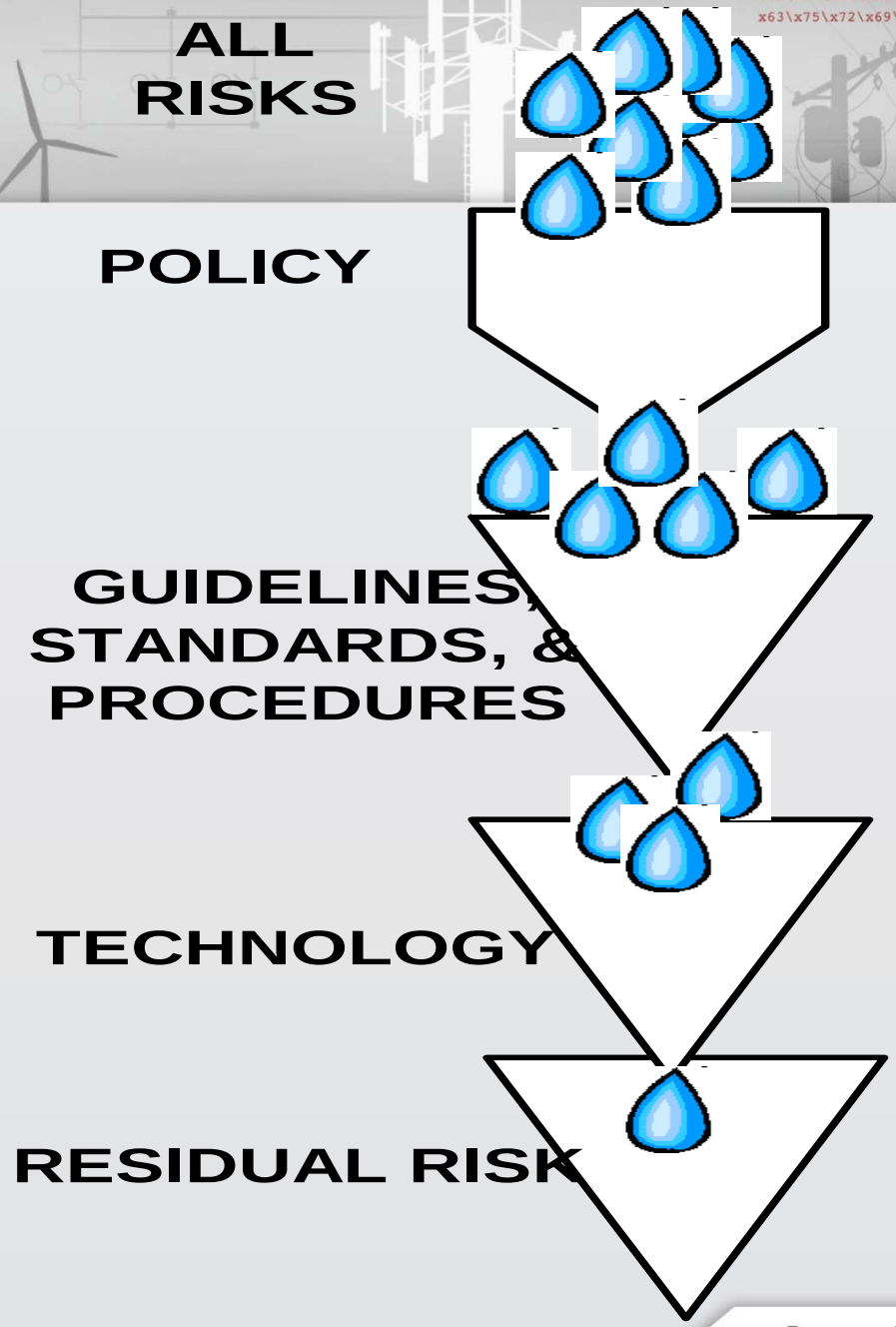
Physical Security Thoughts

- **Deterrence** provides countermeasures and controls to defend against attacks on the assets being protected
- **Detection** monitors for potential breakdowns in protective mechanisms that could result in security breaches
- **Delay** is a necessary measure if there is a breach, to slow down the intruders long enough to allow a security team to apprehend them before they achieve their objective
- **Response**, which requires human involvement, covers procedures and actions for assessing the situation and responding to a breach
- **Recovery** is your plan to continue business and operations as normally as possible following an incident
- **Re-evaluation** is critical. You must constantly keep your physical security under review and keep re-visiting your original assessment and objectives

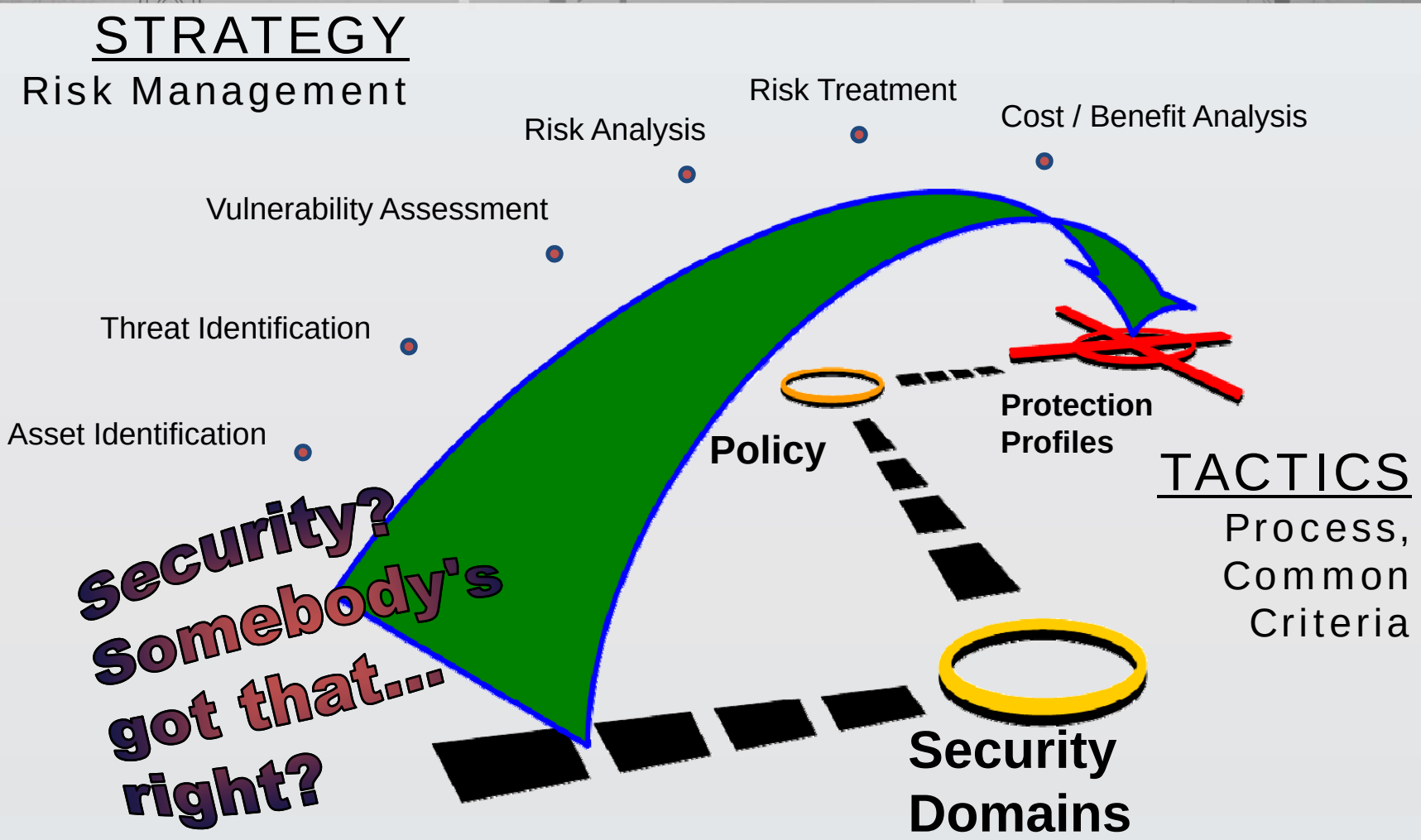
Principles and Strategies

- Security as a holistic approach
- Security as a public / private collaborative (nationally / globally)
- Build security into the business requirements and processes
- Standard set of security standards, practices, and requirements
- Standardized testing (conformity / security)
- Awareness to the enterprise, third parties and customers, including privacy
- Not reinventing the wheel for all the above

Need to establish a risk baseline before you start selecting and implementing security requirements



Developing the Security Architecture



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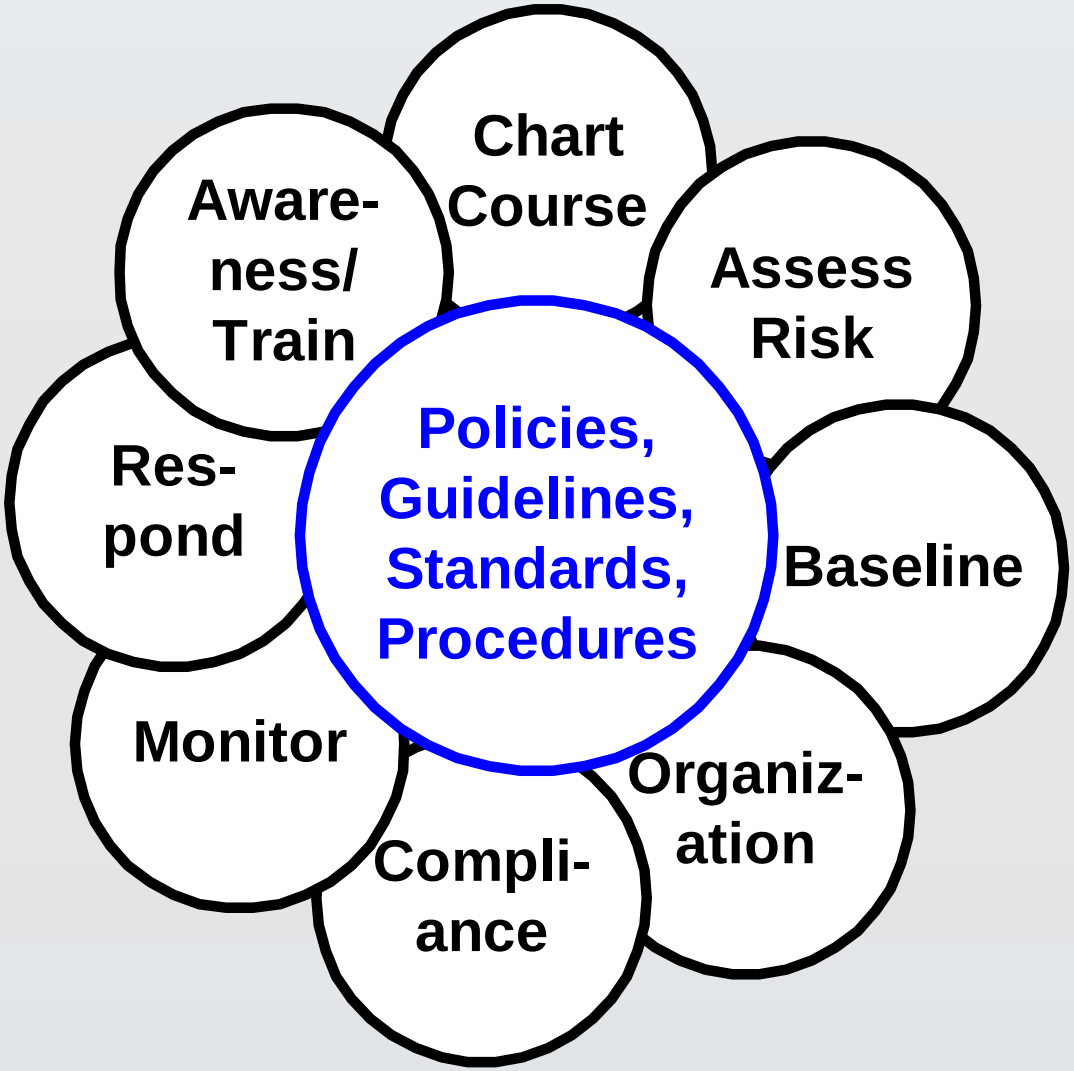
How Do We Govern Assets?

- Administrative and managerial measures
  - Policies & procedures guide behavior
  - Acceptable use
  - Roles and responsibilities
  - Serve business need
  - Systems configured & maintained to policy specification
  - ALL PEOPLE
- Physical
  - Buildings, floors
  - Locks, key cards, guards
  - Hot, warm, off-site storage
  - Desks, recycling & shred bins, dumpsters
  - Cameras, access logs
  - Background checks
- Technical measures
  - Authentication
  - Access control (segregation of duties)
  - Audit
  - Automated software
  - Logging and monitoring

Continuous Process



Reference: Building an Effective Information Security Policy Architecture, by Sandy Bacik, Page16.

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What you need to consider?

- Continually evaluating risk
- Continually reviewing, evaluating, testing controls (and compensating controls)
- Communication with the business, executives, and operations
- What already exists?
- Culture

EnerNex Cyber Security Offerings

- Security Architecture and Policy Development
- Utility Automation Security
- NERC-CIP
- Hardware Embedded Security
- Security & Penetration Testing
- Vulnerability Analysis
- Risk Assessments
- Security Audit Development
- Regulatory Compliance
- Security Training

- *Clients:* Consumers Energy, U.S Department of Energy, Duke Energy, Florida Power & Light (FPL), Southern California Edison (SCE), Tennessee Valley Authority (TVA), TXU Energy

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