

# Leadership in Embedded Security

*Breakout 5 - Smart Grid/Infrastructure*



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# Identify 3 Key *Trends* in the Application Area

- Increasing distribution/heterogeneity of system
  - DERs: home batteries, microgenerators, solar
  - decentralization of ownership and control
  - active demand management
    - via consumer choice
    - via “virtual utility”
    - PNNL pilot: autonomous appliances, no control
- Unexpected dependencies
  - between infrastructures. (propagation of attacks, and of failures)
  - grid repair staff use cellphones
  - sensor calibration. (40 gallons)
  - Max/min price ratio caps.
  - Who is hurt vs who can help
  - power consumption contracts for data centers led to more waste
- Confused expectations
  - Developed vs undeveloped world:
    - reliability
    - need to accommodate legacy systems
  - Goal of making things “smart”
    - efficiency? security? profit for some player?



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## Identify 3 Key *Challenges* in the Application Area

- Mismatch between security lifetime of software (and crypto) vs lifetime of physical components
  - also the reverse direction: new software might be spun up much more quickly than a new giant transformer
- Focus on cyber attacks can lead to overlooking effective simple kinetic attacks
- Authentication/authorization in emergency situations
  - e.g., getting the repair person into the component
- What is “infrastructure”?
  - Besides power.... water? oil/gas? communications? ag?
- Potential human consequences
  - e.g., grandparents on dialysis
  - e.g., national security



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# Identify 3 Potential Novel Solutions in the Application Area

- Education.
  - Consumers (and other players) need to understand their choices and the potential consequences
  - Negative example: upgrading to an efficient hot-water heater made things worse
- Technological
  - Short-lifetime, updatable components next to longer-lifetime ones
    - Crypto...but also input validation
    - Consider the perimeter
  - Crypto agility
- Economic
  - e.g., who deploys the smart meters?
  - e.g., will customers care enough for price-based ADM?
  - e.g., can the right auctions remove information/value conflicts?



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## Extra Slide

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