

# Characteristics of Industrial and Commercial Networks

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# Standby/Networked Power Regulations Affect More Than Common IT Equipment

- Analytical approaches to networked standby power have focused on the common consumer by simply gathering published catalog data
- The advantage of connectivity is greater sensing, control and management of the *systems created by these network linkages*
- Open/constant network communication paths are essential: without a network you can't have a system
- Interruptions to communications cause tears in the “net”, i.e. no net-work
  - If a network loses connection because a device carrying networked information enters an extreme low power mode, the network is impaired or lost
- Research that examines individual devices falsely assumes that devices can drop in and out of communications and there will still be a network. This ignores the fact that mesh networks and other architectures are created by the devices themselves.

# Industrial and Commercial Network Devices are not Dissimilar from Consumer Network Devices

- Examples of networked capable equipment in NEMA Scope:
  - Lighting Systems, LED Bulbs
  - Backup Power Supplies
  - Industrial Automation Controls
  - Utility Power Management Systems (Grid Reliability and Recovery)
  - Supervisory Control and Data Acquisition (SCADA) Systems
  - HVAC and Climate Control Systems
  - Building Management Systems
  - Fire Systems, Life Safety Systems, Nurse Call Systems
  - Security Systems, Emergency Communication Systems
  - Electric Vehicle Supply Systemsand more

# Functioning Networks are Necessary

- While some codes and regulations recommend a special network for certain systems like health and safety, this is not universal, and a second network is one of the first things “value engineered” out of building plans

Example: home security systems typically use the home's single network, leading to vulnerabilities of many kinds, including if low power modes cause interrupted communications between sensors and the server

# Zigbee Alliance

The Zigbee Alliance has this to say about Networked Standby Power and IoT systems:

- “These innovative connected IoT systems are expected to cover a wide-range of applications. The benefits, features and functionality of the systems are increasingly enabled by incorporating additional (secondary) functions like energy storage, sensing, imaging and networking functions. These additional functions will consume some additional energy and cannot be switched off completely without being disconnected from the power source.”
- “One of the core tenets and guiding principles in Zigbee Alliance standards is low-power usage for all devices in a network. While actively supporting the reduction of energy waste, the Zigbee Alliance believes new system oriented methodologies need to be developed to properly characterize and measure energy consumption of these new multi-function connected lighting systems. With effective efforts in this direction, regulatory agencies worldwide will be able to continue their primary mission of driving improved energy regulation and policy while enabling continued deployment of complementary applications beneficial to a society driven by innovation within the Internet-of-Things.”

<https://www.zigbee.org/zigbeealliance/white-papers/>

<https://www.zigbee.org/zigbee-for-developers/about-us/>

# Further Study Needed Before Setting Minimal Networked Standby Power Allocations

- Standby and network power consumption of devices has been examined in a limited manner, by cataloguing reported standby power levels
- Power consumption for network communications can depend on the traffic on the network being carried. Many devices can expand to provide more than on/off control of that individual device.
  - Example: a networked light fixture can just be on/off, or be enhanced with vacancy/occupancy sensors embedded to enable energy savings based on room occupancy or to provide security sensing. The power needed for these added sensors is some factor greater than simple on/off control capability.
- This is a moving target, with no two networks the same
  - Q: How can we say One-Size-Fits-All for network standby? A: We can't
- Studies of the variation of network power needs must be done, for a large scope of devices, to better understand the varying levels of power needed depending on a network's duties
- For more please see NEMA White Paper [IOTP-1](#)