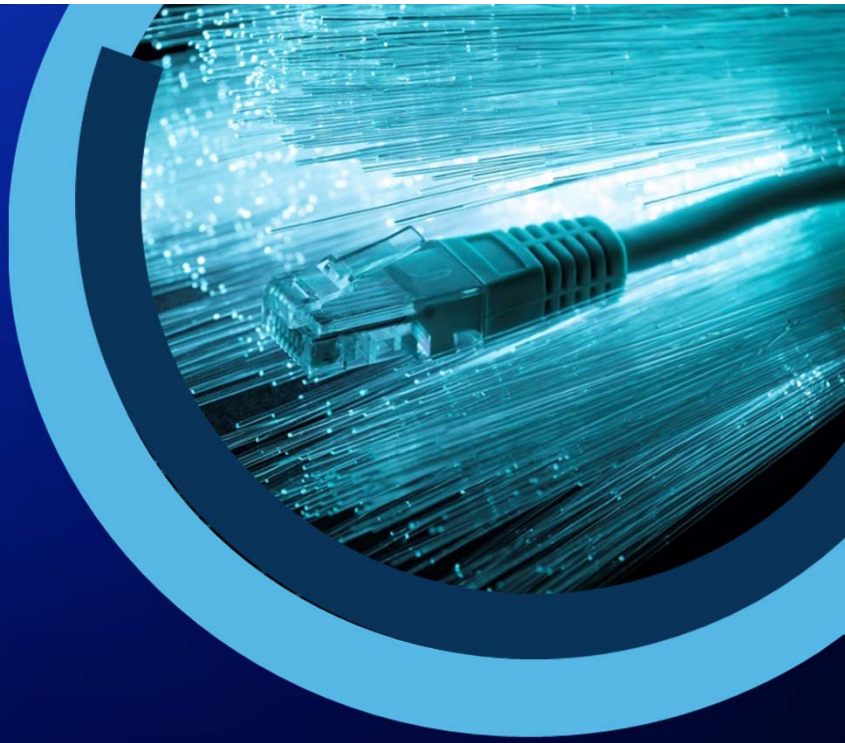
The Real Impact of High-Power PoE on Your Network



NECA • BICSI
SUMMIT 2022

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Discussion

- Setting the Stage!
- Energy Consumption View
- How the Network has Changed!
- Digital Electricity
- Structured Cabling Impacts and Considerations
- Key Takeaways

Definition - Smart Building Technology

WHY SUSTAINABLE SMART BUILDINGS?

ENHANCED OCCUPANT SATISFACTION

Guests can experience advanced control and customization using connected technology, and Operations will be made easy with accessible centralized control and notification platforms

CAPEX & OPEX COST SAVINGS

By using less physical materials, utilizing less expensive labor, and reducing energy consumption, luxury hospitality projects can save money on both capital and operational costs

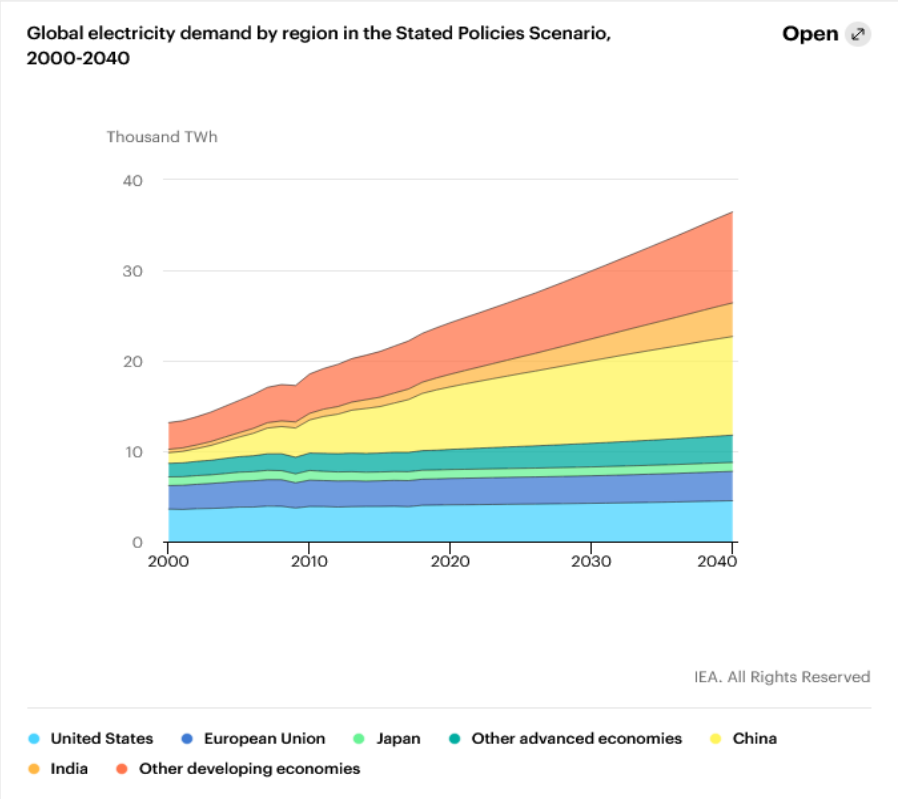
REDUCED ENVIRONMENTAL IMPACT

Using DC Technology, we can eliminate the use of fossil fuels, and substantially reduce the operational and embodied carbon being used in the project

MORE USABLE SPACE

Using intelligent distributed design gives the opportunity to generate more usable space by eliminating the need for IDFs and Electrical Closets

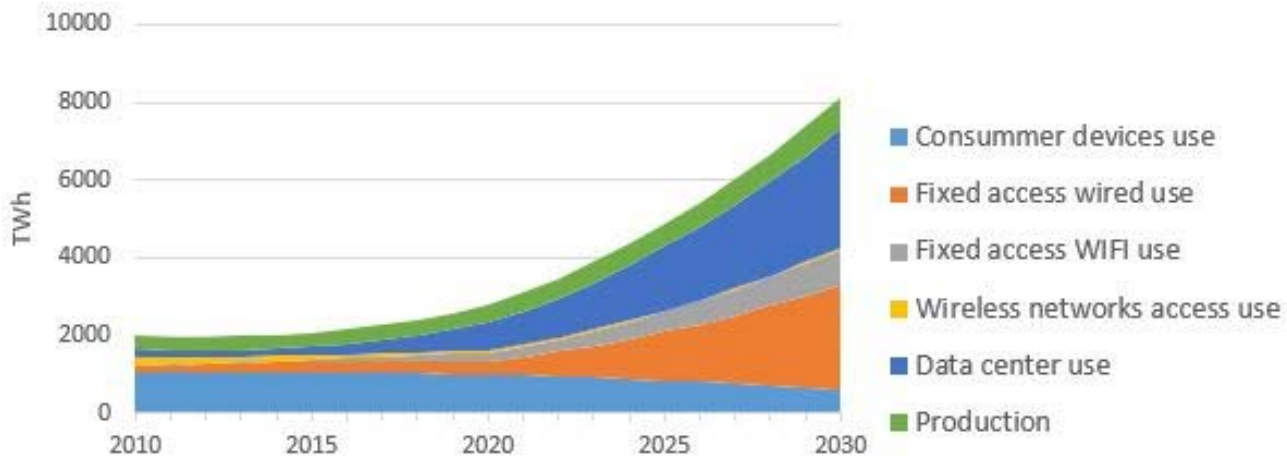
Global Electricity Demand 2000 - 2040



Source: IEA

Electricity demand follows two distinct regional paths. In advanced economies, future growth linked to increasing digitalization and electrification is largely offset by energy efficiency improvements. In developing economies, rising incomes, expanding industrial output and a growing services sector push demand firmly up. Developing economies contribute nearly 90% of global electricity demand growth to 2040 in the Stated Policies Scenario, but demand per person in these economies remains 60% lower than in advanced economies.

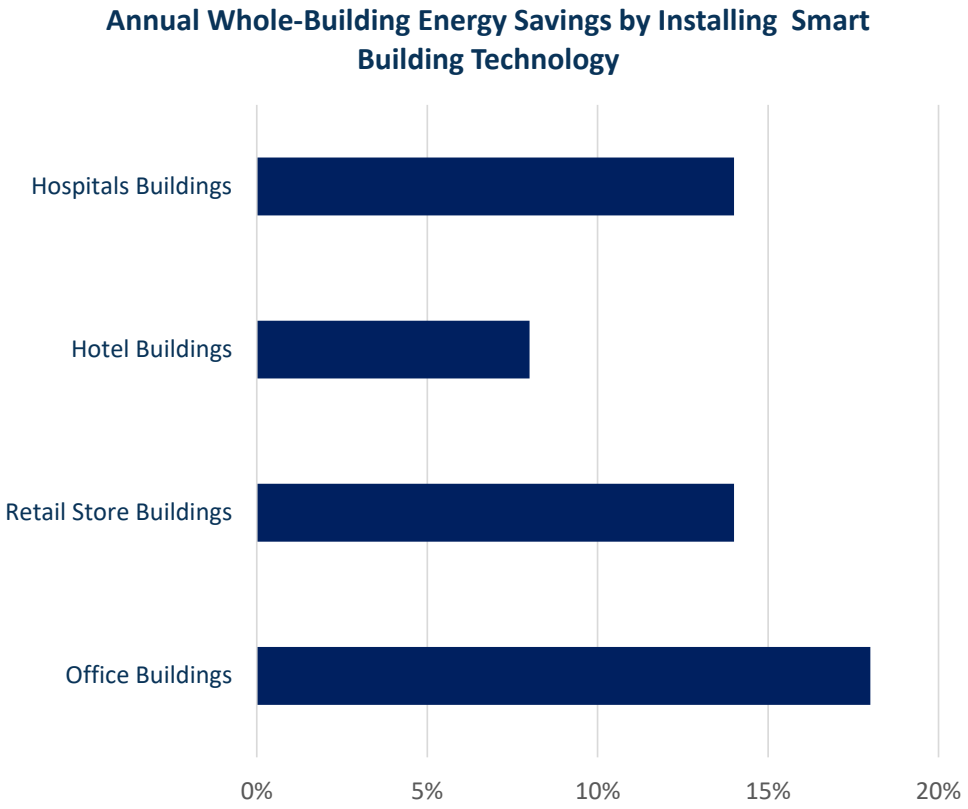
Power Consumption Linked to ICT, 2010 - 2030



Currently, ICTs account for between 5% and 9% of total electricity consumption, and their development suggests a deep transformation of energy systems, from smart networks to customer management or decentralized energy exchanges.

Source: Enerdata

Sustainability through Smart Technologies



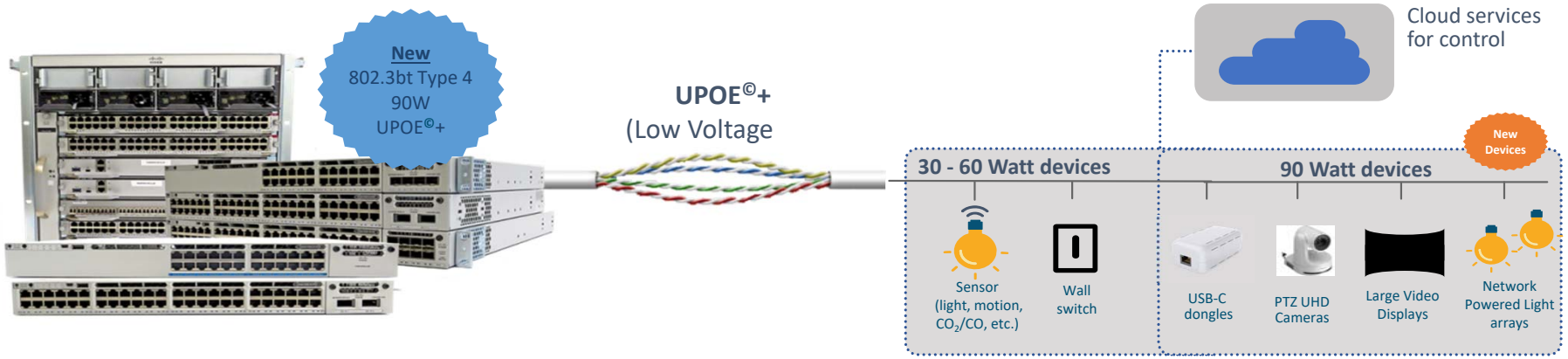
Smart building technologies like occupancy sensors, smart thermostats, HVAC and lighting controls can significantly reduce energy consumption in a variety of building types.

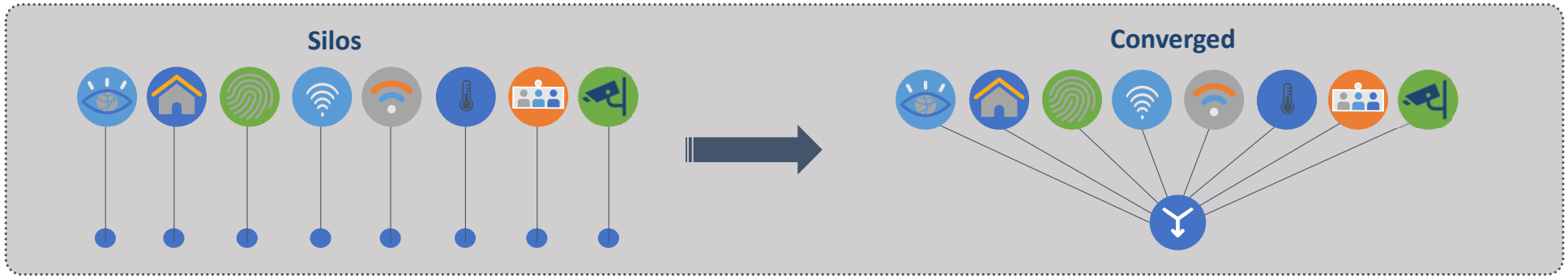
Intelligent Buildings & Sustainable Cabling

Environmental & Economic Benefits

- 30-50% reduction in energy usage
- 14% savings in building operation and maintenance costs
- 5% higher operating income and building asset value

IT Networks Shift: IT/OT Convergence





End-to-end solution managed by central IT provides lowered costs, intelligent control, new experiences

Creating a World of Building PoE Endpoints

Base building services


Access Points


HVAC VAV's


Ceiling Fans


Smoke alarm


Power Meter


Touchscreen PC's

Tenant Access & Security


Surveillance cameras


Biometric Door Locks


Facial Recognition Systems


Entry Barriers And Turnstiles


Badge readers


IP Call Tower

Workspace Transformation

Meeting Room Nameplate


POE Displays


Temp Sensor


Light Fixtures

Status Signs


Horns and Sirens

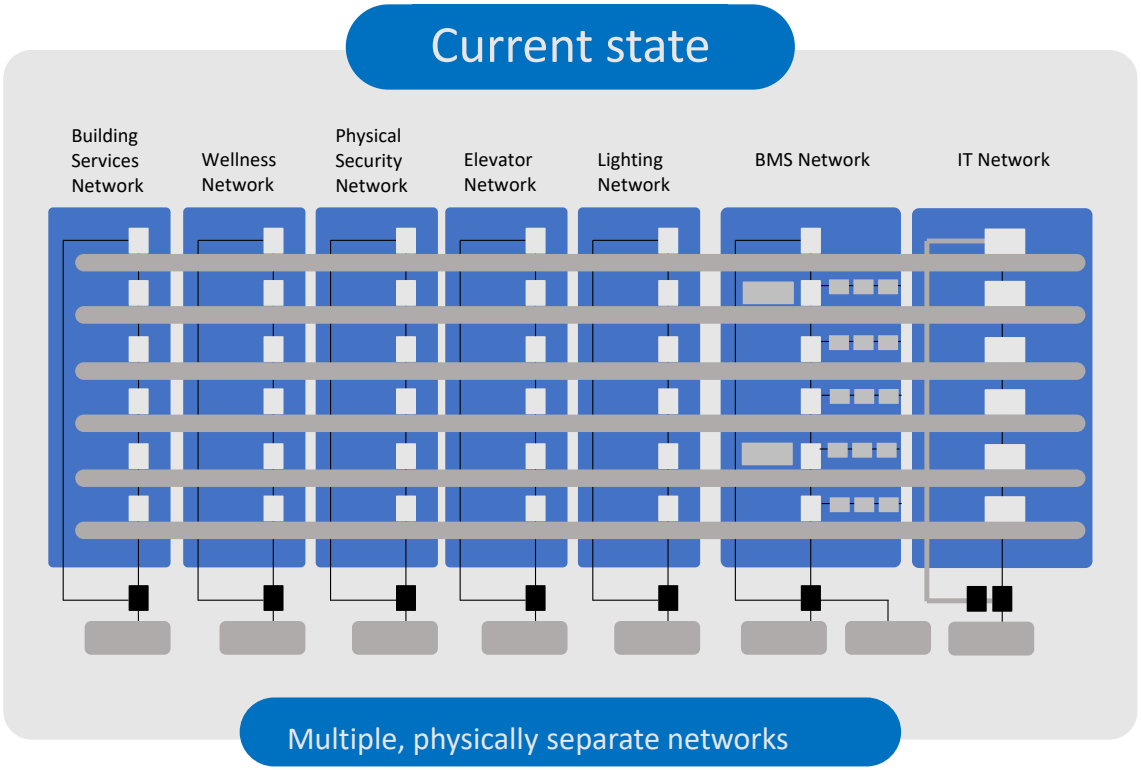

IP Call Stations

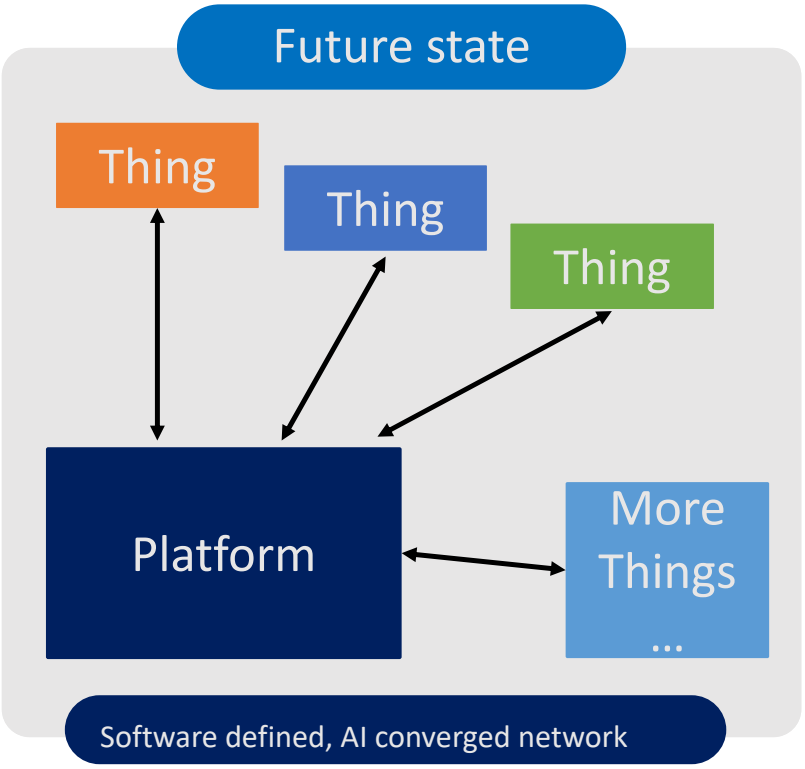

Environmental Sensor Hubs


Blind Motors


Curtain Motors

Eliminate Duplicity & Waste - Convergence





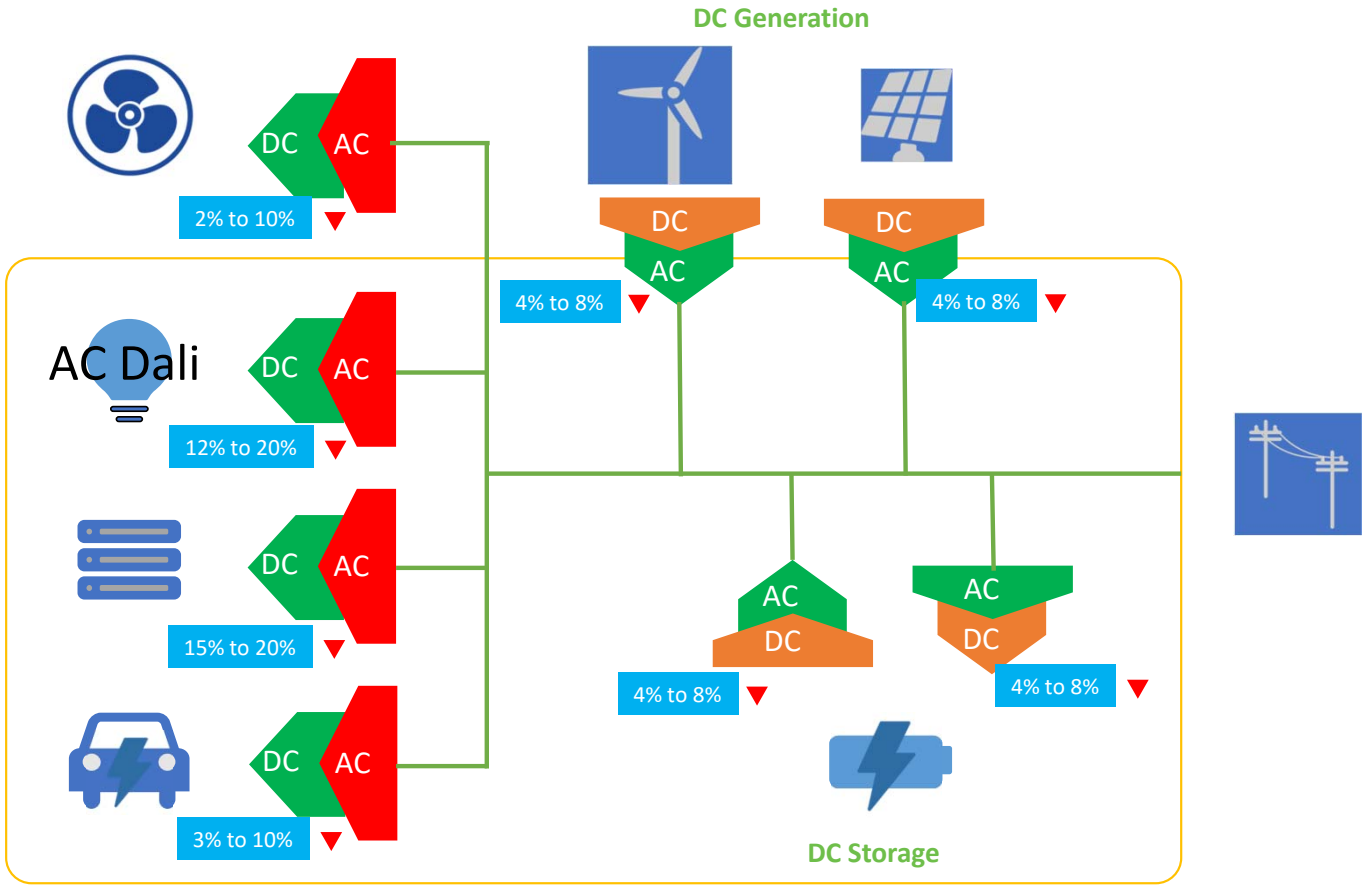
Courtesy of ACA

The Traditional Approach to Power is Wasteful

Up to

20%

of power wasted in conversion loss

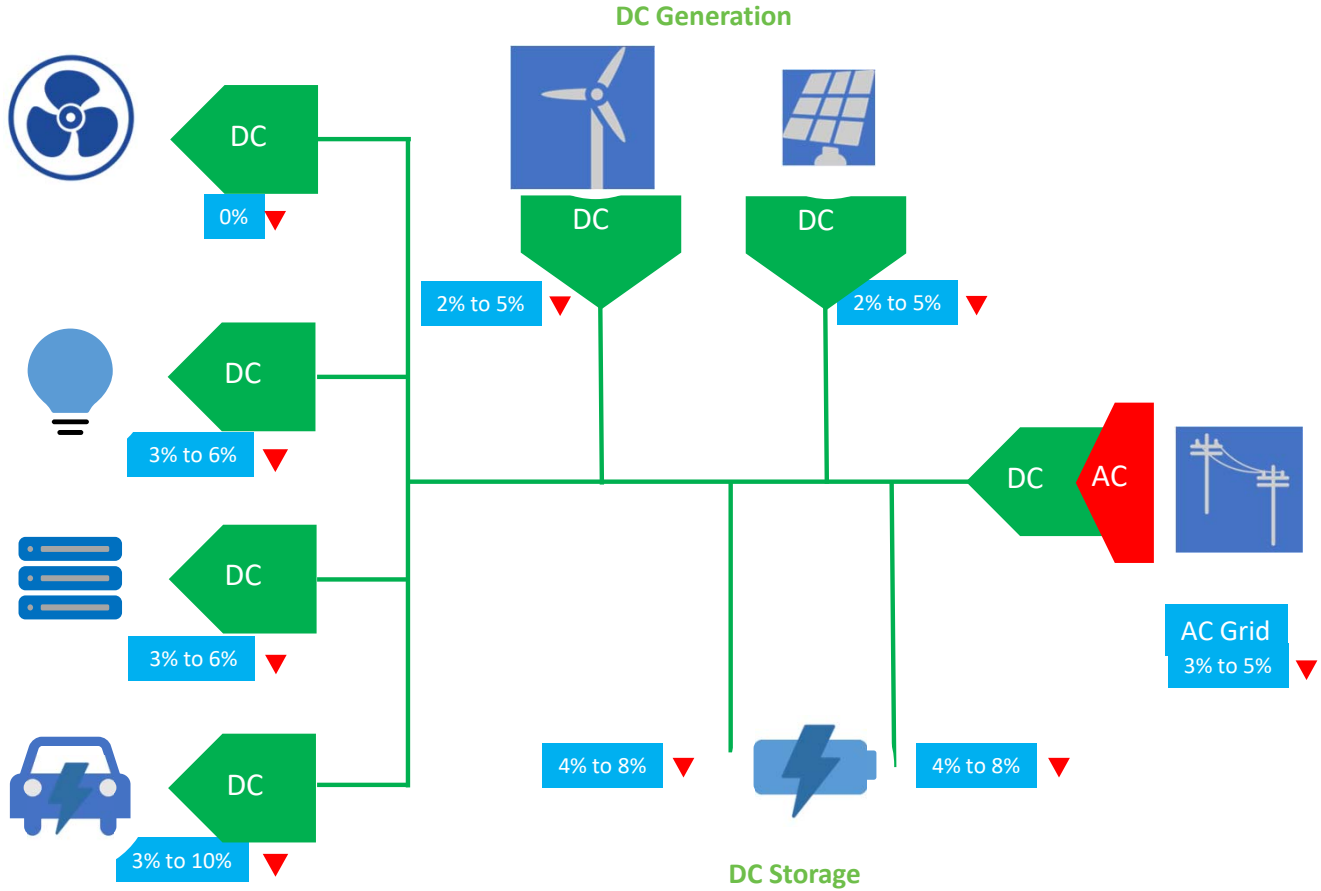


Source: CSA Group

Smart Buildings Save Energy, Cost Less to Operate

45%+

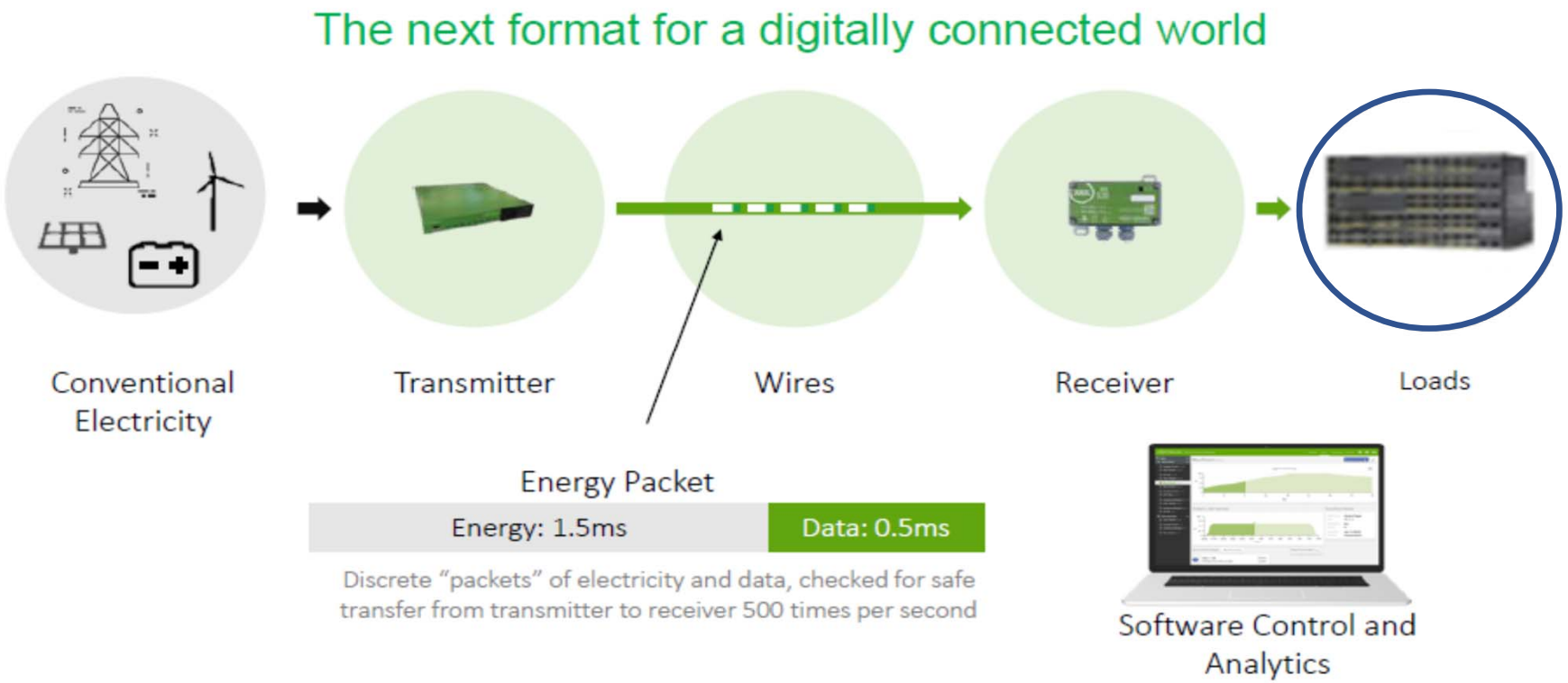
Reduction in energy waste by using DC power



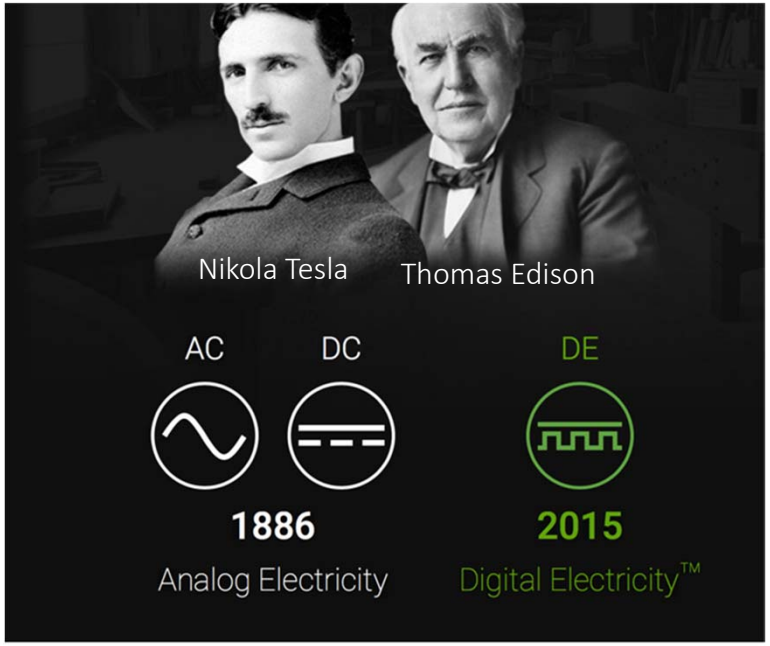
Source: CSA Group

Fault Managed Power (FMP)
Class 4
=
Digital Electricity (DE)

Digital Electricity – Fault Managed Power (Class 4)



Digital Electricity:
A New DC Power Distribution Technology



Digital Electricity

Pulsed DC Power (Packet Energy Transfer)

- Safe to Touch
- NRTL listed NEC 62368-1 limited power source
  - As a listed limited power source, it qualifies to be installed under NEC Article 725
- Each Pulse Packet checks for:
  - High Current
  - Ground Fault
  - Arc Fault
  - High Resistance (loose connection)
  - Touch (resistive load)
- Range up to 2KM
- 500W at 1K ft on 1 pair 18AWG cable

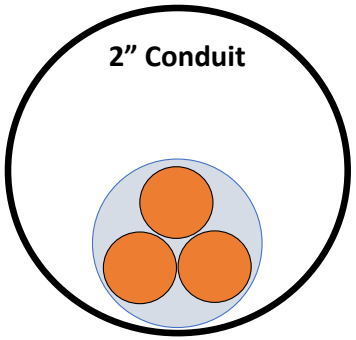
Benefits of DE

- **Significant Power** – up to 600W per pair of conductors
- **Significant Distance** – up to 2km
- **Skinny Conductors** – 16-18AWG
- **Safe** – lab certified for Class 2 wiring practices (same as Ethernet/PoE)
- **System Monitoring and Control** – remotely manage your power distribution
- **Scalable** – built with flexibility in mind to support kW to MW of power
- **Speed to deployment** – can be run in same conduit as fiber optic cable, many jurisdictions do not require permit
- **Simple** – plug and play, does not require any specialized programming to get up and running
- **Sustainable** – energy efficient, especially when paired with renewables and less embodied carbon

Comparison of Material Requirements

Example: Need 1,000W at 1000ft (305m)

120VAC:
3x 3AWG wires in 2” conduit



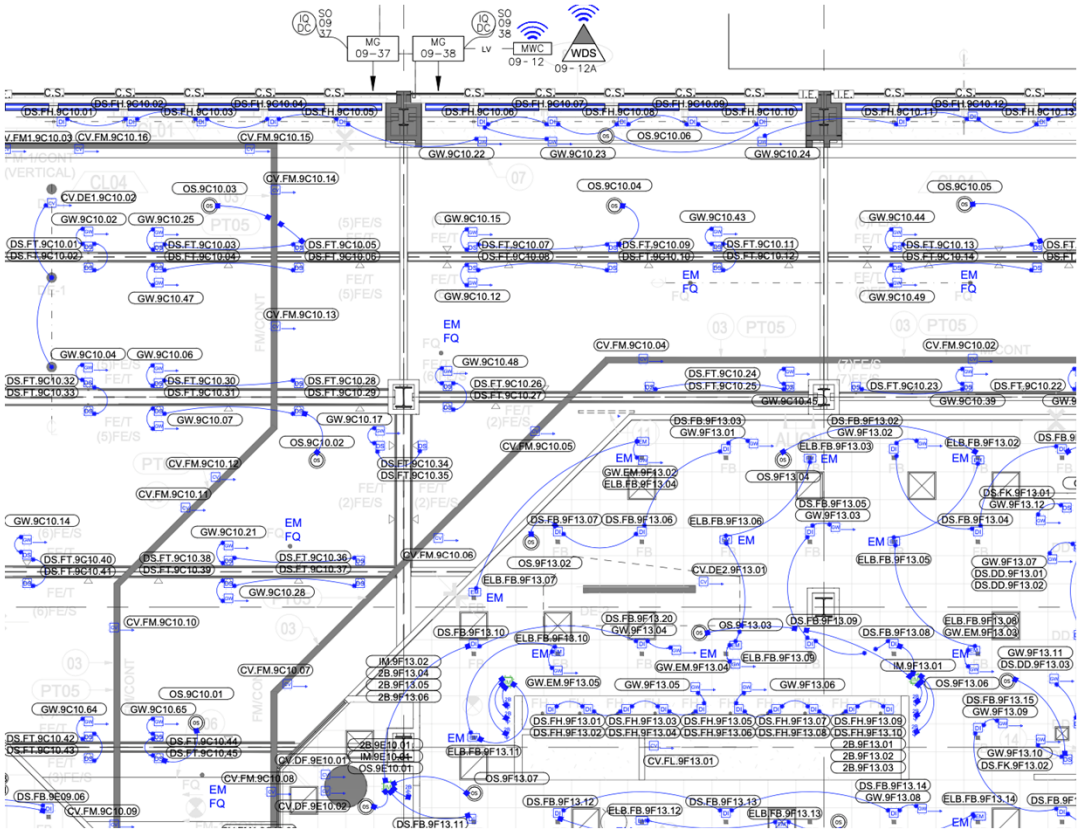
Digital Electricity:
4 pairs 18AWG, no conduit

or

3 pairs 16AWG, no conduit

Up to 90% reduction in embodied carbon!

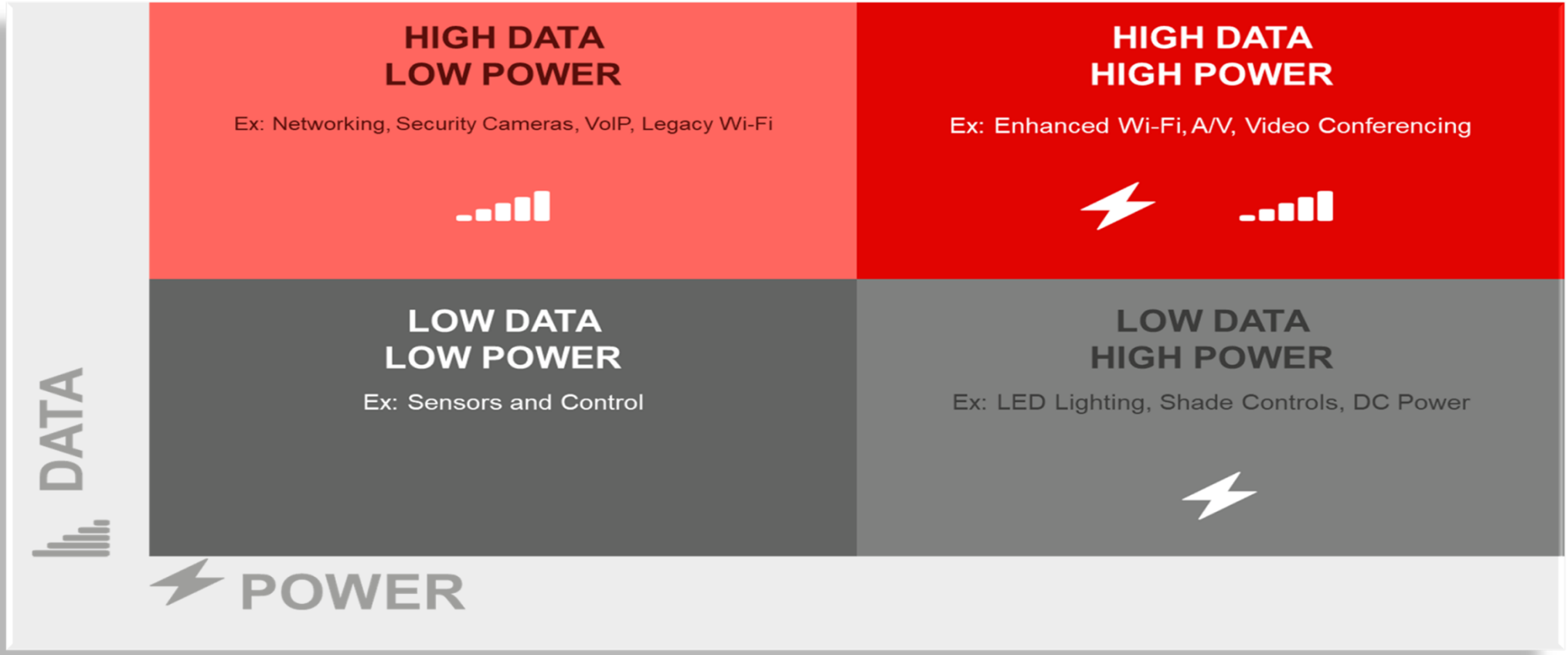
Low Voltage Design Expansion



Combination of multiple devices and manufactures with structured cabling to connect it all!

- Design work shift to low voltage
- PoE disciplines emerging
- Millions of square feet deployed

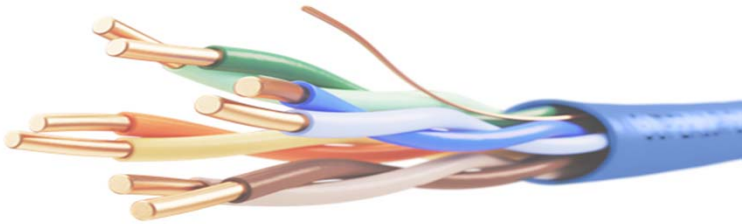
Structured Cabling Considerations



Twisted Pair Cable Factors for PoE

- **Gauge Size**

Larger copper gauge = less heat and is better at mitigating heat rise



- **Cable Size**

Larger cables better dissipate heat

- **Temperature rating**

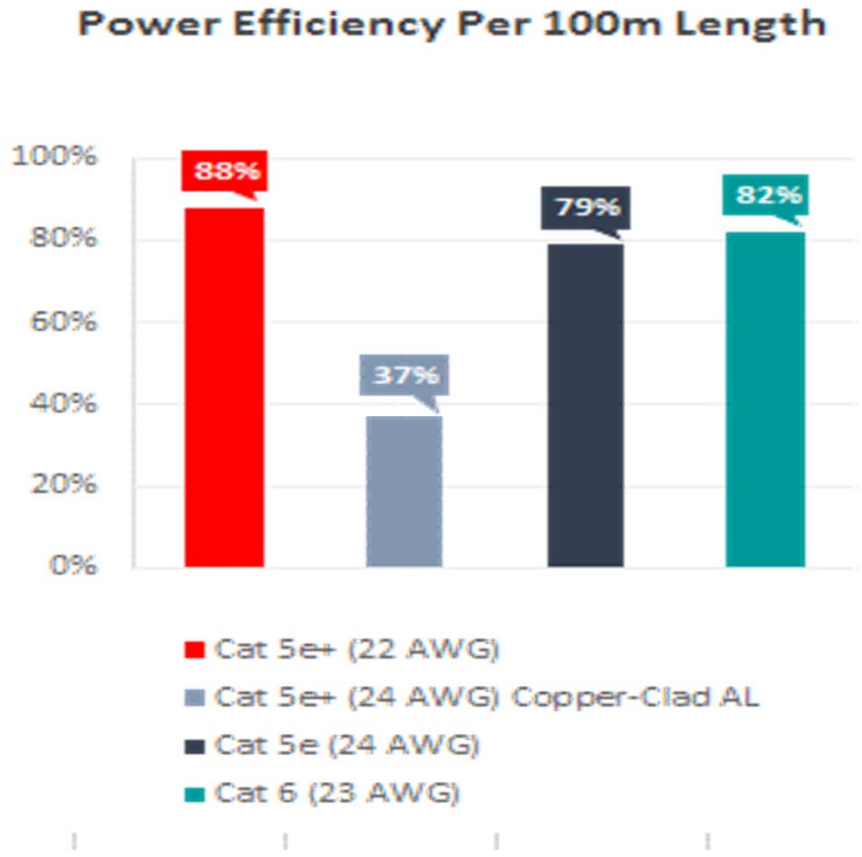
Cables with a higher temp rating = better ability to mitigate heat rise 100% FEP (Plenum) insulation will have a higher rating than partial FEP or polyolefin insulation (Riser)

- **Other elements of cable construction**

Shielded products dissipate heat down the length of the cable and therefore improve capability

Cable: Power Efficiency

- Think about the application
  - High-speed Data vs. High power vs. Mix
  - AWG more important than performance category?
- If main application is high power, high-performance category may not provide best ROI

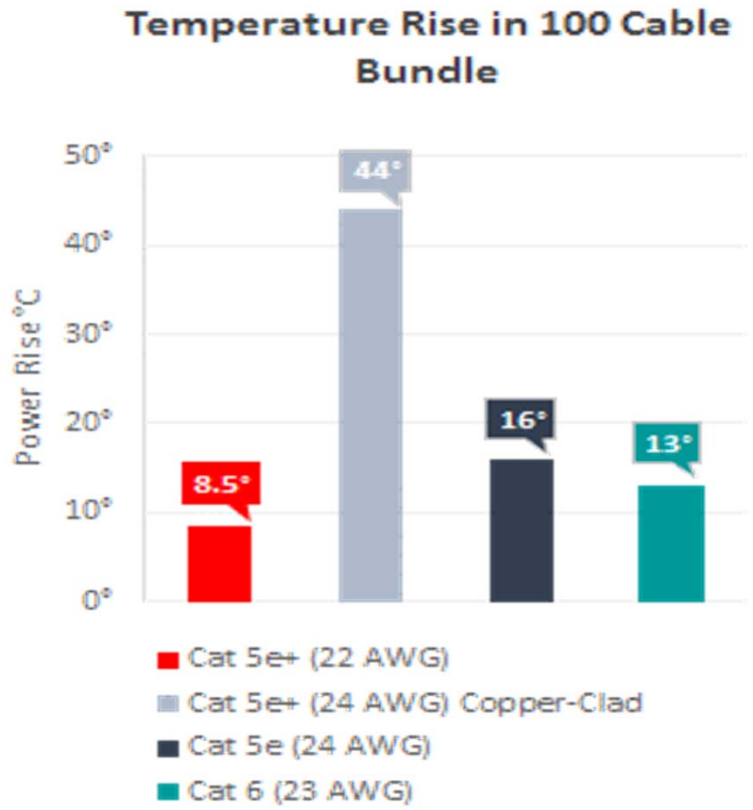


Cable: Temperature Rise

Higher Temp = Higher Attenuation

Higher Attenuation = Signal loss

Signal Loss = Shorter Channel Distance



Takeaways

- Sustainability and Energy Reduction is the focus!
- PoE Applications are here today!
- AC / DC / FMP (DE)
- Structured Cabling is a good Strategy!
- Smart and Sustainable Technologies:
  - Reduce TCO and are Environmentally Friendly
  - Provide a Futureproofing Pathway to New Technologies

Thanks!

Do you have any questions?

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