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INTERNATIONAL

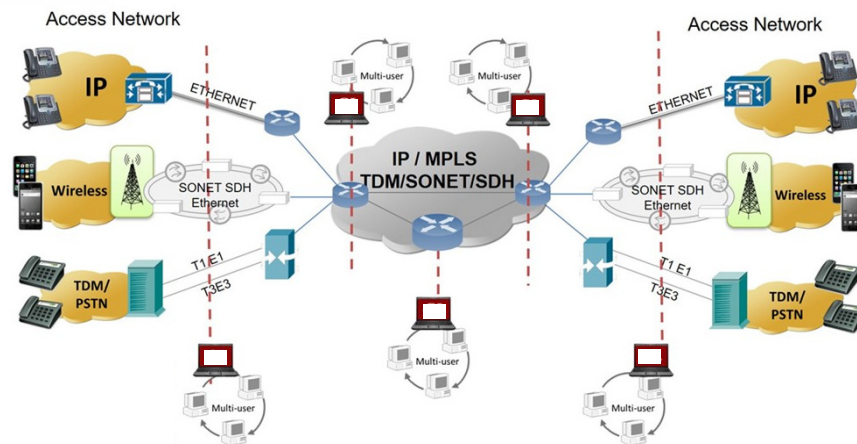
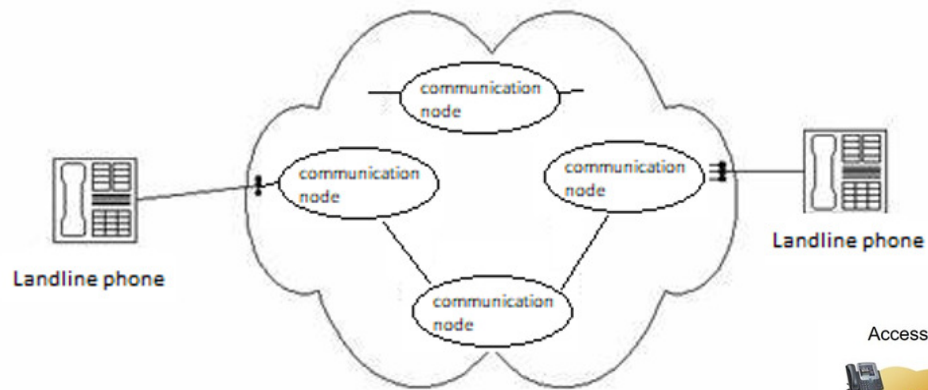
Building Automation Adapts to the Smart Grid Grid



Agenda

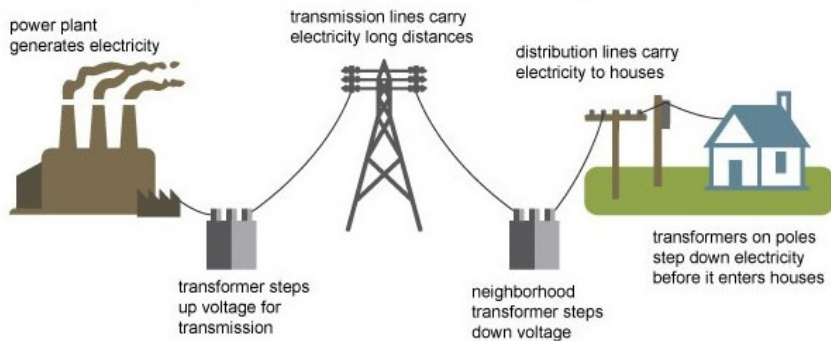
- Understanding the change
- Review of some standards and what to expect
- Regulations already out there

Think about it

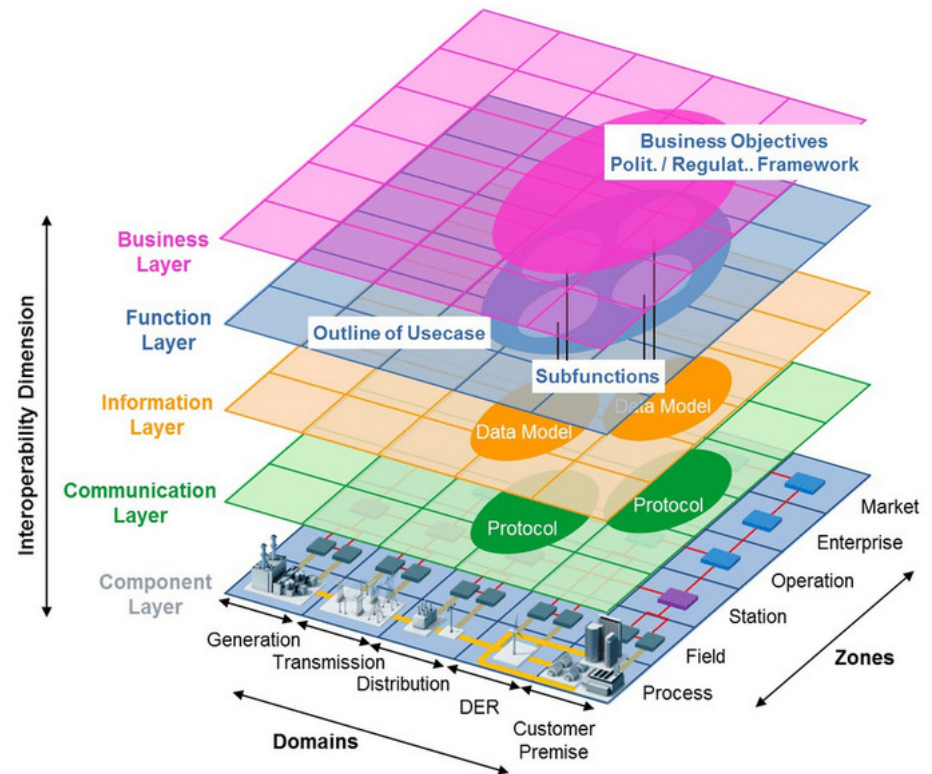


Think about it

Electricity generation, transmission, and distribution



Source: Adapted from National Energy Education Development Project (public domain)



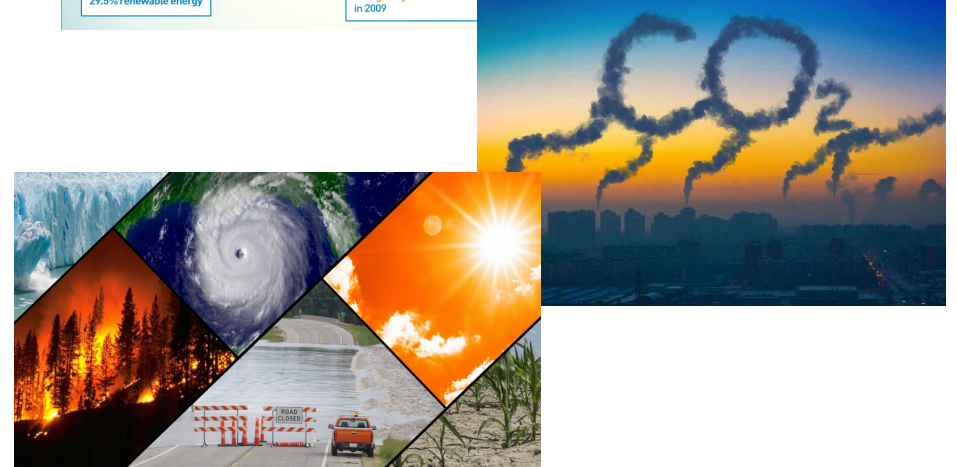
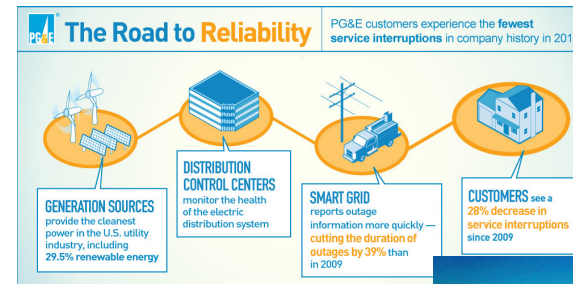
Why do we care? And the customers?

Telecom



vs

Electricity Grid



<https://www.sciencedirect.com/science/article/pii/S0378778815005447>

Southern California Edison

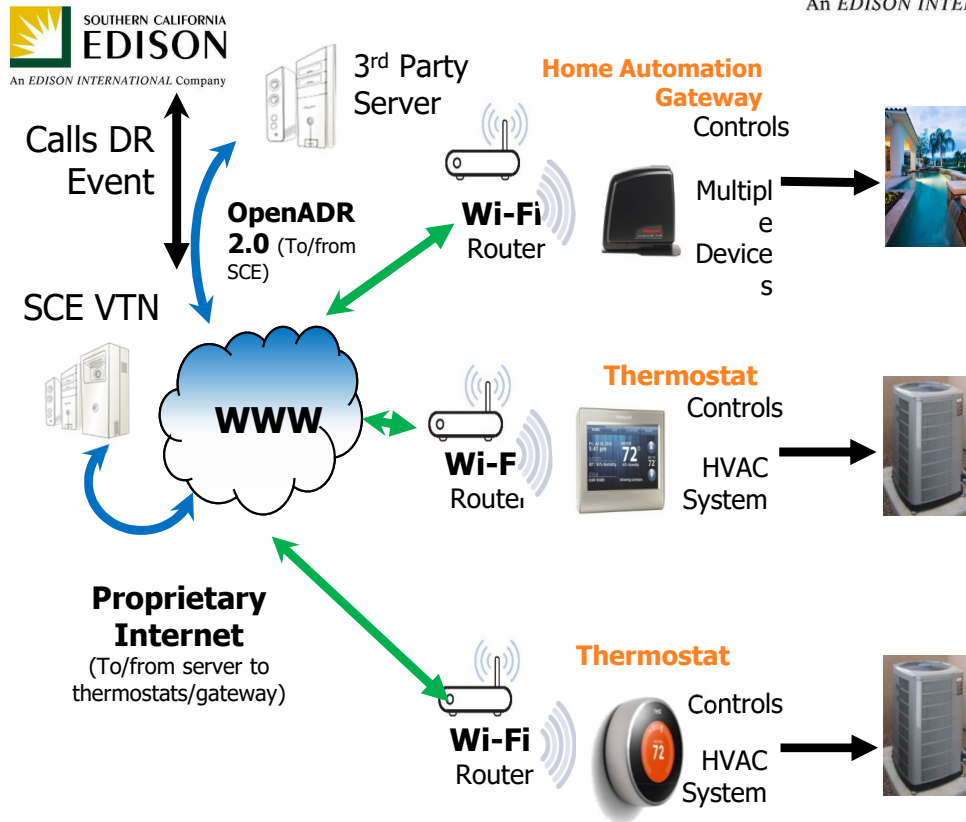
- Support EV TOU customers
- Deployed 80 L2 EVSEs with payment modules at 9 SCE facilities
- Standards based: OpenADR
 - Varied Pricing: Tiers, Rate of Charge, Penalty
 - Varied Curtailment Events
- OCPP
 - Session Reports
 - EVSE Status
 - Credit Card

■ <https://www.sce.com/evbusiness/chargeready>



Southern California Edison

- BYOT model
- 4,800 customers select own devices
- 8 events with an average 750 watts of load reduction per hour per customer
- Energy savings:
 - 3.6MW of average energy reduction per event (peak ~7MW)
 - 115.2MWh of energy saved annually



Some standards

- **IEC TS 62872-1:2019**
 - **Industrial-process measurement, control and automation - Part 1: System interface between industrial facilities and the smart grid**
 - How can a facility make use of grid signals
 - Considerations for the building

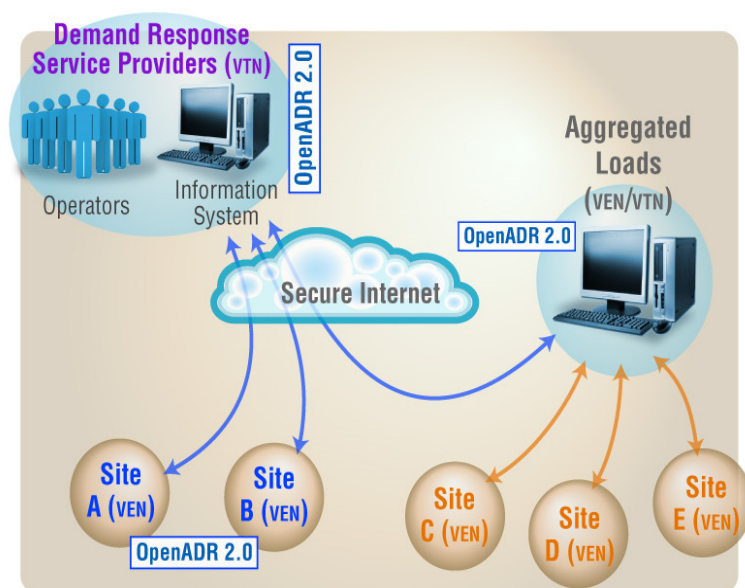
<https://webstore.iec.ch/publication/62884>

Some standards

■ OpenADR 2.0 Standard

OpenADR provides a non-proprietary, open standardized Demand Response (DR) & Distributed Energy Resources (DER) interface that allows DR service providers to communicate DR, DER, and TE (Transactive Energy) signals directly to existing customers using a common language and existing communications such as the Internet.

<https://www.openadr.org>



Some standards

■ CTA-2045 (EcoPort)

Modular Communications Interface for Energy Management.

“USB Port” for appliances

Regulations in place for Heat Pump Water Heaters in Washington State, coming in OR and CA



<https://www.openadr.org/ecoport>

Some standards

■ CTA-2045 (EcoPort)

Modular Communications Interface for Energy Management.

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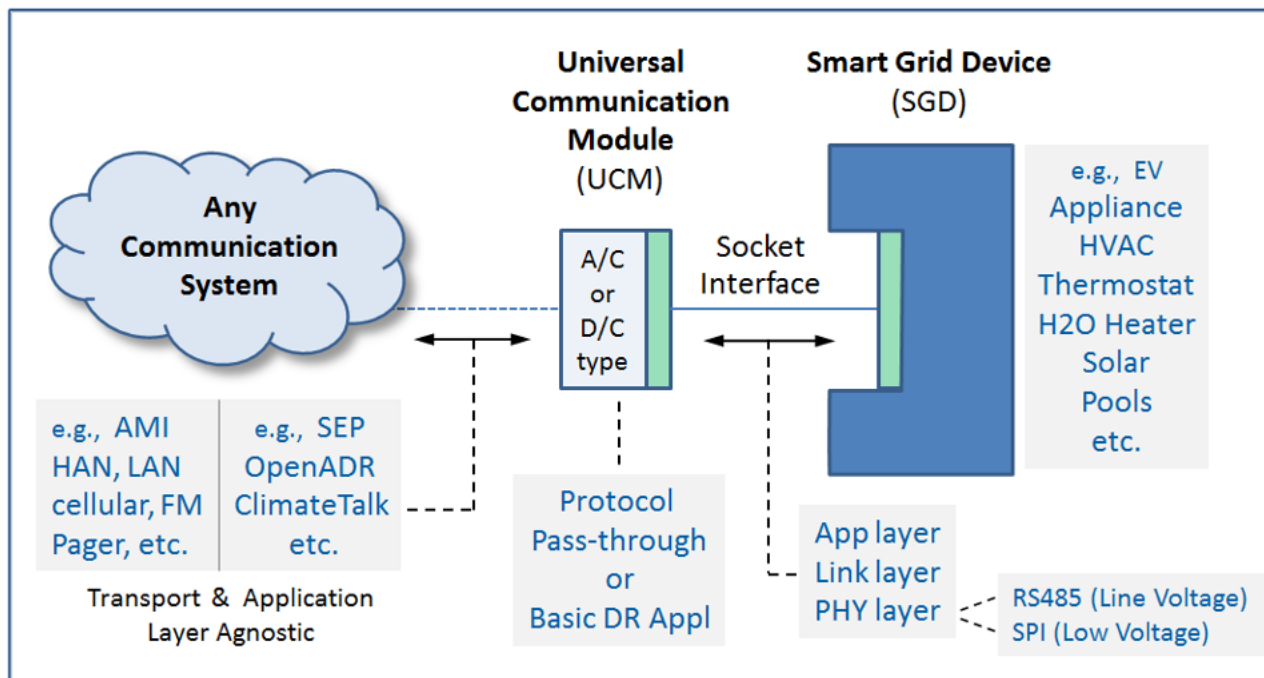
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<https://www.openadr.org/ecoport>

Some standards

■ CTA-2045 (EcoPort)



<https://www.openadr.org/ecoport>

California Code of Regulations, Title 24 (Building Standards) Part 6 (Energy Code)

Slides courtesy of Gabe Taylor, CEC

Nonresidential Building

NONRESIDENTIAL BUILDING is any building which is identified in the California Building Code Table; Description of Occupancy as Group A, B, E, F, H, I, M, or S; and is a U; as defined by Part 2 of ~~Title 24~~ Title 24 of the California Code of Regulation.

NOTE: Requirements for high-rise residential buildings and hotels/motels are included in the nonresidential sections of Part 6.

- “Nonresidential” includes:
 - High-rise residential
 - Hotels/motels

2019 Energy Code DR

- **Nonresidential**

1. Thermostats
2. Lighting
3. EMC
4. General

- **Multifamily**

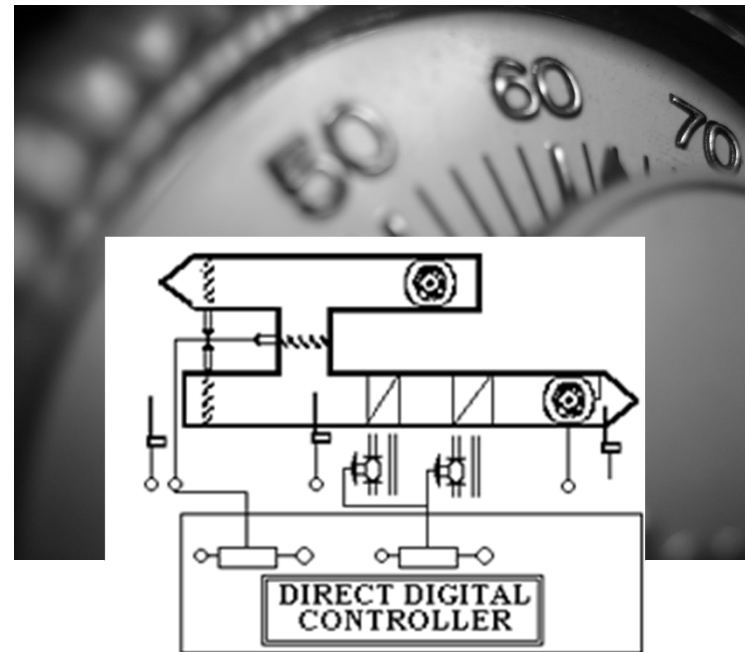
5. Solar Ready

- **Residential**

6. Solar Ready
7. Water Heaters
8. HVAC

Nonresidential

- Single Zone
 - A/C & Heat Pumps
- Single Zone w/ DDC
 - Additional Shed Requirements
- Alterations
 - §120.2(b), 120.2(h) → 110.12(b), & 141(b)2E



REQUIRED

Nonresidential

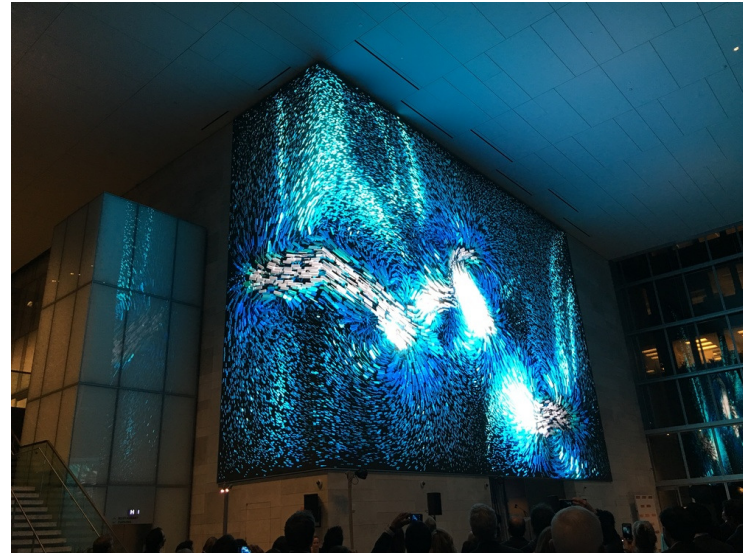
- Lighting Controls
- Buildings $> 10,000 \text{ ft}^2$
- $\text{LPD} > 0.5 \text{ W/ft}^2$
- §130.1(e) → 110.12(c)



REQUIRED

Nonresidential

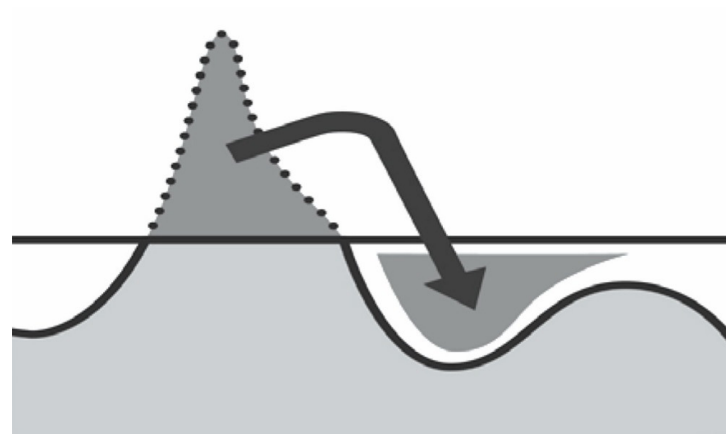
- Electronic Message Centers (EMC)
- > 15 kW
- >30% Reduction
- §130.3(a)3 → 110.12(d)



REQUIRED

Nonresidential

- Demand Responsive Controls
- For Compliance *or* Credit
- §130.5(e) → 110.12



REQUIRED

Multifamily

- DR Thermostats +
Either:
 - Additional EE, or
 - EV Chargers
- **0 ft²** of Solar Ready
 - Down from 250 ft²
- §110.10(b)1B



REQUIRED

Residential

- DR Thermostats
= **150 ft²** of Solar Ready
- Down from 250 ft²
- DR Thermostats
+ Additional EE
= **0 ft²** of Solar Ready
- §110.10(b)1A



REQUIRED

Residential

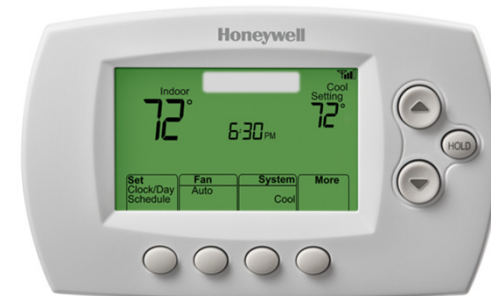
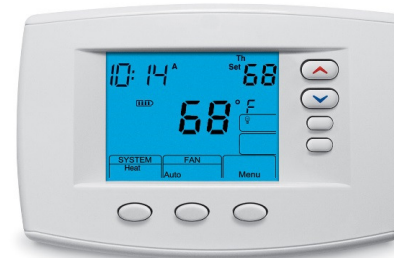
- Heat Pump Only
- Alterations Only
- Optional:
 - §110.12, or
 - NEEA Tier 3
- §150.2(b)1Hiii b & c



REQUIRED

Residential

- Alterations Only
- Optional Testing Allowance
- Rare Cases
- EXCEPTION to §150.2(b)1Fiia
- EXCEPTION to §150.2(b)1Fiib



REQUIRED

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