Integrated Multipoint Submetering

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Agenda

• What is Sub-metering?
• Energy Code Impact
• Why meter?
• Basic Metering Terms
• Multipoint Energy Metering
• Communications
• Meter demos
• Projects
What is Sub-metering?

Utility submeter - Wikipedia
Utility submetering is the implementation of a system that allows a landlord, property management firm, condominium association, homeowners association, or other multi-tenant property to bill tenants for individual measured utility usage.

Submetering | Definition of Submetering by Merriam-Webster
www.merriam-webster.com/dictionary/submetering
the retail sale through individual meters to tenants in large office or apartment buildings of electric current or gas purchased for the entire building by the owners ...

Typically the meter after the utility meter
Changes from 2015:

- **9** states have adopted 2013/2015
- 2013/2015 Code **MANDATES** tenant metering

This link provides information on some of the states that regulate tenant sub metering:

https://www.energycodes.gov/adoption/states#tabs-1
ASHRAE 90.1 Metering Requirements

Section 8 – 8.4.3
Electrical Energy Monitoring

Measurement devices in new building to monitor electrical energy use for each of these separately:
• Total electrical energy
• HVAC systems
• Interior lighting
• Exterior lighting
• Receptacle circuits

For buildings with multiple tenants, the above must be separately monitored for total building and for each tenant (excluding shared systems)

Exception:
• up to 10% of each separate load (other than total) can be from other electrical loads
ASHRAE 90.1 Metering Requirements

Section 8 – 8.4.3
Electrical Energy Monitoring – Recording and Reporting

- Energy use must be automatically recorded a minimum of every 15 minutes
- Use must be reported at least hourly, daily, monthly, and annually
- Data for tenants must be made available to that tenant
- The system must be capable of retaining data for at least 36 months

https://www.energycodes.gov/sites/default/files/becu/90.1-2013_Lighting_BECU.ppt
Why Meter?

- Benchmark energy usage
- Allocate costs to cost centers or tenants
- LEED points
- PUE determination
- Verify energy savings from projects
- Encourage conservation
- Alarm if limits are exceeded
- Monitor quality of power
Four Basic Metering Inputs

• Voltage Reference
  • 120-600VAC, PTs above 600VAC
  • Most common-A,B,C,N Optional-G

• Current Inputs
  • 5A, 1A, 333mV, other
  • A,B,C, Measured or calculated-N,G

• Control Power
  • 120-240 VAC, 24-48 VDC, Higher VAC and VDC

• Communications
  • Serial-Modbus RTU, BACnet MSTP
  • Network-Modbus TCP, BACnet/IP
Common Sub-metering measurements

- Voltage
- Current
- Watts
- Demand
- Watt-hour
- Power Factor
- Pulses from other meters
Product Capabilities

Price

Power Quality

Energy

Features

- Transient detection
- ITIC Curves, 1 ms time stamp, K factor, crest factor, event calendar
- Waveform Recording, Sag/swell
- Ethernet/ Data Logging
- I/O
- Basic metering Communication Opt

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Energy-Multipoint Meter

**Application**

- Where energy usage and utility charges are of primary concern
- Submetering individual loads
- Allocating cost to cost centers or tenants
- Disaggregating Loads-plug, lighting, mechanical
- Alarming on energy/current thresholds
- Energy feed into existing software

**Characteristics**

- Industry standard communication
- Configurable metering-1P, 2P, or 3P
- High density, up to 100 meter points per system
- Front panel LEDs provide status of unit and communication activity
- Scalable metering-6 pole increments
- Web Interface
- Cost Allocation
Integrated Multipoint Metering offers space savings compared to Meter Stacks

25 Socket Meters for 25 Tenants

1 Enclosed PXMP for 27 Tenants in Retrofit installations

New construction - Switchboard with Integrated PXMP Revenue Class Metering for 25 Tenants

No extra Wall Space
Multipoint meter application in switchboard

Multipoint meter embedded in Main Switchboard
Multipoint meter application in switchboard

Color touch screen display for viewing system and tenant metering values.

Current sensors are connected to the meter. This will eliminate timely installation cost.

The current sensors are mounted on brackets in-line with the tenant breaker. Cable installation is made easy!
One Multipoint meter per floor or locate on mid floor level and run CTs up and down floors for more cost effective solution.
Multipoint Metering Panelboard Design Considerations
Integrated Metering in Electrical Equipment

Panelboard Submetering

Flexible Submetering for Energy Use-PRL4 & SWBD

Flexible Submetering for Energy Use-PRL1/2/3

Low Profile Energy Meter-PRL1/2/3
Enclosed Meters

**Application**
- Where no metering compartment or mounting space is available in the existing electrical distribution equipment
- Where installation time is a premium
- Where energy usage and utility charges are of primary concern

**Characteristics**
- NEMA 12, 3R, or 4X
- Single and multiple units
- Fused disconnect for line voltage
- Pre wired CT shorting blocks, CPT option
- Padlocking latch provision
Communications Topology
Meter Demo Sites

- PQ Meter
  - [http://192.104.67.190/](http://192.104.67.190/)
  - user/user1

- PQ Meter
  - [http://192.104.67.189/](http://192.104.67.189/)
  - user/user

- Multipoint Meter
  - [http://192.104.67.164/](http://192.104.67.164/)
  - user/user
Project Examples

- Integrated Multiple Single Point Metering-Panelboards
- Integrated Multipoint Metering-Switchboard and Enclosed
Integrated Multiple Single Point Metering-Panelboards
Integrated Multipoint Metering-Switchboard and Enclosed

Electric

7th Floor

Apt 1 to 27

8th Floor

Apt 1 to 27

Water/BTU Pulses

Water/BTU Pulses
Questions?