Emerging Opportunities for Heat Metering

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Today’s Discussion

1. Define heat metering
2. Why is it important?
3. Status of Heat Metering
4. Questions

Emerging Trends
Standards Development Opportunity
30 MIN
What is Heat Metering?

- Heat metering is the measurement of heat absorbed or given up by a heat conveying liquid across a heat-exchange circuit

- **Meter vs. Metering**
  - A meter is a measurement instrument
  - Metering defines the placement of that instrument into the system environment
    - Placement is part policy issue – what to measure? Useful heat vs. total system output
    - Placement is part accuracy issue – ensuring that sources of error do not influence measurement
  - Both are equally critical in ensuring the accurate accounting of energy
Heat metering is inherently more challenging than electric metering, but easier than steam metering.

Source: DOE
Why is heat metering important?

• The accurate accounting of thermal energy plays an important role in:
  – Policies that can support thermal energy
    • State compliance markets
    • State incentive programs, and
  – Investor confidence
  – Project finance
    • In the cash flows between project developers and off-takers

• Metering is about confidence and the attribution of benefits
Emerging Trends

- Recognition of thermal energy sources in State Renewable Energy Portfolio (RPS) and Energy Efficiency (EERS) Standards
- State incentives for renewable energy projects using performance based incentives (output-based) as opposed to upfront rebate programs (capacity-based)
- Emerging project deployment models including third-party ownership and Energy Purchase Contracts
- Increasing focus on the thermal energy component of buildings (e.g., national green building standards)
An estimated 61 percent of total delivered energy consumption in the residential, commercial and industrial sectors goes to heating and cooling uses.
What is the status of heat metering?

- Heat metering is active in the US market, however...
- The U.S. currently does not have a heat meter standard that defines the accuracy and operational characteristics of heat meter instrumentation
- A standard is needed to promote a quality market for heat meter products
  - Allowing heat meter manufacturers meet a single stated accuracy level and instead compete on cost and features
  - Allow customers to choose the meter that best meets their needs
Existing Heat Meter Standards

- Canadian CSA C900.1
- European EN1434
- Coming Soon!
- OIML R75 – International Recommendation
What’s in EN1434?

- **Part 1: General requirements**
  - Instrument definitions, operating conditions, technical characteristics, working ranges, heat calculation formulas, metrological characteristics, definitions of maximum permissible error, environmental classes etc.

- **Part 2: Constructional requirements**
  - Physical definitions for subassemblies, communications interface requirements, security requirements, power supply requirements etc.

- **Part 3: Data exchange and interfaces**
  - Definitions of the device’s physical, link, and application layers, data elements etc.

- **Part 4: Pattern approval tests**
  - Test requirements, operating conditions, documentation, and procedures etc.

- **Part 5: Initial verification tests**
  - Test requirements, documentation etc.

- **Part 6: Installation, commissioning, operational monitoring and maintenance**
  - Requirements for design, installation, and commissioning; quality of heat conveying fluids, criteria for selection of a heat meter instrument
Standard Development Opportunity

• ASTM & IAPMO signed an MOU – Dec 2011
  – To establish a framework of cooperation for the development of
    ASTM standards for heat metering

• ASTM’s E44.25 Heat Metering subcommittee formed in 2012
  – Currently developing a U.S. heat meter standard for hydronic
    applications
  – Based on existing international standards: OIML R75 and EN1434
  – Will also develop a guidance standard to address implementation
    issues of heat meter instrumentation into system environments
How to get involved?

- For additional information:

  ASTM Committee E44 on Solar, Geothermal and Other Alternative Energy Sources

  - E44.25 Heat Metering Subcommittee
  - Monthly subcommittee meetings
  - In-person meeting Fall 2014
  - [http://www.astm.org/COMMITTEE/E44.htm](http://www.astm.org/COMMITTEE/E44.htm)

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