



**ASTM Standards**  
Solar Biomass Voluntary Industry  
Cooling Consensus **E44.25** CHP Meter Heat **IAPMO** Geothermal Heating

# Emerging Opportunities for Heat Metering

4<sup>th</sup> International Emerging Technology Symposium

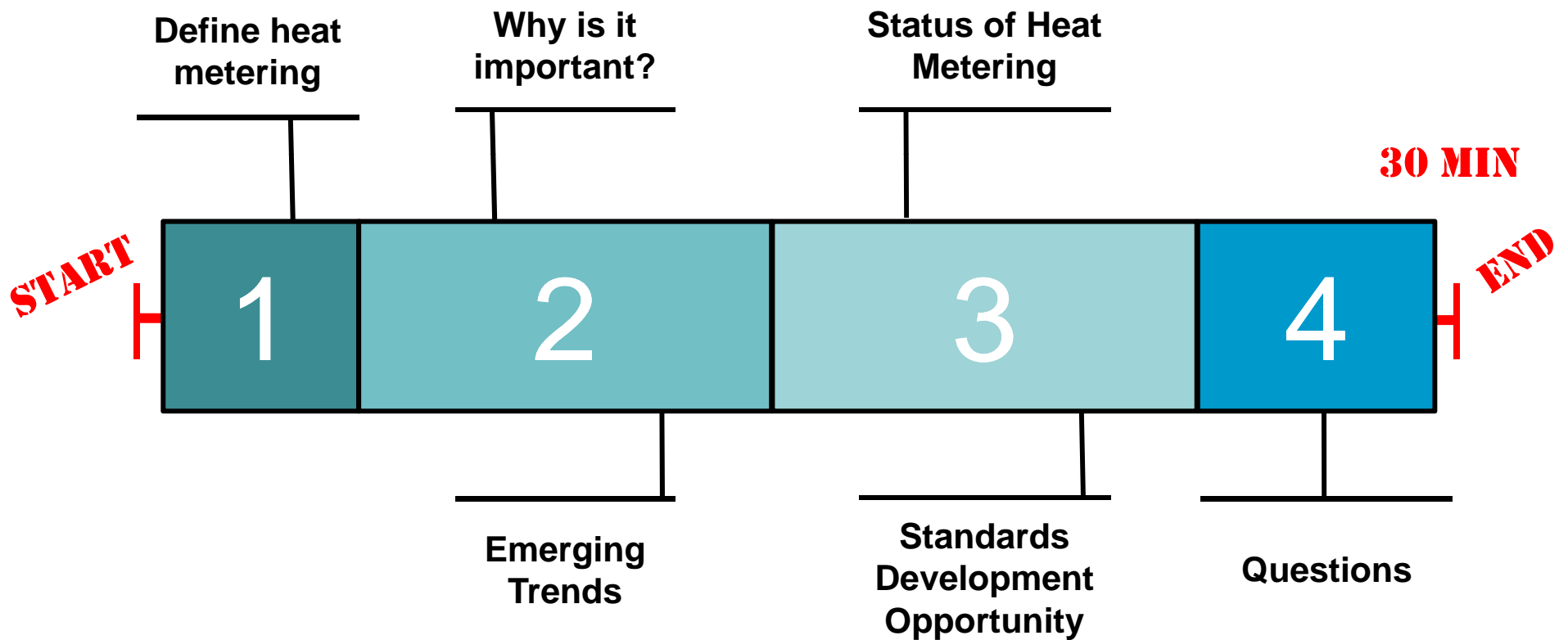
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Chair, ASTM E44.25 Heat Metering Subcommittee



# Today's Discussion

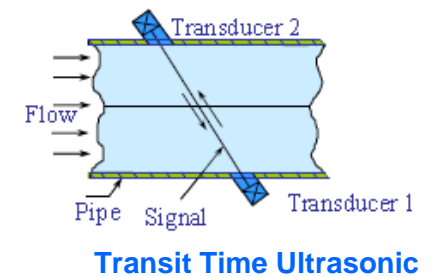
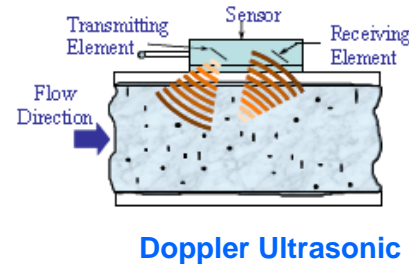
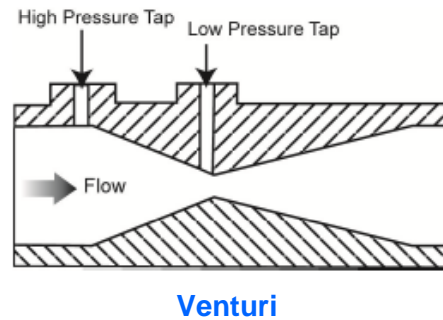
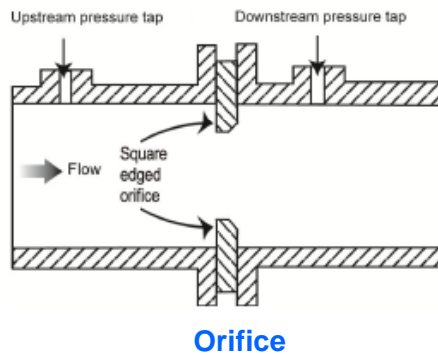
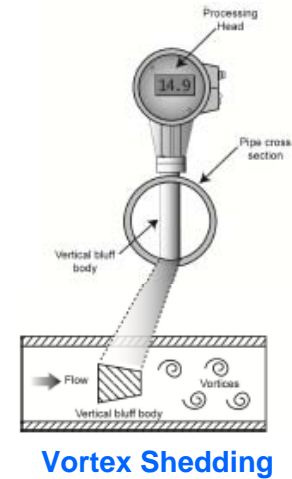
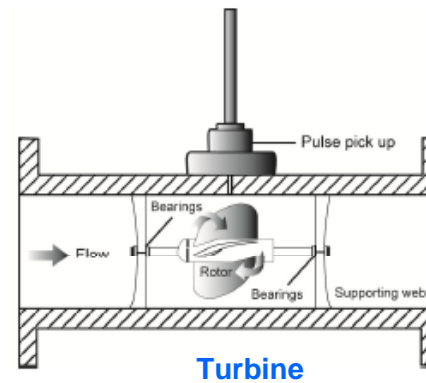
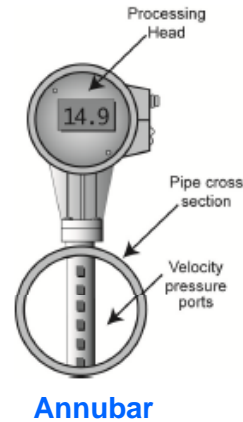
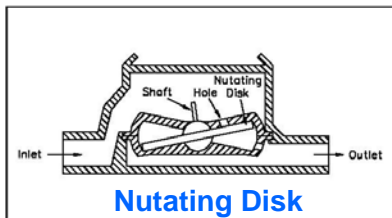


# What is Heat Metering?

- 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

# Types of Metering Instruments

Heat metering is inherently more challenging than electric metering, but easier than steam metering



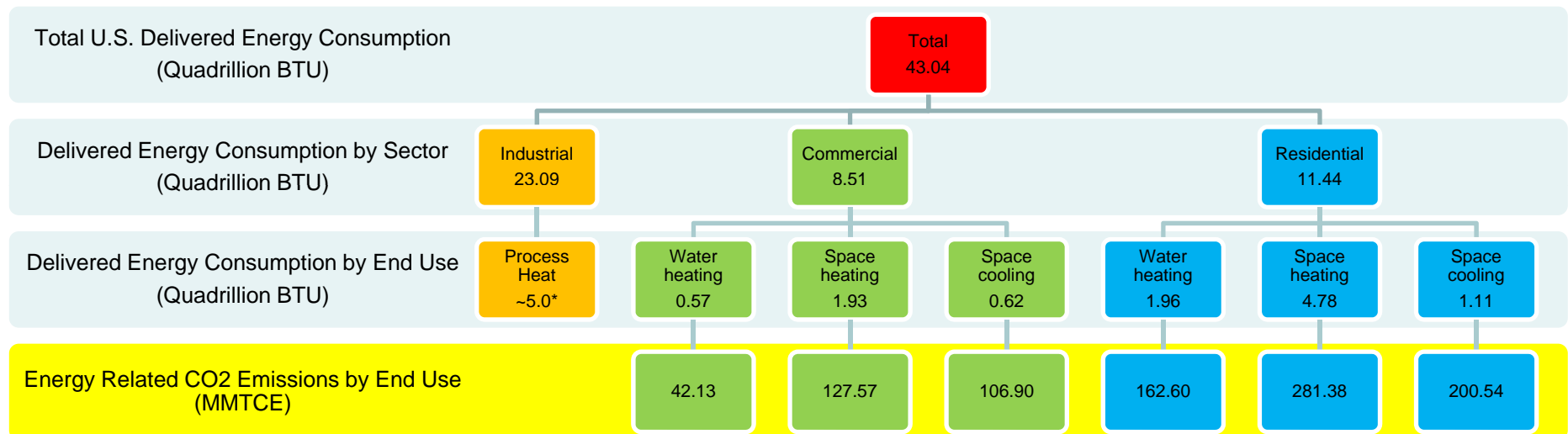
# Why is heat metering important?

- 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)

# Thermal Energy Opportunity



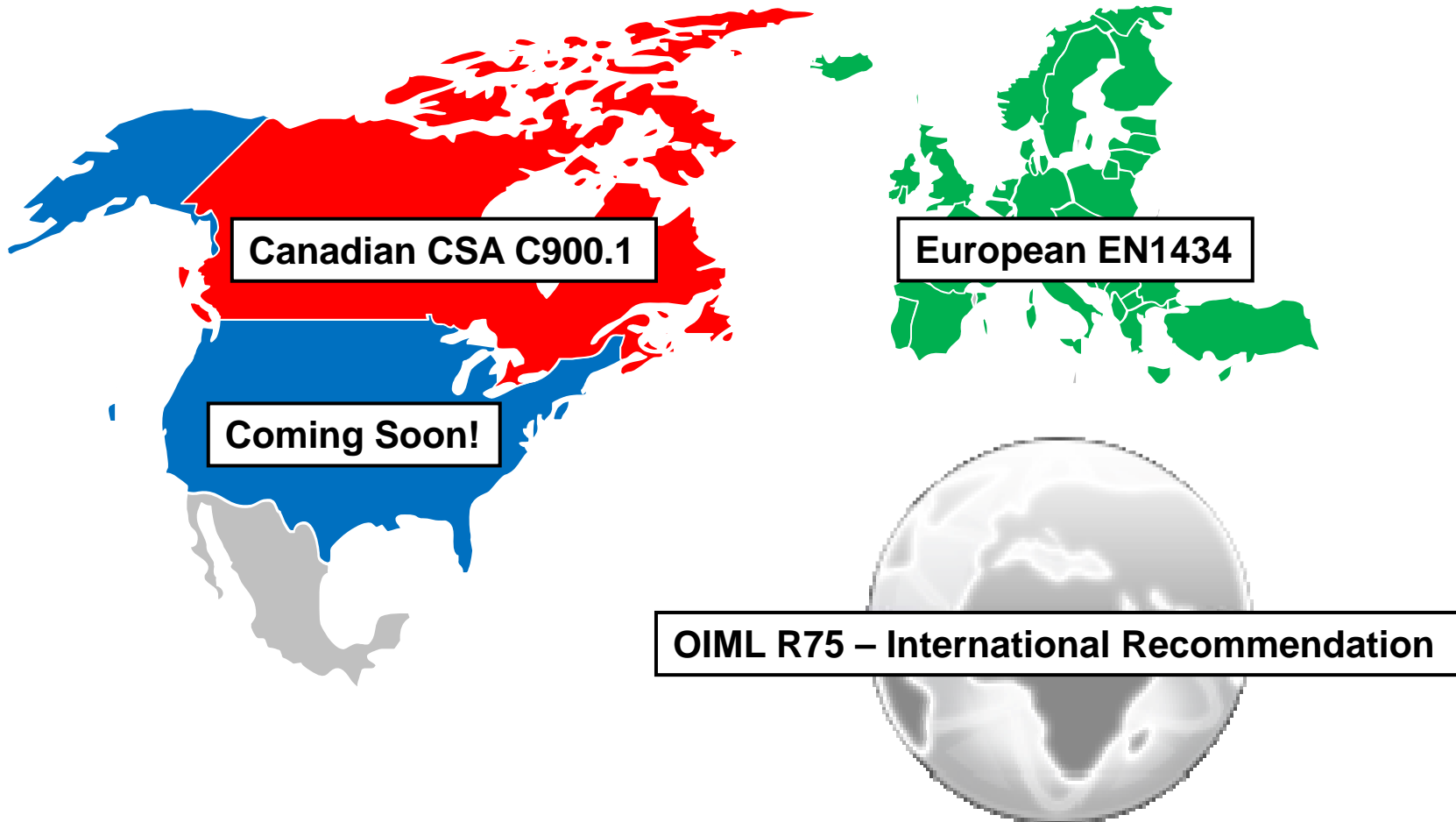
An estimated 61 percent of total delivered energy consumption in the residential, commercial and industrial sectors goes to heating and cooling uses

# 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



# 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>



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