

ACEEE Hot Water Forum

Nashville, TN

February 22 – 24, 2015

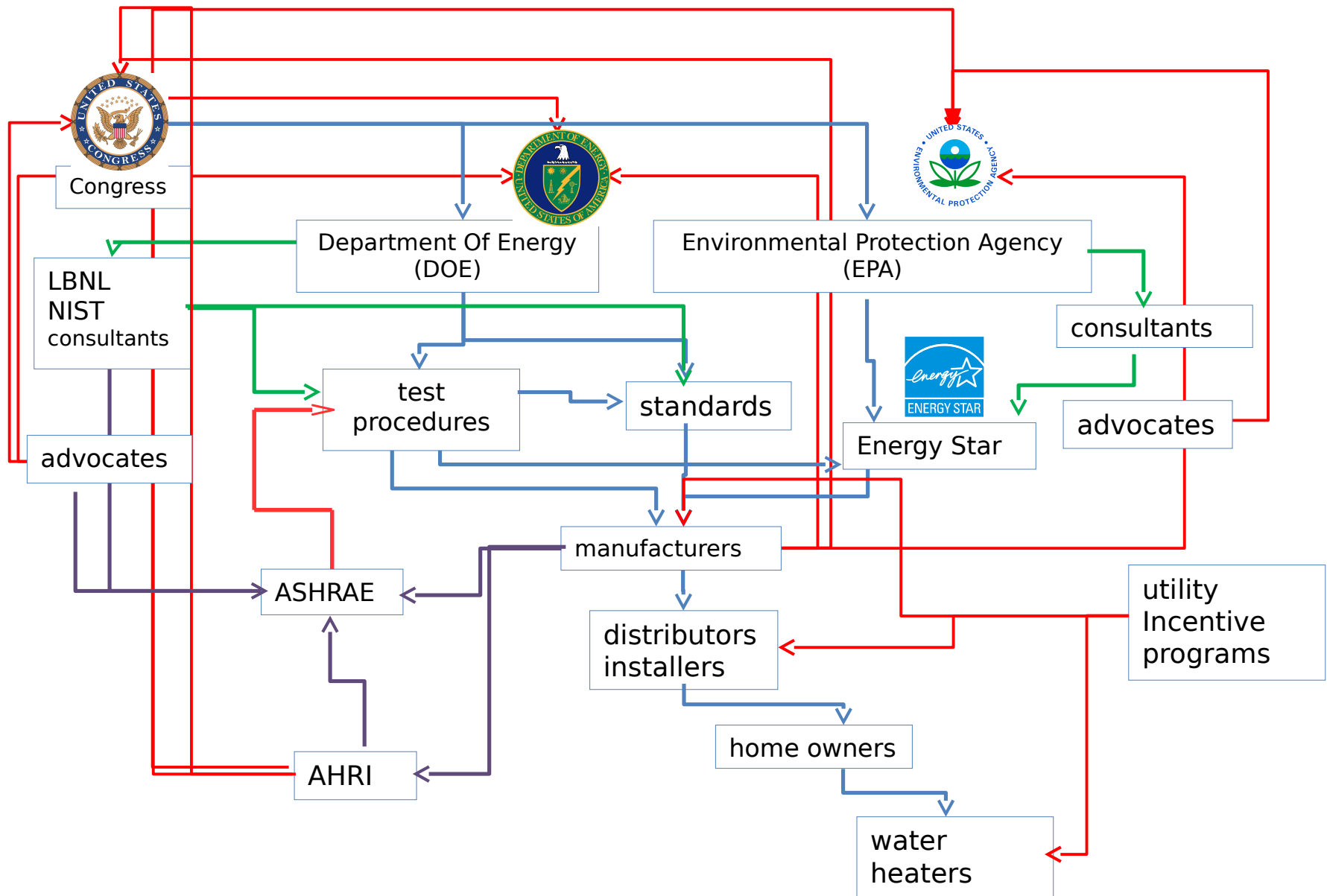
European Union and United States

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**Session 5A - International Test Procedures and
Standards**

United States Water Heater Efficiency Arena



EU & US Test Procedure Similarities

- rate efficiencies of all types of water heaters
- be similar to typical field use.
- ratings representative of actual performance
- reflect expected use of different capacity water heaters

Draw Patterns (Tapping Cycle)

- simulates “real” use of hot water
- multiple hot water draws
- storage and on-demand heaters
- starts after a recovery
- ends after 24 hours
- number of draws varies by capacity of water heater

Capacity Rating

- US
 - first hour test determines draw pattern
- EU
 - largest (or next to largest) load profile WH is able to provide while fulfilling temperature and flow rate conditions

Key Features in Water Heater Test Procedures

Feature	EU Test Procedure	US Test Procedure
Draw Patterns	10 (3XS, XXS, XS, S, M, L, XL, XXL, 3XL, 4XL)	4 (Very-Small-Usage, Low-Usage, Medium-Usage, High-Usage)
Draws per Pattern	3 to 23	9 to 14
Flow Rates	2 to 64 l/min (0.53 to 17 GPM)	1 to 3 GPM (3.8 to 11.4 l/min)
Draw Parameters	useful energy content, useful and peak water temperature, flow rate	volume, flow rate
Temperatures	inlet: 10 °C (50 °F) max: 55 °C (131 °F)	inlet: 58°F (14.4°C) outlet: 125°F (51.7°C)
Based On Field Data	unknown	somewhat
Solar Water Heaters	yes	no
Primary Conversion Factor	2.5	1.0

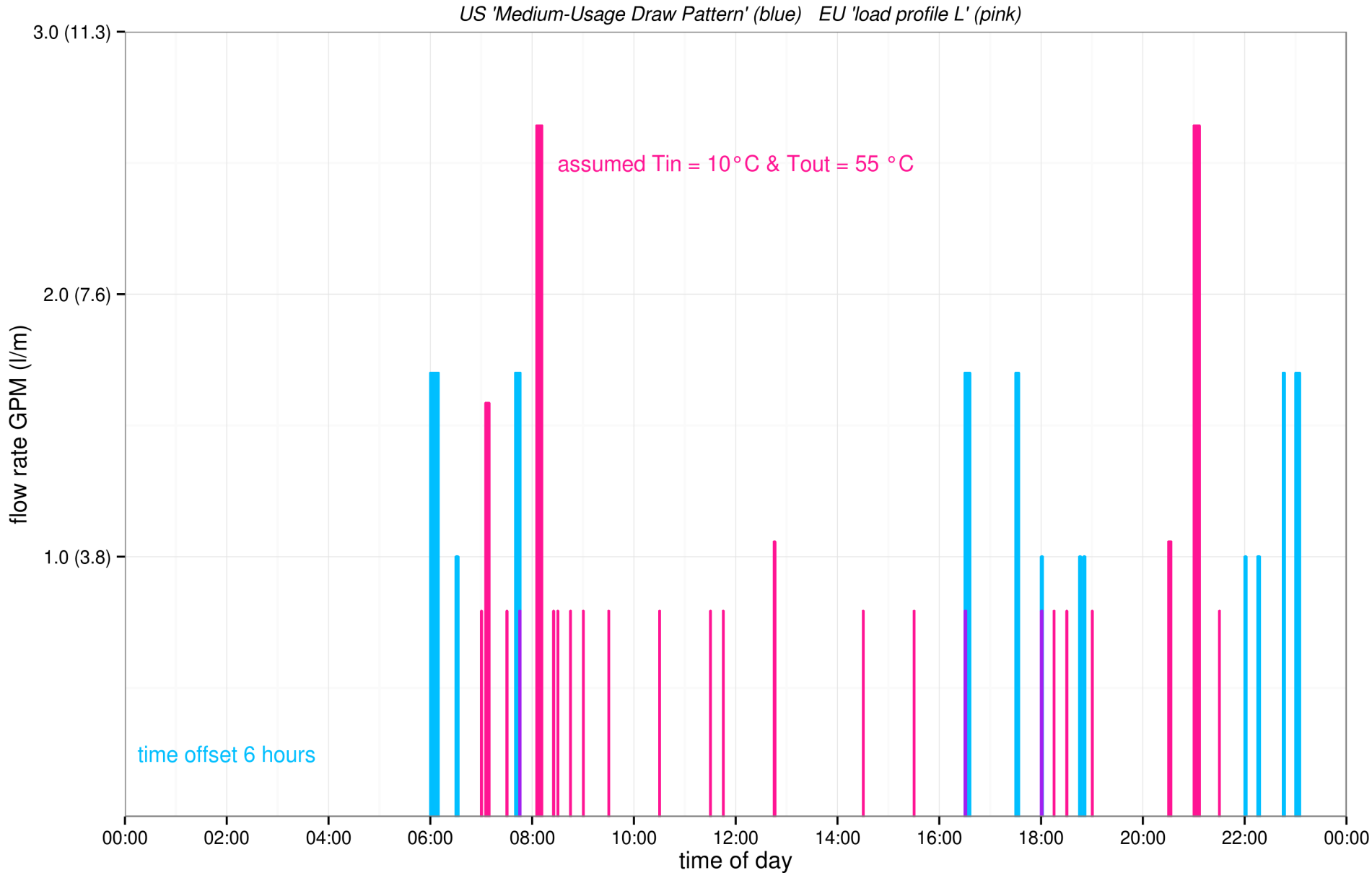
Definition of Individual Draws

- US test procedure defines draws by
 - *flow rate*
 - *volume*
- EU test procedure defines draws by
 - *useful water flow rate*
 - *useful water temperature*
 - *useful energy content*
 - *peak temperature*
- useful energy content only after water reaches useful temperature
- some draws a peak temperature must be reached during the draw

EU Water Heater Categories

Declared load profile	storage volume (litres)	mixed water at 40 °C (litres)	Qref (kWh/day delivered)	approx Volume (gallons/day)
3XS	≤7		0.345	1.7
XXS	≤15		2.1	10.6
XS	≤15		2.1	10.6
S	≤36		2.1	10.6
M		≤65	5.845	29.5
L		≤130	11.655	58.8
XL		≤210	19.07	96.3
XXL		≤300	24.53	124
3XL		≤520	46.76	236
4XL		≤1,040	93.52	472

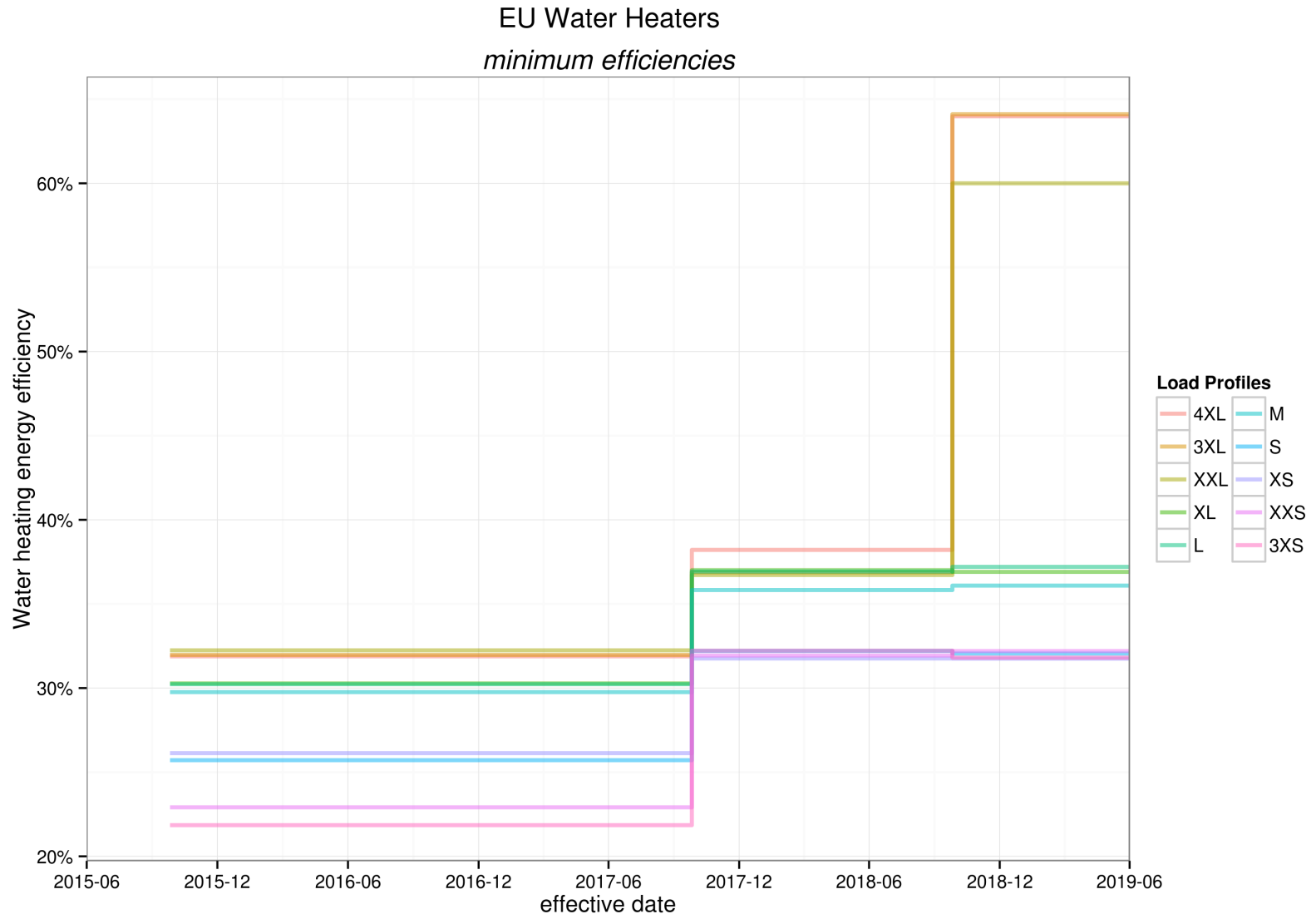
Selected EU & US draw pattern



Other Ecodesign Requirements

- sound power levels for heat pump water heaters
- emissions of nitrogen oxides
- only for rated heat output ≤ 400 kW

Minimum Efficiency Timeline



Energy Labels

