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Bonneville Power Administration and Pacific Northwest Perspectives on Energy Efficiency and Natural Refrigerants

Jack Callahan, P.E., CMVP
Senior Engineer
Bonneville Power Administration
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BPA and the Federal Columbia River Power System (FCRPS)

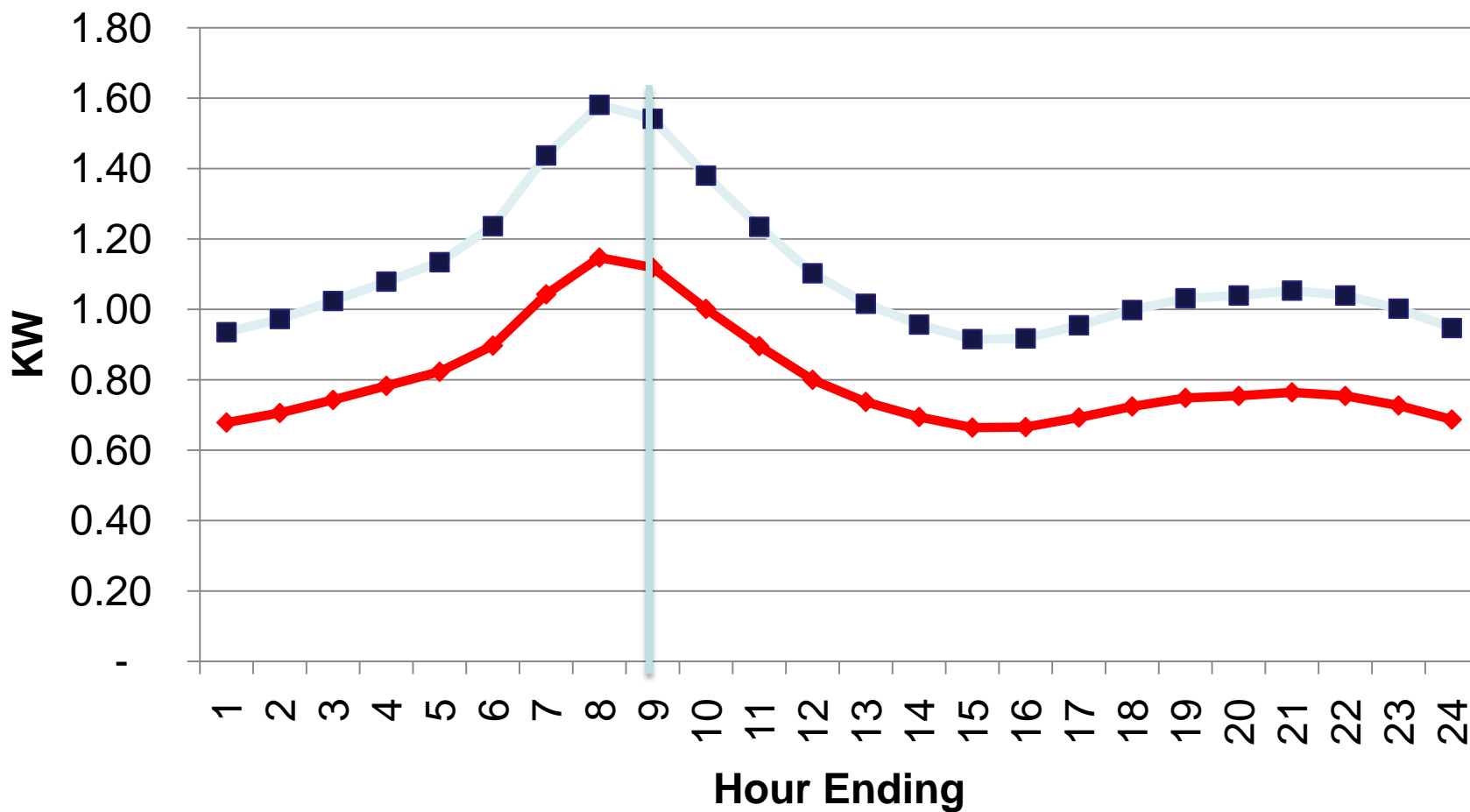
- Federal nonprofit agency self-funding through rates
- Wholesale to 140+ customers, mostly public utilities
- Operates high-voltage transmission
- Markets electric power
- 31 Federal Hydropower plants, 1 nuclear plant
- About 80% of the power BPA sells is hydroelectric.
- BPA acquires cost-effective energy conservation
 - ~\$100 million annual incentives
 - Meet 85% of load growth with energy efficiency



Role of Heat Pumps in the Pacific Northwest

- Large installed base of electric resistance space and water heating
- Great efficiency opportunity to replace electric resistance heat with heat pumps
- Over 20,000 residential ductless heat pumps installed.
- Over 2,000 residential heat pump water heaters installed
- Ongoing heat pump incentives
- Ongoing effort to find higher efficiency emerging technologies

Residential Ductless Heat Pumps Energy and Capacity Benefits



■ ELCAP - ER Annual ◆ ER w/DHP Supplemental Heating Profile

Source: Northwest Power and Conservation Council

Heat Pumps as Energy Efficiency Measures

- BPA spends considerable effort and budget to predict and quantify and ensure proper in-situ heat pump performance.
- Field Performance is not predictable from lab tests and ratings.
 - COPs are variable and lower than expected.
 - Auxiliary electric heat is unpredictable and higher than expected.
 - Heat pump capacity at lower ambient temperatures
- BPA requires heat pump commissioning and QC in attempt to ensure heat pump savings – many issues and difficulties.

2013 BPA Heat Pump Reimbursements

Measure category	Reimbursement
Heat Pump Conversion & Upgrade in Commercial Bldgs.	\$100.00 - \$250.00/ton
Heat Pump Water Heating	\$300.00 - \$500.00/unit
Resistance Heating to Tier 1 Premium Heat Pump	\$250.00
Heat Pump to Tier 1 Premium Efficiency Heat Pump	\$100.00/unit
PTCS Air-Source Heat Pump - Upgrade	\$500.00-\$1,000.00/unit
- Conversions	\$1,400.00-\$1,900.00/unit
- Commissioning and Controls	\$300.00/unit
PTCS Ground Source Heat Pump Systems (new)	\$3,000.00-\$3,500.00/unit
PTCS Duct Sealing	\$400.00-\$500.00/unit
Variable Refrigerant Flow HVAC Field Test	\$200 - \$300/ton
Residential Variable Capacity Heat Pump Upgrade	\$500

PTCS = Performance Tested Comfort Systems

BPA and Natural Refrigerants

- No current mandate to influence refrigerant choices.
- Significant mandate for acquiring cost-effective energy efficiency resources.
 - Transcritical CO₂ heat pump water heating for efficiency and peak load improvements
 - Variable capacity heat pumps
 - Grocery refrigeration
- BPA may see future federal agency requirements related to refrigerants and global warming
- Opportunities for combination of high efficiency and low GWP



ATMO
sphere
business case
natural refrigerants

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Contact Info

Jack Callahan, P.E., CEM, CMVP

Senior Engineer

Bonneville Power Administration

jmcallahan@bpa.gov

503-230-4496

www.bpa.gov/energy/n/emerging_technology/

www.e3tnw.org

