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September 4, 2008

MEMORANDUM

TO: Council Members

FROM: Tom Eckman

SUBJECT: Status of Regional Assessment of Conservation Potential in the Residential Sector

Staff is in the process of updating its assessment of the conservation opportunities in the residential sector for the 6th Plan. This presentation will provide an overview of the preliminary findings of that assessment covering residential lighting, appliances and water heating. Time permitting, staff will also provide a brief review of its assessment of the conservation potential in residential space conditioning (heating and cooling).

In the 5th Plan, the Council estimated that approximately 1600 average megawatts of conservation potential was technically available in the residential sector from improvements in lighting, appliances, and water heating technologies at a levelized cost of less than \$200 MWH. Staff's preliminary estimate for the 6th Plan for these same end uses places the remaining technical potential at just over 1800 average megawatts. In the 5th Plan, nearly 1000 average megawatts of the technical potential had a cost of less than \$50 MWH. Just over 800 average megawatts of conservation potential have costs below this value in the current assessment.

As was noted at the July Power Committee meeting, the Energy Independence and Security Act (EISA), passed in 2007, enacted federal efficiency standards for "general service lamps" (e.g., 40 watt - 100 watt incandescent light bulbs). However, since the federal standards do not cover all residential lighting and there will be additional homes in the region, staff estimates that the remaining potential in this end use is still over 200 average megawatts. In addition to lighting that is more efficient, the largest sources of lower cost conservation potential are in residential clothes washers, hot water heating (high efficiency tanks and heat pump water heaters), and higher efficiency showerheads. There are large potential savings (over 675 average megawatts) from solar water heating, however the levelized cost of these savings exceeds \$140 MWH.

Residential Sector Conservation Resource Assessment

Overview Preliminary Findings
September 16th, 2008



What's Covered – Water Heating

- High Efficiency Tanks
- Heat Pump and Solar Water Heaters
- 2.0 GPM Showerheads
- GFX Wastewater Heat Recovery

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What's Covered – Appliances and Lighting

- Clothes Washers
- Clothes Dryers
- Dishwashers
- Refrigerators
- Freezers
- Microwaves & Ovens
- Solar Photovoltaic Systems (On site use)

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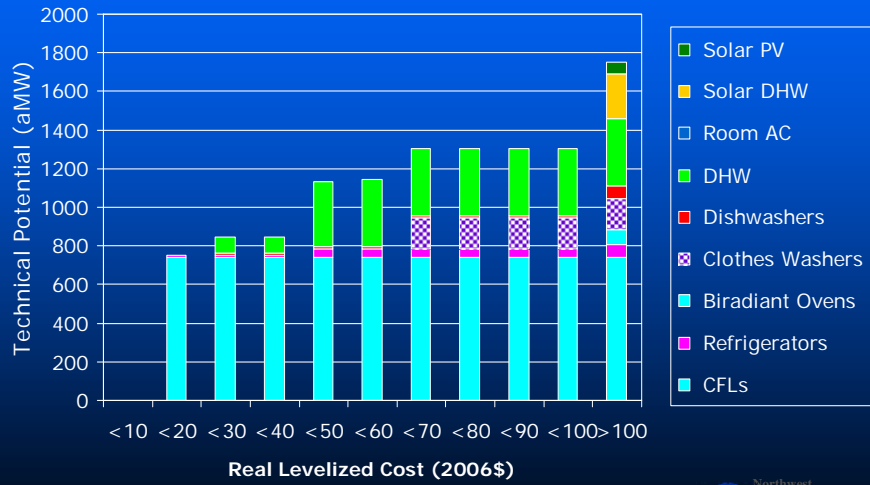
What's Changed

- Number of Households
- Mix of Housing Types
 - Fewer manufactured homes
- Saturation of “Electric” End Uses
 - Increase saturation of central air conditioning
- Baseline Efficiency
 - Federal standards require 60% improvement in general service lamp efficiency by 2020
- Availability of Higher Efficiency Options
 - Clothes washer and refrigerators models 20 -30% better than “best available” in 5th Plan

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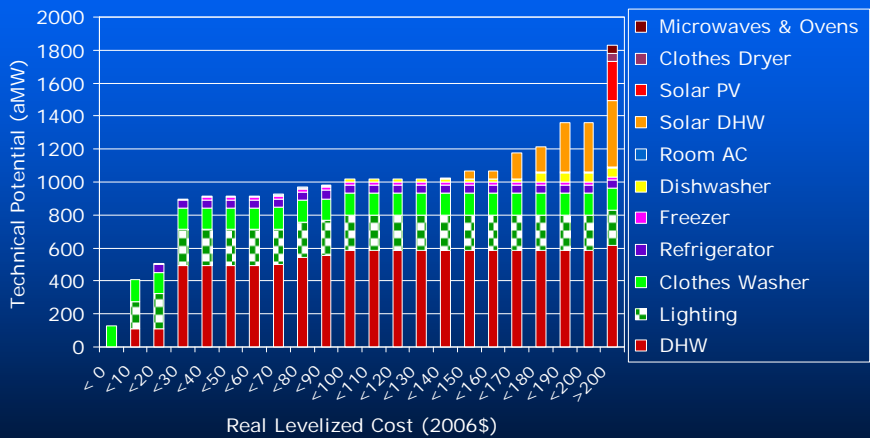
5th Plan Water Heating, Lighting and Appliance Supply Curve



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6th Plan Water Heating, Lighting and Appliance Supply Curve*

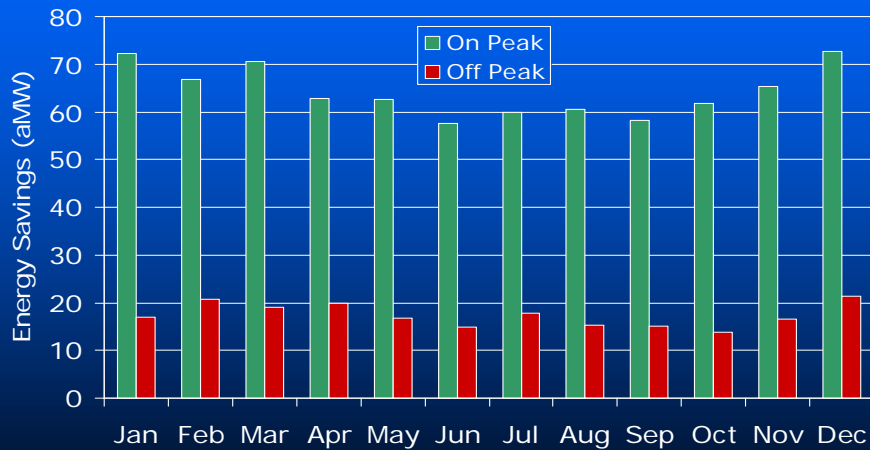


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*Preliminary – Subject to Revision!



Residential DHW, Lighting and Appliance Resource Dispatch Profile



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Based on measures with cost less than \$80 MWH



What's Covered – Space Conditioning

- Three Building Types
 - Single Family (up to & including 4-plex)
 - Multifamily (5-plex & above)
 - Manufactured/Mobile Homes
- Four Vintages
 - Pre-1980
 - 1980 – 1992
 - Post-1992 (= 1983 MCS level construction)
 - *Post 2009 OR/WA/IEEC (New)*

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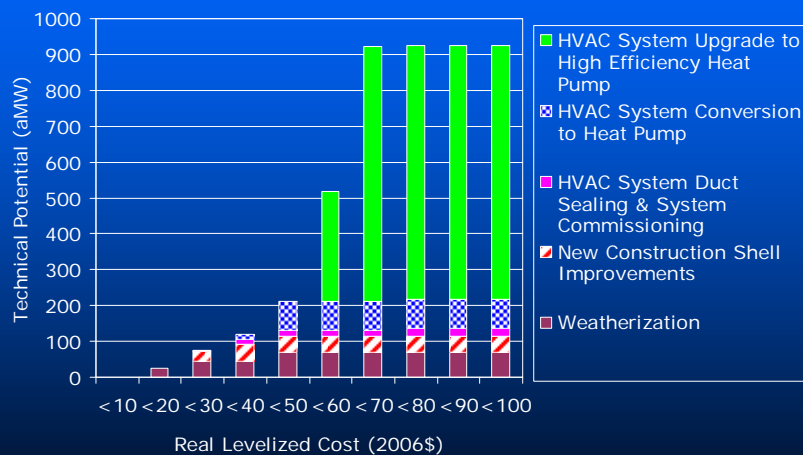
What's Covered (cont)

- Measures/Technologies/Practices
 - Thermal Shell Improvements (e.g. insulation, high efficiency windows)
 - Duct Sealing
 - Heating System Conversions to Air-Source Heat Pumps, including “ductless” systems
 - Heat Pump System Efficiency Upgrades
 - Central Air Conditioning Efficiency Upgrades
 - Heating and Air Condition System “Commissioning”

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5th Plan Space Conditioning Supply Curve



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Summary of 6th Plan Residential Space Conditioning Conservation Resource Potential by Measure*

