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March 3, 2015

### MEMORANDUM

**TO: Council Members**

**FROM: Tom Eckman and Massoud Jourabchi**

**SUBJECT: Guidance on Policy Assumption Regarding the Direct Use of Natural Gas in the Draft Seventh Power Plan**

#### **BACKGROUND:**

Presenter: Tom Eckman and Massoud Jourabchi

Summary: Staff is seeking Council guidance on the policy assumption regarding the direct use of natural gas to be used to develop the draft Seventh Power Plan.

At the January 2015 Power committee staff presented its findings on the potential impacts on future electricity demands from converting existing electric water heaters in single family homes to natural gas for water heating. Two cases were analyzed. The first case assumed that consumers would select their water heating fuel source based solely on economic considerations. That is, it assumed that the water heating fuel with the lowest life cycle cost would always be selected. The second case assumed that a consumer's choice of water heating fuel was influenced by other "non-price" factors, such as simplicity of replacement, or concerns about natural gas safety. In this case future fuel choice decisions were based on observed historical trends of water heating equipment. In both cases, the impacts of new federal standards for both gas and electric water heaters which take effect in April of 2015 were taken into account.

Also, at the January meeting, the Council agreed to release an issue paper requesting comments on the analysis and its current policy regarding the direct use of natural gas. Specifically, the Council requested responses to three questions.

- Is there data that contradicts the trends toward gas water heating? If so, please send it to us.
- Are there program designs that have successfully identified consumers interested in converting to gas water heating?
- Is it possible that future market conditions (fuel prices, technology changes, non-price factors) would warrant Council intervention in the market?

We received comments from regional electric and gas utilities, gas association and other interested parties. Generally speaking electric entities recommended continuation of current policy statements and natural gas utilities recommended modification to the policy. Staff is seeking Council guidance on maintaining or revising the policy statement on fuel switching/direct use of natural gas.

Relevance: The Council's policy, adopted in its first plan, is that fuel switching is not conservation under the Northwest Electric Power Planning and Conservation Act, which defines conservation as the "more efficient use of electricity." Further, the Council has determined, on the basis of its prior analysis, that fuel choice markets are reasonably competitive and that those markets should be allowed to work without interference.

Workplan: 1. D. Prepare for Seventh Power Plan and maintain analytical capability  
Update major deliverables for 7th plan. Develop narratives for key topics and issues -  
Direct Use of Natural Gas Analysis

Background and more Information: complete study and all comments are available at the following address.

<http://www.nwcouncil.org/energy/powerplan/7/dug7thplan/>

# Direct Use of Natural Gas

## Summary of Public Comment and Request for Guidance for Development of Draft 7<sup>th</sup> Plan

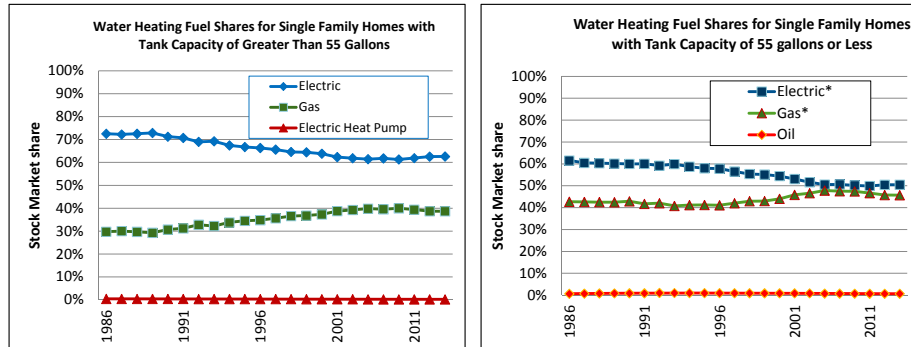
March 2015

### Issue:

## Should Council Maintain or Revise its Policy Statement on Direct Use of Natural Gas?

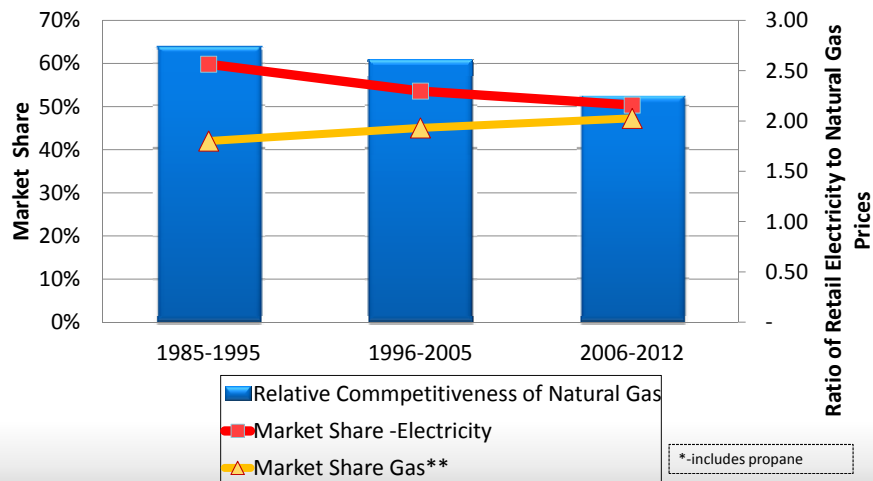
- Existing policy
  - Council recognizes that the direct use of natural gas for some uses is both more thermodynamically and economically efficient than the use of electricity generated by burning natural gas
  - It appears that market-based decisions are generally selecting the most economical fuel
  - Therefore, the Council takes a market-oriented approach to encouraging efficient fuel decisions in the region.

### Since 1986 The Market Share of Natural Gas Water Heating Has Been Growing, While Electric Water Heating's Market Share Has Been Decreasing



Regional market shares will vary depending on the particulars in each service area and state.

### Despite the Improving Relative Competitiveness of Electric Water Heating the Market Share of Natural Gas Water Heating Has Grown

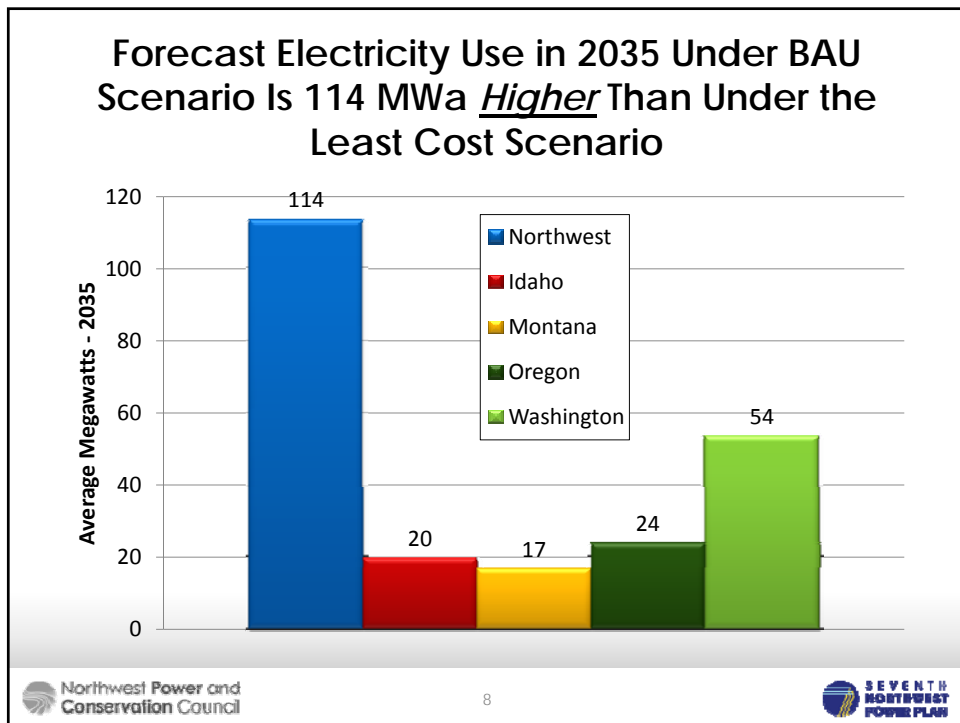
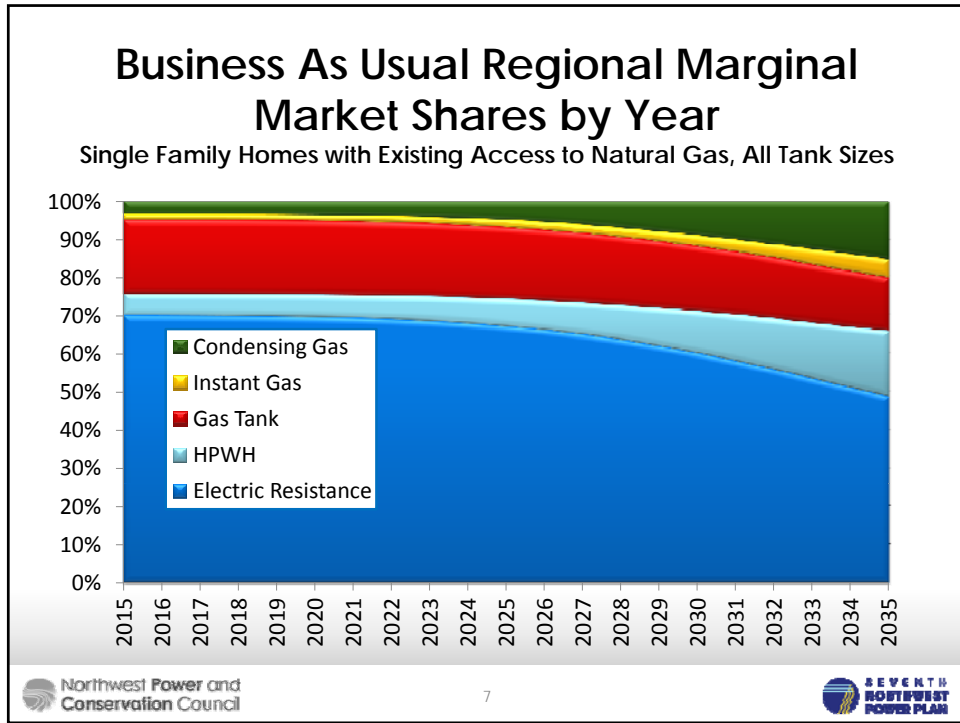


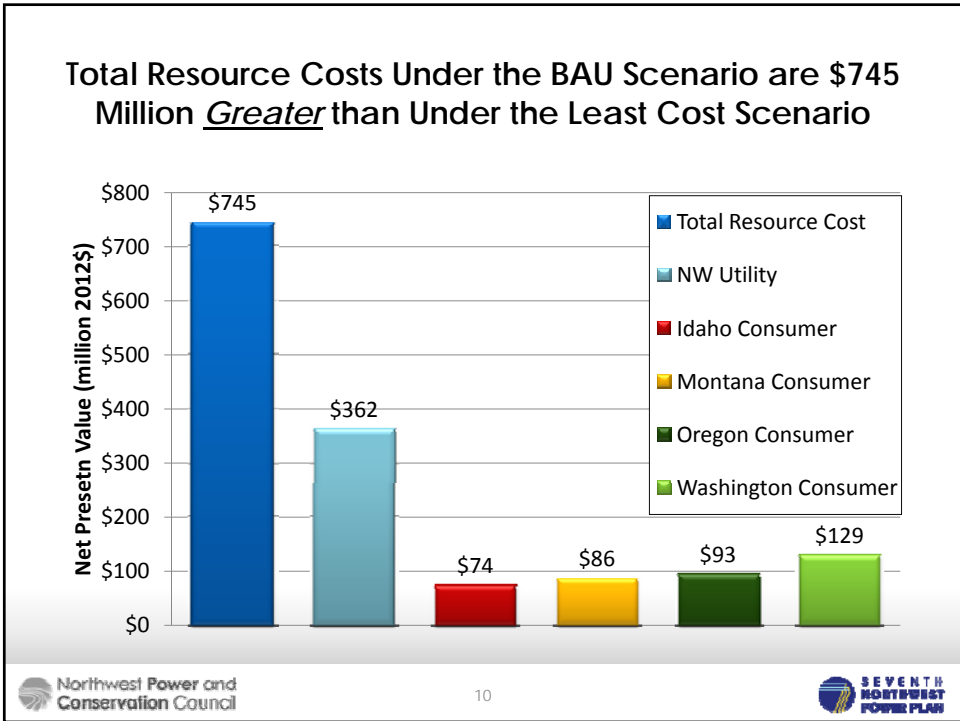
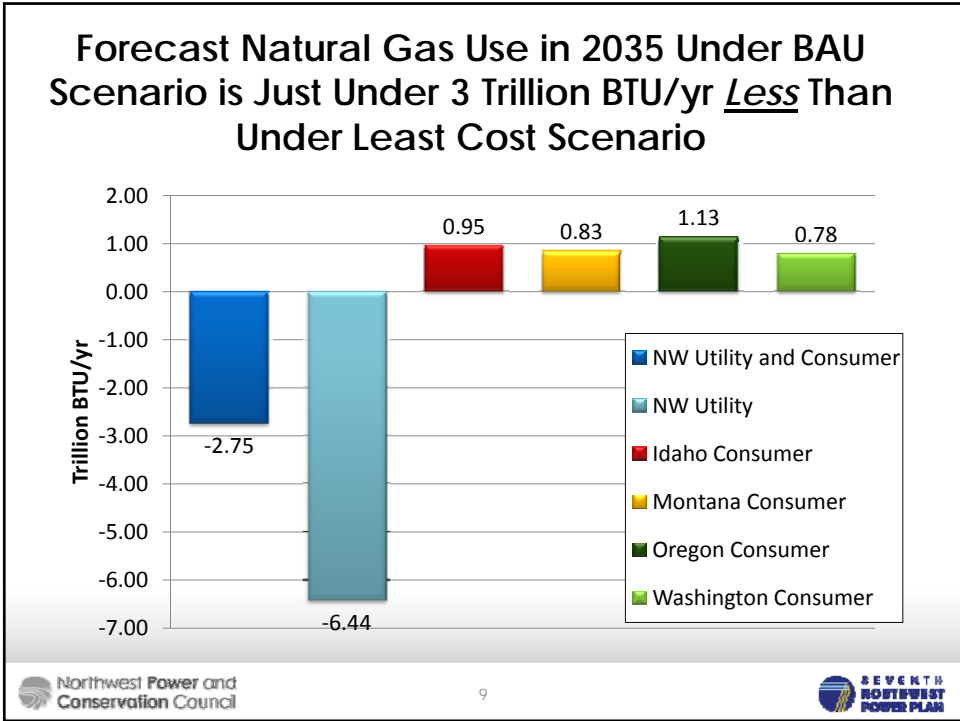
## Council Study for Draft Seventh Plan

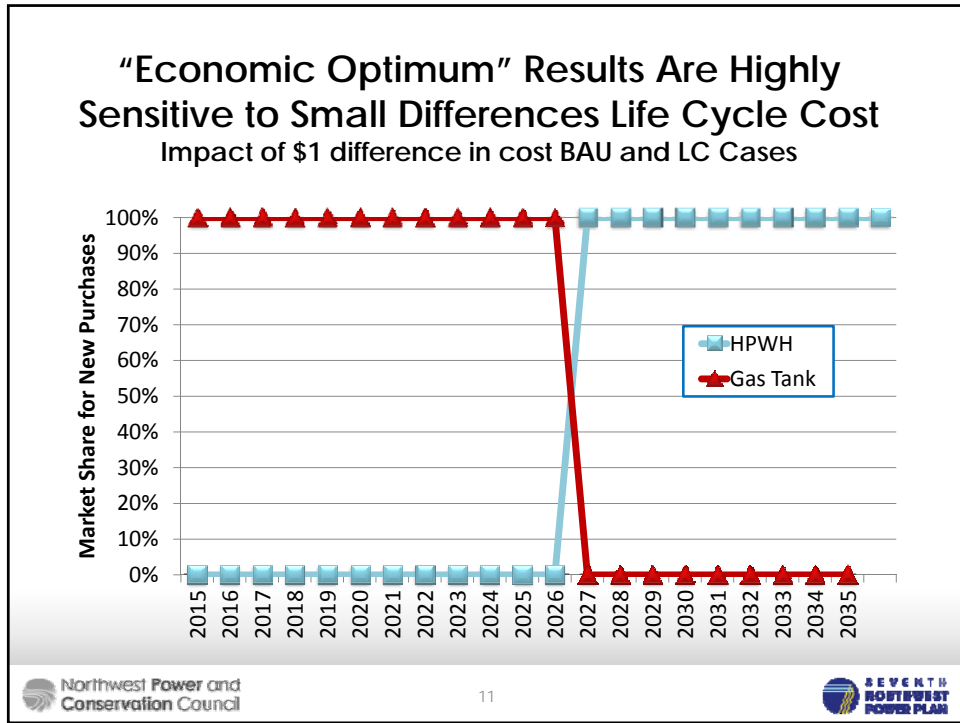
- Focus on market segment with the highest value conversion potential
  - *Existing Single family homes with gas space heating and electric water heating*
- Compare **actual** (i.e., historical) consumer choices for water heating equipment replacements with the “**least cost**” (i.e. economic optimum) system
- Create model to reflect **actual** consumer decisions
- Compare two scenarios to forecast changes in market share for water heating fuels in the single family homes with natural gas already available in the residence.
  - Business-as-Usual (historical trends)
  - Least Cost (economic optimum) – Comparable to 2012 Study

## Summary of Findings

- If consumers selected their water heating fuel type based solely on lowest life cycle cost (i.e., least cost) rather than following historical (i.e., BAU) fuel choice patterns:
  - Forecast demand for electricity in 2035 could be 114 MWa lower
  - Forecast demand for natural gas consumption in 2035 would be 2.7 Trillion BTU lower
- Consumer selections of water heating fuels are influenced by many factors other than cost
- The difference between “economically optimum” water heating fuel choices and historical water heating fuel choices are not significantly different.
- Market driven competition between electricity and natural gas is occurring as evidenced by the continuing growth in natural gas water heating market share







- ## Public Comment on Staff Analysis
- Issue Paper and background analysis released January 16<sup>th</sup>
  - Requested Comment on Three Questions:
    - Is there data that contradicts the trend toward gas water heating?
    - Are there program designs that have successfully identified consumers interested in converting to gas water heating?
    - Is it possible that future market conditions (e.g., fuel prices, technology changes, non-price factors) would warrant Council intervention in the market?
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## Public Comment

- **Written Comment**
  - Two private citizens
  - City of Ellensburg Municipal Utility (electric and natural gas service area)
  - NW Gas Association
  - Cascade Natural Gas
  - Northwest Natural
  - PSE
  - PGE
- **Staff also held consultation with representatives of Northwest Gas Association**

## Public Comment Summary

- Terminate analysis, this is a non-issue
- No way to intervene in the market to achieve a better result than what market and price conditions will already do
- The market shares for gas and electric water heating have stabilized
- Fuel choice market should be allowed to work without interference because the right customer solution is not now -- nor is it likely to become -- easy to generalize across the region
- The Council should promote efforts to inform individual consumer energy source choices to encourage the least cost approach to water heating

## Results of A Recent Oregon Study

- **UM 1565, OPUC docket “investigation into fuel-switching and cross fuel efficiency issues” directed ETO to work with Oregon Public Utility Commission staff to identify and collect information about the reasons underlying gas customers decisions to install a heat pump.**
  - **This study was undertaken to assess whether ETO incentives for higher efficiency heat pumps were encouraging consumers to switch from heating with natural gas**

## Study Conclusions

- **Survey respondents cited a wide range of factors as things they took into account as they made their decision to install a heat pump (including the availability of rebates and tax incentives)**
- **It appears to be that system performance characteristics (perceived effectiveness of the system to keep the home comfortable, system efficiency, relative fuel costs, reliability, and the ability to add air conditioning to the home) were most important in influencing their final decisions**
- **ETO incentives, while considered were rarely the determining factor**

## Council Policy Statement

- The Council recognizes that there are applications in which it is more energy efficient to use natural gas directly than to generate electricity from natural gas and then use the electricity in the end-use application. The Council also recognizes that in many cases the direct use of natural gas can be more economically efficient. These potentially cost-effective reductions in electricity use, while not defined as conservation in the sense the Council uses the term, are nevertheless alternatives to be considered in planning for future electricity requirements.
- The changing nature of energy markets, the substantial benefits that can accrue from healthy competition among natural gas, electricity and other fuels, and the desire to preserve individual energy source choices all support the Council taking a market-oriented approach to encouraging efficient fuel decisions in the region.

## Staff Recommendation

- Retain “Business-As-Usual” fuel conversion logic in baseline frozen efficiency load forecast.
  - Does not assume all consumers will adopt “least cost” water heating equipment
- Retain current policy with minor modification:

*The changing nature of energy markets, the substantial benefits that can accrue from healthy competition among natural gas, electricity and other fuels choices, and the desire to ~~preserve~~ promote informed individual energy source choices all support the Council taking a market-oriented approach to encouraging efficient fuel decisions in the region*

The following slides provide a more detailed summary of public comments

## Summary of Comments from Individuals

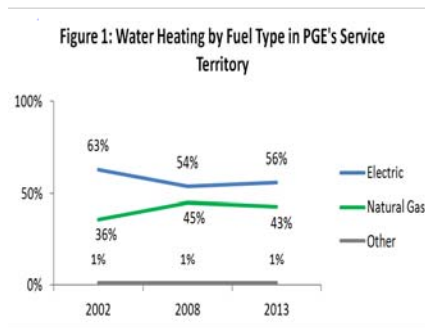
- **Changes in water heating (and space heating) technology (e.g., heat pump water heaters) are making the use of electricity more thermodynamically efficient than gas was heating.**
- **It is difficult to see any utility in the Council continuing to investigate trends regarding consumer's use of gas vs. electricity for water and or space heating. The Council should terminate consideration of this non-issue.**

## Summary of Comments City of Ellensburg Municipal Utility

- **Market conditions (BPA's Tiered Rates) has driven utility to initiate efforts to shift load away from the electric utility over to the natural gas utility.**
- **Not sure how the Council could intervene in the market to achieve a better result than what market and price conditions will already do.**

## Summary of Comments PGE

- **Is there data that contradicts the trend toward natural gas water heating?**
  - PGE's recent Residential Appliance Saturation Study (RASS) indicates that in PGE's service territory, the market shares for gas and electric water heating have stabilized. As Figure 1 demonstrates, in the past five years, the trend toward gas water heating has stopped in PGE's service territory.



## Summary of Comments PGE

- **Is it possible that future market conditions (fuel prices, technology changes, non-price factors) would warrant Council intervention in the market?**
- Again, we support the Council's position that "fuel choice markets...should be allowed to work without interference." In the particular case of water heaters, we recommend that the Council continue its practice of non-intervention, chiefly because the right customer solution is not now -- nor is it likely to become -- easy to generalize in the region.
- **Is it Possible that future market conditions would warrant Council intervention in the market?**
- As a result of the technological advancements underway in electric water heaters and the variation in household conditions that can greatly impact consumer choice in fuel source for water heaters, we recommend that the Council not intervene in this market.

## Summary of Comments PSE

- PSE offers programs to assist consumers switch from electricity to natural gas space and water heating
- The Council's present policy that does not consider fuel switching as conservation promotes differing incentives for electricity and natural gas that can lead to market distortions

## NW Natural Comments

- The level of aggregation masks policy level relevance
- The working assumption of no market intervention is overly simplistic and misleading.
- The paper's final conclusion appears inconsistent with its detail finding

## Summary of Comments NW Gas Association

- **The analysis is narrowly focused on a single market segment.**
  - Because this analysis is limited to the conversion of electric to gas water heat where a gas furnace is in place, this paper by its own definition understates potential benefits of direct use.
  - It is reasonable to assume that additional energy savings may be available to the region from other appropriate conversion opportunities.

## Summary of Comments NW Gas Association

- **The analysis does not account for market intervention.**
  - We acknowledge that this is an appropriate modeling approach given the variety and disparity of energy efficiency incentives offered across the region.
  - Yet market intervention (utility programs that offer rebates as well as state or federal tax incentives for the purchase of energy efficient equipment) is ongoing throughout the region on the electric side, and has a significant impact on the choices consumers make.

## Summary of Comments NW Gas Association

- **The Draft Paper's analysis does not comport with its conclusion.**
  - The analysis and conclusions are based on projections of future energy prices by state. The reality for individual customers is more complicated and will be based on their individual rates.
  - It is possible, therefore, that the analysis underestimates the energy savings potential even of this one narrow market segment.



## Summary of Comments NW Gas Association

- **The Council's current policy on direct use of natural gas implies a level playing field between fuel choices.**
  - NWGA's members generally support a "market-oriented approach."
  - However, the Council's current policy turns a blind eye toward the interventions that do exist in our region and which may skew the BAU towards electric applications when the least cost, most efficient application is gas (see above).
  - The current policy also assumes a market that is fully informed of its life cycle, least cost option, which is simply not the case.

## Summary of Comments NW Gas Association

- **The region's combined utilities view appropriate fuel conversion as conservation.**
  - It is notable that the region's combined utilities use electric conservation dollars to fund fuel conversion programs. They do so even though in some cases the load goes to different LDC. Clearly, they view and promote fuel conversion as a conservation and energy efficiency resource.

## Summary of Comments NW Gas Association

- **The NWGA recommends the Council consider amending its current Direct Use of Gas policy:**

The Council recognizes that there are applications in which it is more energy efficient to use natural gas directly than to generate electricity from natural gas and then use the electricity in the end-use application. The Council also recognizes that in many cases the direct use of natural gas can be more economically efficient. These potentially cost-effective reductions in electricity use, ~~while not defined as conservation in the sense the Council uses the term,~~ are nevertheless alternatives to be considered in planning for future electricity requirements.

## Summary of Comments NW Gas Association

- **The NWGA recommends the Council consider amending its current Direct Use policy:**

The changing nature of energy markets, the substantial benefits that can accrue ~~from healthy competition~~ among natural gas, electricity and other fuels choices, and the desire to ~~preserve promote~~ ~~informed~~ individual energy source choices all support the Council taking a ~~least cost market-oriented~~ approach to encouraging efficient fuel decisions in the region.

*Northwest Natural and Cascade echo NW Gas association.*

## Summary of Comments NW Gas Association

- **We further recommend that the Council identify particular steps to implement its revised direct use of natural gas policy in the Action Items of the 7th Power Plan.**
  - The Draft Paper identified a number of attitudes and behaviors that affect a consumer's choice at the point of decision. Rather than looking at these as barriers to adoption, we suggest using them as a starting point to identify mechanisms to promote the appropriate uptake of least-cost, energy efficient direct use of natural gas.