

**Bruce A. Measure**  
Chair  
Montana

**Rhonda Whiting**  
Montana

**W. Bill Booth**  
Idaho

**James A. Yost**  
Idaho



**Joan M. Dukes**  
Vice-Chair  
Oregon

**Bill Bradbury**  
Oregon

**Tom Karier**  
Washington

**Phil Rockefeller**  
Washington

December 4, 2012

## **DECISION MEMORANDUM**

**TO:** Council members

**FROM:** Terry Morlan  
Director, Power Planning

**SUBJECT:** Direct Use of Natural Gas Analysis

**PROPOSED ACTION:** Approve release of a draft paper on the Direct Use of Natural Gas for public comment.

**SIGNIFICANCE:** This paper describes the results of an analysis that compares the cost-effectiveness of using natural gas appliances for residential space heating and water heating and makes recommendations for Council policy. The analysis fulfills Sixth Power Plan action item ANLYS-16.

## **BUDGETARY/ECONOMIC IMPACTS**

The decision to release the document for public comments has no significant budgetary effects.

## **BACKGROUND**

Is it better to use natural gas directly in water heaters and furnaces or to generate electricity for electrical space and water heating systems that provide these services? The Council has deliberated on this question since its inception. Over the years, the Council has performed several studies and issued papers addressing the issue. The topic has gone under different names; total-energy efficiency, fuel switching, direct use of gas, and others.

In light of changing technologies and energy prices and of growing climate concerns, in 2008 the Council was again asked to look at the direct use of natural gas issue. With the financial support and cooperation of the Northwest Gas Association and Puget Sound Energy, the Council has updated its economic analyses. The Council's Regional Technical Forum oversaw the study and its scope.

Based on previous analysis, the Council's policy regarding fuel choice has been to allow fuel choice markets to work because they appear to be adequately competitive. The complete statement of the Council fuel choice policy appears on page two of the document.

## **ANALYSIS**

This is the most detailed and complete analysis of the direct use of natural gas issue to date. The analysis found that most consumers should remain with their current space and water heating fuels. There are few cost effective fuel conversions in space heating, but up to 26 percent of water heating choices could involve changes in fuels. Most of the water-heating fuel conversions involve shifting to natural gas water heating away from electric resistance where natural gas is already in the home for space heating. However, there are also situations where it is cost-effective to shift from natural gas water heaters to heat pump water heaters when the water heaters are greater than 55 gallons.

Two technologies no longer appear cost-effective; electric resistance water heat, and electric forced air furnace space heat. The analysis found that it is cost-effective to shift away from these technologies. Replacement technologies are quite competitive between natural gas and electricity. Gas forced air furnaces, heat pumps, and electric zonal are all competitive replacements for electric forced air furnaces depending on home characteristics, climate, and fuel prices. For water heating replacements heat pump water heaters and condensing gas water heaters are very close in cost.

The analysis was done from two different perspectives; a regional or societal perspective using the Council's Resource Portfolio Model, and a consumer perspective using a spreadsheet model developed by Tom Eckman. The results showed that choices from the consumer perspective are generally similar to choices made from the regional perspective.

The overall potential effects on gas and electricity use if all of the cost-effective conversion choices were made is small. Across all households, regional electric loads decrease around 340 average megawatts or about 1.5% of projected loads in 2030. Natural gas use by customers increases 13 trillion BTU. However, less natural gas is used by the power generation turbines that would otherwise have served those electric space and water heating systems. After netting out the 21 trillion BTU decrease of gas use by these turbines, total regional natural gas consumption falls 8 trillion BTU per year by the end of the 20-year study. The analysis also showed that fuel choice made little difference to total carbon emissions from residential space and water heating.

## **ALTERNATIVES**

Because this analysis has been widely reviewed and discussed with the RTF and the Northwest Gas Association and its members, the Council could decide to forgo the additional public comment. It is staff's recommendation, however, to ask for additional public comment. Not only might it raise some additional issues, but it will bring more awareness of the analysis and the Council's potential policy choice.

In addition, the Council could request changes to the document before it is sent out for public comment. Staff believes it is ready for public review, but would certainly make changes that the Council wants.

## **ATTACHMENTS**

The draft paper entitled “[Direct Use of Natural Gas: Economic Choices from the Regional Power System and Consumer’s Perspective](#)” is linked. The Power Committee packet includes a PowerPoint presentation further describing the analysis and results.

## **TABLES, GRAPHS, CHARTS, FIGURES, OTHER GRAPHICS**

None

---

q:\tm\council mtgs\2012\january\c05\_dug\_dm.docx