Northwest Power and Conservation Council

May 3, 2004

MEMORANDUM

TO: Power Committee

FROM: Terry Morlan

SUBJECT: Revised Fuel Choice Insert for Power Plan

At the April Power Committee meeting, the staff was asked to include more specific examples of situations where it might be especially cost effective to convert from electricity to natural gas. The attached document includes an added paragraph, highlighted, that provides some additional general guidance for consumers.

The paragraph is based on several previous Council analyses of fuel conversion economics. We have not done additional analysis. It does not appear likely that the a new study would significantly affect the general conclusions reached earlier, nor would it likely affect the Council's policy on fuel conversions or fuel choice. If the Council wishes to explore the fuel choice issue anew, with a new analysis, I would recommend including such a study in the action plan for future Council actions, rather than trying to incorporate such a study in the plan that is under development.

Attachment

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Attachment:
Draft 5th Plan Section on Fuel Choice, or Direct Use of Natural Gas

The appropriate role for the Council in promoting the direct use of natural gas for space and water heating has long been an issue in the region. The Council has analyzed the technical and policy issues in a number of studies.[1] The specific issues have changed somewhat over time and include:

- Should fuel conversions to natural gas be considered conservation of electricity?
- Will incentive payments for electricity efficiency improvements adversely affect natural gas choice?
- What are the potential reductions in electricity use from cost-effective fuel switching available to the region?
- Are fuel choice markets working adequately, or are there impediments that keep consumers from making the most economical choice?
- What are the relative risks of price change for natural gas and electricity?
- How do the environmental effects differ between direct natural gas use and gas use for electricity generation?

The Council policy on fuel choice has consistently been that fuel conversions, while they do reduce electricity use, are not conservation under the Northwest Power Act because they do not constitute a more efficient use of electricity. The Council has recognized, however that, if its conservation programs were to cause a reduction in the use of natural gas in favor of electricity, it would reduce the electricity savings expected from electricity conservation programs.

Council analyses have found that in cases where retail natural gas service is readily available it is often more economically efficient to use natural gas directly for space and water heating than to use electricity generated by a gas-fired generator. However, this is very case specific and depends on a number of factors including the proximity of natural gas distribution lines, the size and structure of the house, the climate and heating requirements in the area, and the desire for air conditioning and suitability for heat pump applications. In general, although direct use of natural gas is more thermodynamically efficient (except for the case of heat pumps), it is more costly to purchase and install. Moreover, the price of natural

[1] See for example; Northwest Power Planning Council. *Direct Use of Natural Gas: Analysis and Policy Options.* Publication 94-41. August 11, 1994; or Northwest Power Planning Council. *Direct Use of Natural Gas Policy*. Publication 2001-17, July 17, 2001.

gas for a small residential or commercial consumer is generally higher than the price to the operator of a gas-fired power plant, reducing the operating cost advantage of the more thermodynamically-efficient direct use. Therefore, the economic advantage of direct use of gas depends on the ability to save enough in energy costs to pay for the higher initial cost.

One particularly attractive opportunity for conversion to natural gas is in homes that have natural gas space heating systems, but electric water heaters. In many of these cases, it would be cost effective for consumers to install natural gas water heaters. Council studies have also shown that it would often be cost effective to convert a home with electric forced air heat to a gas forced air system. These homes already have the duct work necessary for natural gas heating systems. The advantages of conversion are best in large homes that use a lot of energy and are close to natural gas distribution lines. In homes with zonal electric heating conversion is less likely to be cost effective, and improving the thermal integrity of the house may be more cost effective. In its 1994 study the Council estimated that 700 megawatts of electricity savings could be achieved through fuel conversion in single-family homes. That potential will have decreased since then because of continuing conversions and increased penetration of natural gas in new homes.

The Council has not included programs in its power plans to encourage the direct use of natural gas, or to promote conversion of electric space and water heat to natural gas. This policy is consistent with the Council's view of its legal mandate. In addition, the Council's analysis has indicated that fuel choice markets are working well. Since the large electricity price increases around 1980, the electric space heating share has stopped growing in the region while the natural gas space heat share in existing homes increased from 26 to 37 percent. A survey of new residential buildings conducted in 2000 for the Northwest Energy Efficiency Alliance found that nearly all new single-family homes constructed where natural gas was available had gas-fired forced air heating systems.[2] The survey also found an increased penetration of natural gas heating in the traditionally electric heat dominated multi-family market, especially in larger units and in Washington.[3] Fuel conversion of existing houses to natural gas has been an active market as well, often promoted by dual fuel utilities. These trends extend to the commercial building sector as well. A recently completed Commercial Building Stock Assessment shows significantly higher penetration of gas heating in new

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[2] David Baylon et.al. *Baseline Characteristics of the Residential Sector: Idaho, Montana, Oregon, and Washington*. Report to the Northwest Energy Efficiency Alliance. October, 2001

[3] David Baylon et.al. *Baseline Characteristics of the Multi-Family Sector: Oregon, and Washington*. Report to the Northwest Energy Efficiency Alliance. October, 2001

commercial floor space. Since 1987, about 74 percent of commercial floor space is gas heated compared to 61 percent before 1987. In addition, significant conversion from electric heat to gas heat has occurred in the in pre-1988 stock increasing the gas-heated share from 50 to 61 percent.[4]

The Council's policy on fuel choice is a market-based approach. The Council will leave the choice of heating fuels to individual consumers. But at the same time, the Council will work to facilitate appropriate fuel choice through information and promoting efficient pricing of electricity. Electricity prices that reflect the cost of incremental supplies are important incentives not only for fuel choice, but for electricity use and conservation decisions as well.

[4] Kema-Xenergy Inc. *Assessment of the Commercial Building Stock in the Pacific Northwest.* Report prepared for the Northwest Energy Efficiency Alliance. March 8, 2004