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Fisher, Sheehan & Colton, Public Finance and General Economics

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### IN THIS ISSUE

Energy use of low-income consumers

### NOTE TO READERS

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### Energy Consumption Levels and Low-Income Consumers

As electric and natural gas utilities enter a period of increasingly volatile prices, one response of the industry involves an effort to increase the proportion of revenue collected through fixed charges.

Common forms these proposals can take include: (1) an increased fixed monthly customer charge; and (2) a set "minimum bill," which includes the customer charge plus a set amount of usage. Moving an increased proportion of fixed charges to the initial blocks of a block rate structure tends to have the same effect as an increased customer charge or a minimum bill.

Increasing fixed charges at lower consumption levels tends to be regressive in nature. In particular, such fixed charges harm low-income customers who tend to have below-average energy consumption.

In recent testimony presented on behalf of the Missouri Office of Public Counsel (OPC), Fisher, Sheehan & Colton, Public Finance and General Economics (FSC) outlined available federal data that documents the relationship between income and energy consumption.

### U.S. Department of Energy

In January 2001, the U.S. Department of Energy published its most recent analysis of the relationship between natural gas consumption and household income. The DOE concluded: ". . . natural gas consumption and expenditures per household did vary by household income—higher income households consumed more and spent more on average. Higher income households

lived in larger housing units, which require more energy for heating.”

DOE found that natural gas consumption steadily increased with income. While households with incomes less than \$10,000 consumed 65 mmBtu, households with incomes between \$10,000 and \$25,000 consumed 75 mmBtu; between \$25,000 and \$50,000 85 mmBtu, and over \$50,000 consumed 98 mmBtu. While the average consumption for all households was 83 mmBtu, the average consumption for households below the Poverty Level was only 68 mmBtu.

	Consumption	Expenditures
All households	83	\$765
Less than \$10,000	65	\$624
\$10,000 - \$24,999	75	\$689
\$25,000 - \$49,999	85	\$783
\$50,000 and more	96	\$895
Below Poverty Level	68	\$634
Eligible for fuel assistance	73	\$683
Consumption in mmBtu		

### Low-Income Home Energy Assistance Program (LIHEAP)

Each year, the Division of Energy Assistance within the Office of Community Services prepares a “LIHEAP Home Energy Notebook” to assist state LIHEAP offices in designing their federal fuel assistance program. The LIHEAP Home Energy Notebook for Fiscal Year 1998 (October 2000) is the most recent such publication.

The LIHEAP notebook presents national data as well as regional data.

According to the LIHEAP report, for example, low-income Midwest households that use natural gas as their primary heating source have average annual home heating expenditures of \$449. In contrast, non-low-income households have average annual home heating expenditures of \$473. Average home heating expenditures are \$466.

Home heating, of course, is not the only use of energy. LIHEAP reports that low-income Midwest households using natural gas as their primary heating fuel have average annual energy expenditures of \$1,163, while non-low-income households have average annual expenditures of \$1,394. Home energy expenditures for the average household are \$1,328.

Clearly, low-income households have natural gas expenditures that are not only “below average,” but that are also considerably below what non-low-income households spend.

The “all fuels” data is presented below. The LIHEAP Notebook presents data disaggregated by main heating fuel (natural gas, electricity, fuel oil, kerosene, LPG).

Residential Energy by Income Status (All Fuels)		
	Use (mmBtu)	Expenditures
All households	96.4	\$1,280
Non-low-income	13.5	\$1,380
Low-income	82.2	\$1,082

The LIHEAP notebook also presents data broken down by home heating and home cooling. Home heating data is by main heating fuel. The “all fuels” data is presented below.

Residential Home Heating by Income Status (All Fuels)		
	Use (mmBtu)	Expenditures
All households	46.2	\$361
Non-low-income	49.7	\$386
Low-income	39.2	\$312

### Consumer Expenditures Survey (U.S. Department of Labor)

The U.S. Department of Labor, Bureau of Labor Statistics, publishes the annual Consumer Expenditures Survey. This analysis is based on actual data provided by households participating in the survey.

The Consumer Expenditures Survey presents national data as well as regional data. The Survey provides natural gas expenditures (in dollars) as

well as electricity expenditures. It does not provide consumption data.

The Department of Labor reports that there is a direct relationship between income and natural gas expenditures. While households with incomes of less than \$5,000 have natural gas expenditures of \$193, households with incomes of \$20,000 to \$30,000 have expenditures of \$352, and households with income over \$70,000 have natural gas expenditures of \$528. Each level of higher income reports higher natural gas expenditures.

The table below presents information from the most recent three two-year periods for the Midwest region to illustrate the results.

Natural Gas Expenditures (Midwest)			
Income	1998 - 1999	1997 - 1998	1996 - 1997
Less than \$5000	\$193	\$235	\$265
\$5000 - \$9999	\$284	\$295	\$277
\$10,000 - \$14,999	\$303	\$334	\$362
\$15,000 - \$19,999	\$331	\$380	\$390
\$20,000 - \$29,999	\$352	\$411	\$405
\$30,000 - \$39,999	\$331	\$404	\$435
\$40,000 - \$49,999	\$414	\$454	\$484
\$50,000 - \$69,999	\$448	\$501	\$523
\$70,000 and over	\$528	\$566	\$629

### Residential Energy Consumption Survey (RECS)

The final information cited by FSC is from the U.S. Department of Energy's 1997 Residential Energy Consumption Survey (RECS). DOE reports that, holding all else equal, low-income households that use natural gas for space heating have a higher "heating intensity" than do households with higher incomes. Heating intensity is measured as usage per thousand square feet per heating degree day.

DOE, however, found that factors between income levels were *not* equal. The 1997 RECS results document that while the average household has a space heating intensity of 7.919, households with incomes below Poverty Level have a space heating intensity of 10.704. Households with incomes less than \$10,000 have a space heating intensity of 11.327.

If one were to stop at this point, the conclusion would clearly be that "low-income households use more energy than households on average holding all else equal." However, DOE goes on to find that while households on average have 1,747 square feet of heating floor space, households with incomes below Poverty have only 1,192 of heating floor space. Households with incomes below \$10,000 have only 1,143 square feet of heated floor space.

As a result, while total natural gas space heating consumption is 66.9 mmBtu for the average household, total natural gas space heating consumption is only 55.3 mmBtu for the household living below Poverty and only 56.6 mmBtu for the household with income below \$10,000.

DOE also empirically found that total space heating consumption for households using natural gas steadily increases as income increases. While households with incomes below Poverty have 1,192 square feet of heated floor space, households with incomes of \$50,000 or more have 2,360 square feet of heated floor space.

	Space Htg Use	Sp Htg Intensity	Htd Square Footage
Total households	66.9	7.919	1,747
Less than \$10,000	56.6	11.327	1,143
\$10,000 - \$24,999	61.5	9.903	1,343
\$25,000 - \$49,999	67.4	7.627	1,746
\$50,000 or more	75.5	6.422	2,360
Below Poverty	55.3	10.704	1,192
Space heating use in mmBtu.			
Heating intensity in BTU/HDD/000sqft			

### Summary

The available data, on a national and regional basis, supports the conclusion that low-income households consume less energy (whether heating energy or total household energy) than do households on average, and certainly more than non-low-income households.

As a result, proposals to move a greater proportion of utility bills to fixed monthly charges

are regressive in nature and will tend to impose adverse impacts on low-income consumers.

Anyone wishing a copy of the FSC testimony outlining the available federal information on the relationship between energy consumption and income (June 2001) can send a request to:

[publications@fsconline.com](mailto:publications@fsconline.com)

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Fisher, Sheehan and Colton, Public Finance and General Economics (FSC) is a research and consulting firm with offices in Belmont (MA), Scappoose (OR), and Iowa City (IA).

*FSC* specializes in providing economic, financial and regulatory consulting. The areas in which *FSC* has worked include infrastructure financing, public enterprise planning and development, natural resource economics, community economic development, telecommunications, public sector labor economics, planning and zoning, regulatory economics, energy law and economics, fair housing, and public welfare policy.

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