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Statistical Brief

Manufacturers Respond to Volatility in Energy Markets

The U.S. manufacturing sector consumes about 30 percent of the Nation's energy.

Tax proposals, international conflict, and many other circumstances—political, economic, and environmental—introduce unpredictability into the price of fuels used by U.S. manufacturers.

To minimize the sudden impact of higher costs resulting from unforeseen events, 1 in 7 manufacturers have technology that allows them to switch quickly from their primary fuel source to at least one other type of fuel. This 14.3 percent of plants uses nearly 32 percent of all energy consumed by the manufacturing sector.

Events Affect Fuel Prices Unevenly

Manufacturing plants use coal, natural gas, fuel oils (distillate or residual), electricity—or some combination thereof—to meet their energy needs. But the energy market is, at best, a precipitous terrain subject to abrupt upheavals.

A single event can have a range of consequences—from immediate, devastating, and sudden to almost none at all—for the different fuel sources upon which manufacturers rely. These impacts are reflected in energy prices for the various fuel types.

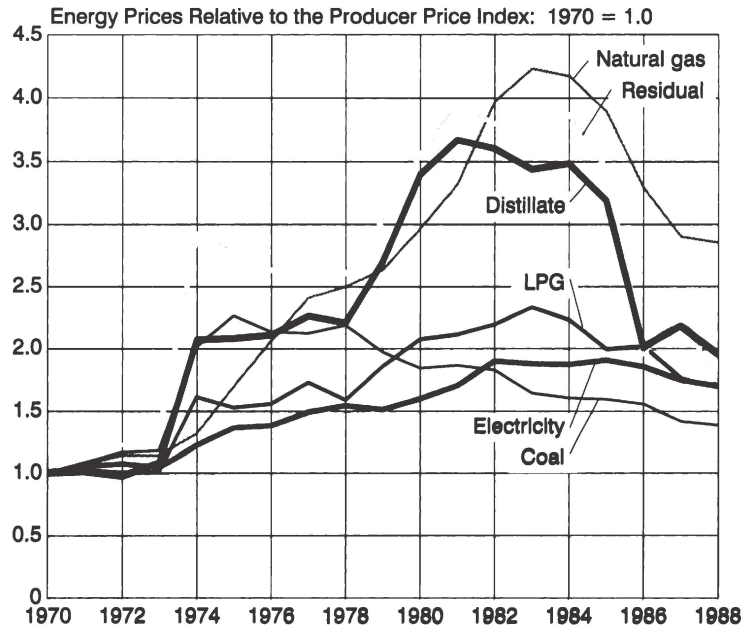
Some Manufacturers Respond by Adopting Fuel-Switching Technology

To take advantage of a second fuel source—whose price may not be affected by a particular policy or event—nearly one-seventh of U.S. manufacturing plants have adopted fuel-switching technology. These technologies enable manufacturers to change swiftly from their primary fuel to an alternative fuel without disrupting production.

The relative importance of plants with fuel-switching technology can best be understood by an examination of the data in the 1985 Manufacturing Energy Consumption Survey (MECS).

Energy Prices, by Fuel Type: 1970–1988

Energy prices—by fuel type—show the volatile nature of fuel pricing encountered by the manufacturing sector.



Source: U.S. Department of Energy, Energy Information Agency.

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U.S. Department of Commerce
Economics and Statistics Administration
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Using a sample of more than 8,500 manufacturing plants, researchers analyzed data on—

- Usage of industrial fuels by fuel type.
- The share of total manufacturing sector energy consumed by each fuel type.

Technology	Percent of plants	Share of energy consumed
Electricity	21.92	2.83
Fuel oil	8.24	2.89
Natural gas	28.40	22.90
Coal	0.62	16.32
Switch	14.33	31.69
Unknown	26.49	23.37

Plants with fuel-switching capabilities are the largest users of the Nation's fuel within the manufacturing sector. Plants relying upon natural gas are the next largest users and, as shown, have the greatest capacity to switch to another source of fuel.

By contrast, the plants relying upon coal, electricity, or petroleum fuel oils use 22.04 percent of manufacturing sector energy and have the lowest capabilities for fuel switching.

Switching Technology Helps Keep Costs Down

The advantages of fuel switching technologies are several:

- Plants can purchase the cheapest fuel at a point in time.
- If there is a supply disruption, a plant can readily switch to a more abundant fuel.
- Manufacturers can bargain strongly for lower fuel prices. The plant can present a credible claim that it will use another fuel if taxes or other factors drive fuel prices beyond the point of satisfactory returns.

Fuel-Switching Technologies Are Not for Everyone

Despite the flexibility offered by fuel-switching technologies, only manufacturing plants that expect to recover their costs will adopt them.

Moreover, fuel switching may not be appropriate for the type of manufacturing performed at the plant, or in that particular industry. The amount of energy consumed, and the level of energy intensity needed to manufacture the product are two important factors that limit or prescribe fuel choices for the manufacturer. For example:

- The plant's size (defined as the amount of energy consumed) may indicate that cost savings would be inconsequential.
- Plants may require fuels that have special properties. For example, aluminum smelters use electricity.

Finally, regional availability of a particular type of fuel may be so cost effective that fuel switching is not a realistic alternative. For example, natural gas is the most cost effective fuel for those manufacturers in Louisiana, Oklahoma, and Texas.

The full research report upon which this information is based contains complete descriptions of the data bases and statistical methods used, as well as any limitations of the data.

This Brief is one of a series that presents information of current interest based upon research conducted at the Center for Economic Studies (CES) of the U.S. Census Bureau. The CES houses highly specialized longitudinal microdata files on the U.S. manufacturing sector. One of the Center's missions is to develop projects and procedures for enhancing researcher access to these files with confidentiality protection. For further information, contact Robert H. McGuckin, (301) 763-2337.

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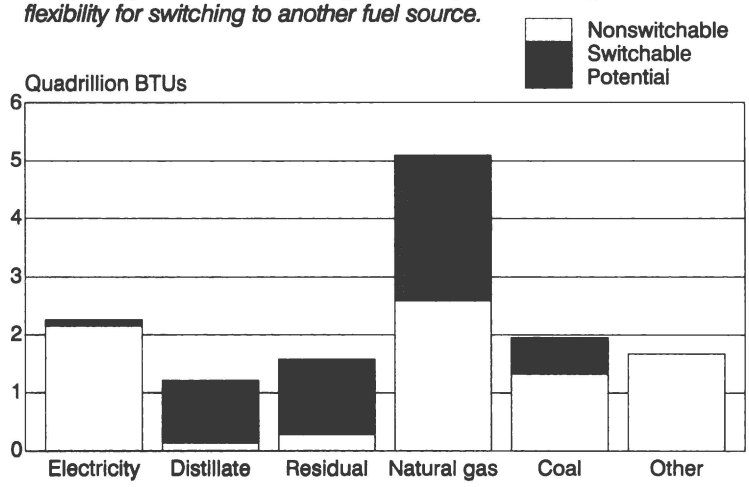
1985 Manufacturing Fuel Consumption and Switching Capability in the United States

The switchable portion of each segment represents the amount of fuel used that could have been replaced by other fuels without disrupting production. Natural gas usage provides the greatest flexibility for switching to another fuel source.



*No fuel switching information was collected for Other.

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