
A smaller part of the CWIP is related to emission of electricity does not increase, in the run. Nevertheless, if the consumption in the capital (the rate base) in the short run. To prevent that, PUCO should consider baring its prices not only on the utility’s performance but also on changes in regional price differences throughout the United States.

**Chart 3 Increase in Construction Work in Progress**

<table>
<thead>
<tr>
<th>Year</th>
<th>CWIP not in utility plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>100.0</td>
</tr>
<tr>
<td>1967</td>
<td>100.0</td>
</tr>
<tr>
<td>1969</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Conclusion**

While the energy price shocks in the 1970s created a price advantage for Ohio’s electric utilities, a relatively slow reduction in Ohio’s nonfuel expenses. This would be favorable reflected on Ohio’s electricity prices, and possibly the gap between prices of California’s electricity prices or that of other states would remain in Ohio’s favor.

The alarming growth of CWIP under taken by Ohio’s electric utilities could lead to a situation considerably different from that in scenario I. Currently, there is a record high level of CWIP. In 1964, the ratio of CWIP to existing capital stock was 0.02, while in 1982, both of these ratios rose to 0.32 and 0.91, respectively (see chart 2).  

**Scenario II.** As time progresses, CWIP would reach its completion level, and then PUCO would be under pressure to include a great amount of capital in the rate base, which would automatically and dramatically increase the price of electricity. Most studies sug gest that price elasticity for long-term demand of electricity exceeds unity (Sweeney 1984). By raising prices, a utility would not increase revenue in the long run, although the short run electricity demand is fairly inelastic (Bohi 1981). By increasing prices, utilities would be able to recover the cost of CWIP which then would be included in the capital (the rate base) in the short run. Nevertheless, the consumption of electricity does not increase, in the long run utilities would have greater difficulty recovering their capital cost, which would put constant upward pressure on their prices. Under this scenario, more companies would find it advantageous to settle in other states, thereby increasing the excess capacity of Ohio’s utilities and incurring greater payments to the remaining customers for idle capacity.

While factors not considered in the preceding scenarios can affect electricity prices, many factors can be incorporated in the framework of these scenarios. Acid rain proposals, for example, would require utilities to increase capital expenditures and, at the same time, lower productivity; then the declining TFP and the rising rate base undoubtedly would increase electricity prices, as explained in scenario II.

**The energy crisis of the 1970s had a dramatic effect on the comparative prices of electrical utilities across the nation. Triggered by the emergence of OPEC, oil prices in the United States rose 175 percent between 1973 and 1982 (after adjusting for inflation). Over the same period, natural gas increased 350 percent, while coal prices rose only 85 percent. The prices of primary energy (hydro, coal, and natural gas) are a major cost component in the production of electricity. As a result, utilities that use coal as the major fuel to generate electricity experienced much smaller increases in production costs than oil or gas-dependent utilities. With 90 percent of their electricity generated from coal, Ohio’s utilities have been major beneficiaries, along with Ohio’s businesses and consumers, of a decline in coal prices relative to other natural fuels. The relative decline of fuel costs to Ohio’s utilities produced one of the slowest rates of electrical price increases in any state in the nation. In Ohio, utility prices are regulated, and changes in production costs are major component of electrical price changes (see box 1). Fuel prices, of course, are not the only factor affecting the rate of price changes. Nonfuel factors, such as declining utility rates, increasing capital costs, and falling productivity also increase the cost of producing electricity. One of the questions that we address in this article is whether falling relative coal prices have been overwhelmed by nonfuel factors that are rising more rapidly in Ohio than elsewhere. Or, how beneficial has it been to Ohio’s consumers that their electrical utilities are coal-based?**

Federal Reserve Bank of Cleveland Research Department P.O. Box 6387 Cleveland, OH 44101

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**Ohio’s Electric Prices**

by Philip R. Israilevich

The 1973 and 1979 oil embargoes dramatically increased fuel prices across the United States. Chart 1 shows the effect of these oil embargoes on the average electricity prices across the ten largest electricity-consuming states over the period 1971-81. The combined electricity consumption of these 10 states represents 51 percent of the total U.S. economy.

Federal Reserve Bank of Cleveland
Research Department
P.O. Box 6387
Cleveland, OH 44101

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**References**


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**Box 1 Utility Regulation in Ohio**

The goal of utility regulation is to award the regulated utility a "fair rate of return" (electrically called "income") from its investment in its assets. The process of price setting can be expressed as the following equation:

\[
\text{Q} = \frac{\text{PQ} - \text{W}L}{\text{PQ}},
\]

where

- \( Q \) = excess profit (loss)
- \( P \) = price per unit of output (Kwhr)
- \( w \) = value of capital (rate base of utility)
- \( L \) = rental per dollar of capital (variable inputs (material, fuel, labor, services) used by the utility)
- \( r \) = cost of variable inputs.

The main purpose of the Public Utilities Commission of Ohio (PUCO) is to regulate electricity prices to achieve the allowed rate of return on capital. In other words, revenue (PQ = wL + rK). Therefore, electricity prices should set at a level that guarantees no excess profit or loss (w = 0). Variable costs (wL), increase prices would have to go up the same amount, other factors being constant. Or, if the capital stock (the rate base) expanded, then the electricity price would have to be raised to cover the increase in the capital stock (i.e., rK). PUCO is not allowed to include construction work in progress (CWIP) in the rate base until the construction work is at least 75 percent complete, after which PUCO uses its own discretion to account for CWIP. In reality, PUCO cannot control prices continually. According to the well-accepted view of Jokow (1979), PUCO is a passive agent. It exercises its power when a utility files a petition regarding incurred losses or when it is pressured by consumer groups to lower a utility’s profit.

In a competitive environment, if demand rises, price increases; if demand falls, price declines. Nevertheless, under the current regulatory rule, a rise in consumption of electricity tends to lower electricity prices, and a decline in consumption tends to increase electricity prices for the following reasons. The rise in electricity consumption increases electricity utility, reducing less capital per unit of output (K/D) declines. At the same time, production of variable inputs also tends to increase (L/D declines) because of an increasing return to scale and other factors. As a result, prices would have to decline to show no profit excess (w = 0). The decline in consumption of electricity would drive up prices for similar reasons. In these cases of the passive nature of its regulation, PUCO would be more likely to increase a price increase (with certain lags) than a price decline (see Jokow 1974).

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**Fuel Costs and Electricity Prices**

The 1973 and 1979 oil embargoes dramatically increased fuel prices across the United States. Chart 1 shows the effect of these oil embargoes on the average electricity prices across the ten largest electricity-consuming states over the period 1971-81. The combined electricity consumption of these 10 states represents 51 percent of the total U.S. economy.
electricity consumption in 1981.) In four of these states (Texas, Florida, California, and New York), the share of oil and natural gas in electricity production exceeded 70 percent. 

A surge in fuel prices, the actual price of electricity in California did not rise much above the price of electricity in Ohio. In fact, all of the states listed in table 1 seemed to do better than Ohio. Each state, despite their nonfuel expenses in the production of electricity, has a different pattern of nonfuel costs. The capitalization of nonfuel costs to California’s electricity prices would have resulted from (1) an increase in the purchasing of cheaper electricity from other states; (2) technological changes that allowed substitution of cheaper fuels; and (3) improved productivity.

Realizing that each state’s utilities have their own character, we might consider the nonfuel factors that could improve the performance particularly of Ohio’s utilities. The purchase of electricity from other states historically was minimal in Ohio, and its future expansion is doubtful. Since Ohio’s utilities are coal-based, the substitution for cheaper fuel for existing generators would be improbable. Therefore, improvement in productivity would most probably assure stable electricity prices in Ohio relative to other states (again, assuming no change among fuel prices).

Yet, the regulatory price mechanism has no feedback from the falling demand for electricity, which would stop the price hike (see box 1). In Ohio, as well as in other states, regulators monitor the profits of regulated utilities. Profits of privately owned utilities are established by methods that are relatively uniform and comparable at the national level. Therefore, regulators in Ohio have the advantage of lower electricity prices in the state, TFP for each utility behaved consistently over time. TFP for each company rose from 1964 through 1972, meaning productivity trends.

**Table 1**

<table>
<thead>
<tr>
<th>State</th>
<th>Electric Prices and Productivity Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dollars per million Btu</td>
</tr>
<tr>
<td></td>
<td>Price ratio: 1971/1981</td>
</tr>
<tr>
<td></td>
<td>Price ratio: 1971/1981</td>
</tr>
<tr>
<td>Ohio</td>
<td>4.90</td>
</tr>
<tr>
<td>California</td>
<td>4.97</td>
</tr>
<tr>
<td>Florida</td>
<td>5.82</td>
</tr>
<tr>
<td>Texas</td>
<td>4.77</td>
</tr>
<tr>
<td>United States</td>
<td>5.27</td>
</tr>
</tbody>
</table>


**NOTE:** Prices are normalized for 1971 and 1981, based on Ohio’s electricity prices.

1. Composi resulting in the production of electricity, energy, measured in dollars per million Btu.
2. This is revealed by electrific prices to fuel prices, which are reported below for 1971-83, derived from double log regressions for each state. Ohio has the highest electricity price, i.e., 1 percent of the fuel prices would result at the lowest increase of electricity prices in Ohio compared with the other listed states: Ohio 0.42 (12.62) California 0.42 (12.62) Florida 0.60 (6.60) Texas 0.52 (14.40) United States 0.60 (12.60) United States.
3. According to the equation shown in box 1, the impact of fuel prices and the relative price of electricity in Ohio resulted mainly from fuel price differentials. The relative price of electricity would be able to reduce this advantage in the future, making nonfuel factors a prime reason for interstate electricity price differences. The change from the relative decline of electricity price to its relative increase could promote a deterioration of Ohio’s industrial base.

**Chart 1** Comparative Electric Prices in 1971 and 1981

![Chart](image)


**NOTE:** Prices are normalized for 1971 and 1981, based on Ohio’s electricity prices.

1. Scenario 1: The excess capacity accumulated in the last decade will allow lower electricity prices to drop below fuel prices, translating into a large reduction in the price of electricity. Declines in electricity prices do not necessarily guarantee expansion of businesses in a state, as a firm’s location decision is affected by many factors, particularly the cost of electricity. Interestingly, third-of-the-consumers states are Sunbelt states—Ohio’s major competitors in economic expansion. In these states, the advantage of lower electricity prices in Ohio resulted mainly from fuel price differentials. The relative price of electricity could eliminate this advantage in the future, making nonfuel factors a prime reason for interstate electricity price differences. The change from the relative decline of electricity price to its relative increase could promote a deterioration of Ohio’s industrial base.

**Chart 2** Electricity Prices and Quantity Sold by Ohio’s Major Electric Utilities, 1964 to 1982

<table>
<thead>
<tr>
<th>Year</th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>$1.00</td>
<td>100,000</td>
</tr>
<tr>
<td>1970</td>
<td>$1.50</td>
<td>200,000</td>
</tr>
<tr>
<td>1975</td>
<td>$2.00</td>
<td>300,000</td>
</tr>
<tr>
<td>1980</td>
<td>$2.50</td>
<td>400,000</td>
</tr>
<tr>
<td>1985</td>
<td>$3.00</td>
<td>500,000</td>
</tr>
</tbody>
</table>


1. Scenario 1: The excess capacity accumulated in the last decade will allow lower electricity prices to drop below fuel prices, translating into a large reduction in the price of electricity. Declines in electricity prices do not necessarily guarantee expansion of businesses in a state, as a firm’s location decision is affected by many factors, particularly the cost of electricity.