

# The Energy Crisis and New England's Economy

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## I. Introduction

New England's locational disadvantages and paucity of natural resources have shaped its economy. The realities of the region's situation have forced it to concentrate its manufacturing on skill-intensive products with low energy requirements. This paper analyzes the problem of whether the region's manufacturing base can survive present high energy costs.

Part II includes a brief history of the region's economy and shows that the firms that have survived do not require easy access to national markets, low-cost unskilled labor, low-cost fuel and energy or a mild climate. The region's firms now specialize in the manufacture of such products as computers, jet engines, electronics, specialized machinery, medical instrumentation, specialized industrial fabrics and razor blades. In this way, the region's firms minimize their locational disadvantages and maximize the benefits of a pool of inexpensive high-skilled labor.

Part III of our paper demonstrates that even though the region's firms have adapted to their harsh environment by specializing in non-energy intensive products and services, the recent rapid escalation in fuel and energy costs has provided a substantial shock. This shock is likely to be felt most by the region's manufacturers. Even though New England manufacturers do not produce energy intensive goods, they still require more than twice as much energy per employee as services (See Table I). Part III addresses the question of whether the recent increases in energy costs will allow even nonenergy intensive manufacturing industries in New England to survive. An attempt is made to answer this question by quantifying the competitive burden of recent energy price increases on the total costs of New England manufacturing industries.

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Note: Throughout this paper, the electrical component of total energy is on a net basis. Net useful energy is the Btu content of electricity at the point of consumption. It does not include energy losses incurred in the production and transmission of electricity.



Table 1

NET ENERGY USE PER EMPLOYEE  
IN MANUFACTURING AND SERVICES:  
NEW ENGLAND AND THE REST  
OF THE UNITED STATES, 1971  
(Mill. of Btus per Year)

	United States (excluding New England)	New England
Manufacturing	738	334
Services <sup>1</sup>	133	155
Total Manufacturing and Services	302	211

<sup>1</sup>Services include finance, trade, construction, government and a great variety of business and personal services.

Source: See Bibliography.

The paper concludes that the crux of New England's competitive problem is that most manufacturing energy in the region is supplied by oil while in the rest of the country natural gas is used. The price of oil has increased substantially since the Arab oil embargo while the price of natural gas has remained relatively low. If New England is to retain any significant manufacturing employment, the prices of these fuels need to be brought closer together.

## II. The New England Economy: Its History and Adaptation to High Energy Costs

Few if any regions in the United States have as poor a natural endowment as New England. The region suffers from high power and fuel costs, is far distant from most national markets and has almost no indigenous raw materials. It has little good farmland, a harsh winter climate and high cost unskilled labor. As a result of all these factors, it has a high cost of living. If the west coast of the United States had been explored and developed before the east, it is a fair guess that the settlement pattern of the United States would be entirely different from what it is today. Both California and the Northwest would be substantially more densely populated. The east coast, on the other hand, would have many fewer people and New England might be largely under the administration of the U.S. Park Service.

Despite all its disadvantages New England has been able to remain an important economic region because it has benefited from its head start. It had a mature manufacturing economy by 1860 and each of its six constituent states has grown steadily ever since. Connecticut now has the highest per capita income in the Nation and Massachusetts ranks 16th. Even though the region has only 5.8 percent of the Nation's population, it has 7.1 percent of the Nation's manufacturing employment. How has it been possible for such a poorly endowed region to maintain growth when it is in competition with regions with much lower factor costs? There are a number of partial answers to the question but they all relate to the ability of New England's firms to adapt to their harsh economic climate.

New England now only has a small remnant of the prosperous agricultural economy it had in 1850. Similarly, the region no longer mines its own iron ore as it did in the late 1600s in eastern Massachusetts and in the 1700s in Litchfield County, Connecticut or its own coal as it did in Rhode Island in the 1800s. The region's manufacturing and service sectors, however, have gradually adapted by specializing in industrial processes and types of economic activity which are not handicapped by a poor natural endowment. In the late 1800s and the early 1900s manufacturing firms in this region became labor intensive because they had access to low-cost unskilled labor from the abandoned farms in northern New England and from immigrant labor moving in from Europe. However, the farm abandonment process gradually slowed and in 1920 Federal laws restricted immigration from Europe. Thus, New England was cut off from its plentiful supply of low-cost labor. As a result, the region started its relative decline in manufacturing in the 1920s and this decline accelerated in the late 1940s and 1950s as the Midwest, South and Far West competed successfully.

After the war, New England's economy was extremely vulnerable. In 1947 there were 282,000 employees in the textile industry, 109,000 in the shoe and leather industry, and another 92,000 in the furniture and apparel industries. Altogether, therefore, 33 percent of the total manufacturing employment in the region was in declining industries which were extremely vulnerable to low-cost competition in other regions in the country. The relatively high cost of unskilled labor has been a major competitive disadvantage for firms in these industries, but the costs of fuel and energy were a contributing factor. The result was a drastic recession in New England which lasted from 1948 through 1953. During that entire period the unemployment rate in New England was typically about 1/3 higher than the national average and the unemployment rate in such depressed areas as Fall River, New Bedford, Lowell, and Lawrence often was twice the national average. Gradually, however, New England manufacturing firms did adapt by moving into industries that were high-skill intensive and those that used a relatively small amount of fuel and energy. The adaption was made somewhat easier because, as is shown in Table 2, the relative disadvantage of the region's fuel and energy costs diminished substantially in the period between 1947 and 1971.



Table 2

COST OF ENERGY USED IN MANUFACTURING:  
NEW ENGLAND AND THE REST  
OF THE UNITED STATES  
(Dollars per Mill. Btus)

	1947	1958	1962	1971	1974 <sup>1</sup>
New England	.66	.91	1.04	1.15	2.82
United States (excluding New England)	.32	.59	.62	.78	1.22
Ratio of New England to United States Costs	2.06	1.54	1.68	1.47	2.31

<sup>1</sup>Estimated

Source: See Bibliography.

Nevertheless, it is quite clear that those industries which grew the slowest in the postwar period were those that used relatively large amounts of unskilled labor and energy. Thus, the food and kindred products, textiles, leather, lumber and wood products, petroleum, and the primary metals industries all remained relatively stable or declined precipitously. On the other hand, the instrumentation, transportation, electrical and electronic equipment industries all grew rapidly. These industries typically depend primarily on skilled labor and use relatively small amounts of energy.

While New England manufacturing was changing from one type of labor intensiveness to another, U.S. manufacturing was undergoing its own revolution. Between 1947 and 1971 the average annual increase in productivity in U.S. manufacturing was 4.4 percent. These giant strides in productivity permitted a relatively small number of employees to produce the Nation's needed output in energy intensive basic industries such as steel, petroleum, coal and textiles. At the same time, there was a plentiful supply of labor available to produce a rapidly expanding volume of non-energy intensive products.

The preceding paragraphs demonstrated that the United States and New England both moved toward nonenergy intensive production in the postwar period. As Table 3 shows, the revolution was somewhat more dramatic in the Nation. In 1947 manufacturers in the rest of the Nation used 2.86 as many Btus per dollar of value added as did those in New England; by 1971 this ratio had declined to 1.90. However, New England manufacturing as a result of its industrial mix continues to use only about one half as much energy per unit of output as manufacturing in the rest of the Nation.

Table 3

NET ENERGY USE PER DOLLAR  
OF VALUE ADDED IN MANUFACTURING:  
NEW ENGLAND AND THE REST  
OF THE UNITED STATES  
(Energy Use in Thousands of Btus;  
Value Added in Constant Dollars — 1971=100)

	1947	1958	1962	1971
United States (excluding New England)	91.1	52.1	47.6	44.0
New England	31.9	27.6	21.8	23.2
Ratio of United States to New England Use	2.86	1.89	2.18	1.90

Source: See Bibliography.

*Energy Use by Industry*

The data in Table 4 indicate that most industries in New England use substantially less energy per dollar of value added than the same industries in the rest of the Nation. This might seem to suggest that firms in New England use substantially less energy per unit of output than do firms producing identical products in other parts of the country. This is not the case, however. If detailed information were available by type of firm for different parts of the country, it would undoubtedly show New England manufacturers to be very similar to their national counterparts in energy use. Detailed information is available on the internal composition of each industry in both New England and the United States. While there are no regional data on energy use for subindustries, such information is available for the Nation as a whole. These data clearly demonstrate that New England specializes in nonenergy intensive subindustries within each broad industry classification.

For example, Table 5 indicates that within the machinery and electrical and electronic equipment industries New England manufacturers tend to specialize in the less energy intensive products. Typewriters, office machinery, and electronic computing machinery account for almost 45 percent of New England's value added in the nonelectric machinery industry. These products require about 5,000 or 6,000 Btus per dollar of value added compared to the industry average of 12,000. Similarly, radio and television communication equipment, the most important New England component of the electrical and electronic equipment industry, requires very little energy.

Table 4

NET ENERGY USE PER DOLLAR  
OF VALUE ADDED IN MANUFACTURING:  
NEW ENGLAND AND THE REST  
OF THE UNITED STATES, 1971

Industry	United States (excluding New England)		New England	
	Thousands of Btus/\$ Value Added	Percent Distri- bution of Value Added	Thousands of Btus/\$ Value Added	Percent Distri- bution of Value Added
All Manufacturing	44.0	100.0%	23.2	100.0%
Food and Kindred Products	30.5	11.2	29.1	5.7
Tobacco Manufacturing	7.5	0.9	N.A.	0.0
Textile Mill Products	35.8	3.1	44.1	4.3
Apparel and Other Textiles	5.5	4.0	3.8	3.0
Lumber and Wood Products	36.4	2.2	20.6	1.4
Furniture and Fixtures	11.8	1.7	18.1	1.1
Paper and Allied Products	120.2	3.6	117.8	4.8
Printing and Publishing	5.7	5.7	6.5	6.1
Chemicals and Allied Products	98.8	9.6	35.7	5.1
Petroleum and Coal Products	288.2	1.9	N.A.	0.1
Rubber and Miscellaneous Plastics	24.0	3.0	25.3	2.9
Leather and Leather Products	11.7	0.7	14.1	3.2
Stone, Clay and Glass Products	125.3	3.5	47.5	2.5
Primary Metal Industry	125.1	6.9	43.4	4.4
Fabricated Metal Industry	16.1	7.0	14.9	7.3
Machinery, except Electrical	12.3	9.5	9.2	12.4
Electrical and Electronic Equipment	9.9	8.7	8.5	11.6
Transportation Equipment	11.1	11.4	12.1	7.0
Instruments and Relative Products	8.6	2.4	6.2	6.1
Miscellaneous	10.4	3.1	12.8	5.7

Source: See Bibliography.

Table 5  
ENERGY USE AND DISTRIBUTION OF VALUE  
ADDED FOR SELECTED INDUSTRIES, 1971

SIC Code	Industry	Percentage of Value Added Within Industry Group		Thousands of Btus/\$ Value Added United States
		United States	New England	
35	Machinery, except Electrical	100.0%	100.0%	12.0
3531	Construction Machinery	8.3	0.4	15.6
3535	Conveyors and Conveyor	1.4	0.3	8.8
3541	Machine Tools, Metal Cutting	2.4	10.0	12.9
3542	Machine Tools, Metal Forming	1.2	3.4	13.1
3544	Special Dies, Tools, Jigs, Fixtures	4.8	4.3	11.2
3545	Machine Tool Accessories	2.3	7.3	11.0
3551	Food Products Machinery	1.6	1.2	9.3
3552	Textile Machinery	1.3	6.6	15.7
3554	Paper Industry Machinery	0.7	1.9	14.0
3555	Printing Trades Machinery	1.3	3.0	8.4
3559	Special Industry Machinery, nec.	4.2	7.6	10.8
3561	Pumps and Compressors	4.1	1.0	12.1
3564	Blowers and Fans	1.2	0.8	11.3
3567	Industrial Furnaces and Ovens	0.7	0.2	6.3
3569	General Industry Machinery, nec.	2.0	2.1	10.0
3572	Typewriters and Office Machinery	2.1	13.7	6.2
3579	Electronic Computing Machinery	9.6	30.5	5.2
3573	Refrigeration Machinery	9.3	1.2	14.5
3585	Service Industrial Machinery, nec.	1.3	1.2	11.1
3589	Miscellaneous	8.1	5.6	12.7
36	Electric and Electronic Equipment	100.0	100.0	9.8
3621	Motors and Generators	4.8	0.2	14.7
3623	Welding Apparatus, Electrical	1.2	0.3	13.1
3629	Electric Industrial Apparatus, nec.	0.9	1.7	9.9
3634	Electric Housewares and Fans	2.8	1.0	10.4
3643	Current-Carrying Wiring Devices	2.6	8.0	7.8
3644	Non-Current-Carrying Wiring Devices	1.6	3.1	14.9
3651	Radio and TV Receiving Sets	5.9	3.0	4.7
3661	Telephone and Telegraph Equipment	8.7	1.8	7.1
3662	Radio and Television Communications Equipment	19.0	23.3	5.1
3674	Semiconductors and Relative Equipment	4.7	0.8	10.5
3679	Electronic Components, nec.	6.2	7.5	10.8

Source: See Bibliography.



### III. Energy as a Competitive Factor for New England Manufacturing, Then and Now

Although most New England firms specialize in nonenergy intensive production, it does not follow that the high cost of energy in the region is not a significant problem for them. As shown previously in Table 2, New England firms have traditionally paid much higher prices for industrial energy than firms in other regions. In 1947 industrial fuel costs in the region were 106 percent higher than in the Nation. Although this disadvantage decreased to 47 percent in 1971, it skyrocketed to an estimated 131 percent in 1974.

The reason for the high cost of energy in New England is obvious. With the exception of a relatively small amount of water power, the region has no indigenous sources of energy. Coal and natural gas, the principal sources of energy in the rest of the country, can only be transported at high cost to the region. As a result, petroleum products — particularly residual oil — constitute New England's principal sources of energy (See Table 6). Residual oil is a relatively high-cost fuel in most parts of the Nation, but in New England it is usually the lowest cost fuel available. Since 1971, residual oil costs have gone through the roof. As shown in Table 7, the average price of residual oil in New England increased by 262 percent between 1971 and 1974. In the same time period, in the Nation the cost of natural gas increased only 65 percent and coal rose by 96 percent. Similarly, between 1971 and 1974 the cost of purchased industrial electricity rose by 84 percent in New England because the region's

Table 6

#### DISTRIBUTION OF NET ENERGY USED IN MANUFACTURING: NEW ENGLAND AND THE REST OF THE UNITED STATES, 1971 (Percent of Total Btus)

	Bituminous Coal and Lignite	Petroleum Products	Natural Gas	Utility Electricity
United States (excluding New England)	19.3%	22.5%	48.1%	10.2%
New England	1.9	58.9	17.6	21.6

Source: See Bibliography.

electric utilities depend on residual oil. In comparison industrial electricity rose only 49 percent in the Nation in the same period. In summary then, New England firms have always had an industrial fuel cost disadvantage which has been exacerbated by the Arab oil embargo and the recent national energy crisis. As a result, industrial energy costs in New England are now in a class by themselves.

It is difficult to quantify the competitive burden imposed on New England firms by the high cost of industrial energy. Obviously, the disadvantage varies by industry. However, Table 8 provides some interesting data for the region's manufacturing compared with the Nation's. In 1971 the cost of energy amounted to 1.4 percent of total shipments of New England manufacturers, somewhat less than the 1.6 percent average for the rest of the country. In 1974, however, the cost of purchased energy is estimated at about 2.6 percent of total shipments in New England which is much greater than the 2 percent average figure for the remainder of the

Table 7

#### PERCENT CHANGE IN ENERGY PRICES BETWEEN 1971 AND 1974: NEW ENGLAND AND THE UNITED STATES (Percent)

	United States	New England
Coal	95.6%	190.6%
Gas	64.9	195.6
Fuel Oil		
Distillate (No. 2)	83.4	80.6
Residual (No. 6)	246.3	262.2
Other Fuels	94.8	232.8
Purchased Electricity	49.2	84.0

Note: Other fuels include gasoline, liquified petroleum gases, wood, purchased steam and coal, gas and oil not specified elsewhere. Since a price index was not available for this category, an average of the indexes of coal, gas and fuel oil was used, weighted by the distribution of these fuel costs to total manufacturing in New England and the United States.

Source: See Bibliography.



Table 8  
ESTIMATED EFFECT OF ENERGY PRICE INCREASES FOR MANUFACTURING:  
NEW ENGLAND AND THE REST OF THE UNITED STATES

	Energy Costs as a Percent of Value of Shipments, 1971		Energy Costs as a Percent of Value of Shipments 1974 (Estimated)		Percent Change in Energy Costs per Dollar of Shipments, 1971-74		Percent Distribution of Production Workers	
	United States*	New England	United States*	New England	United States*	New England	United States*	New England
All Manufacturing	1.6%	1.4%	2.0%	2.6%	27.1%	84.4%	100.0%	100.0%
Group 1								
Textile Mill Products	1.6	2.3	2.3	5.0	40.8	117.5	6.1	7.0
Apparel and Other Textiles	0.5	0.5	0.6	0.9	29.2	83.5	9.2	5.5
Leather and Leather Products	0.7	0.8	0.9	1.6	17.7	90.9	1.5	6.7
Paper and Allied Products	3.4	4.3	5.1	9.5	51.0	128.1	3.7	5.6
Group 2:								
Lumber and Wood Products	1.9	1.4	2.2	2.1	18.2	55.0	3.7	2.1
Furniture and Fixtures	0.8	1.0	1.2	1.9	39.5	100.6	2.9	1.7
Chemicals and Allied Products	3.3	1.6	4.4	3.3	33.2	105.5	4.2	2.2
Stone, Clay and Glass Products	4.6	2.6	6.4	6.1	38.1	131.7	3.7	2.3 <sup>1</sup>
Tobacco Manufacturing	0.4	N.A.	0.6	N.A.	61.9	N.A.	0.5	— <sup>2</sup>
Petroleum and Coal Products	2.4	N.A.	1.9	N.A.	-18.1	N.A.	0.8	0.2
Group 3:								
Food and Kindred Products	0.8	1.1	0.9	1.6	7.9	44.5	8.6	4.5
Printing and Publishing	0.6	0.8	0.8	1.3	18.0	73.6	4.8	5.1
Rubber and Misc. Plastics	1.5	1.9	2.0	3.5	28.3	82.5	3.1	5.5
Primary Metal Industry	4.1	2.1	4.9	3.6	21.1	72.7	7.4	4.5
Miscellaneous	0.8	1.1	1.0	2.2	27.5	95.0	3.2	7.3
Group 4:								
Fabricated Metal Industry	1.0	1.2	1.3	1.7	21.9	38.7	7.6	7.8
Electric and Electronic Equipment	0.8	0.9	1.1	1.7	38.4	94.0	8.6	10.5
Machinery except Electrical	0.8	1.0	1.1	1.8	32.7	84.2	9.2	10.3
Transportation Equipment	0.6	0.8	0.8	1.6	40.8	100.4	9.4	7.1
Instruments and Relative Products	0.7	0.6	1.1	1.3	51.6	99.5	1.7	4.2

\*Excluding New England.

<sup>1</sup>Derived by subtracting other industries from total.

<sup>2</sup>— Less than .05.

Note: See text for a discussion of the characteristics of each group.

Source: See Bibliography.

Nation.<sup>1</sup> Thus, even though New England firms on average use only about one-half as much energy per unit of output as their counterparts in the Nation, energy is still a greater share of manufacturing costs in the region.

#### *Differential Energy Costs by Major Industries*

Although the difference in energy costs of manufacturing as a whole between New England and the rest of the United States is interesting, it is not as revealing as comparisons by industries. To provide this more detailed analysis we divided New England's industries<sup>2</sup> into four groups:

- 1) Declining industries
- 2) Industries that are not major employers
- 3) Major employers that are not high technology industries
- 4) High technology industries

*Group 1 — The Declining Industries: Textiles, Apparel, Leather and Paper.* Although these industries have been declining for some time, they still supply about one-fifth of New England's manufacturing employment. In each of them energy costs as a percentage of shipments increased by at least three times as much in New England as in the rest of the country between 1971 and 1974. Energy costs are not a substantial share of total costs in the leather or apparel industries and thus will have little impact in determining their competitive position in New England. Energy costs are extremely important, however, in the textile industry. As shown in Table 8, in New England energy costs as a percentage of shipments are estimated to be 5.0 percent as compared to 2.3 percent in the United States. The region's textile industry declined sharply after World War II but has stabilized somewhat in recent years. Nevertheless, it is extremely vulnerable. If the present wide differential in energy costs between the region and the Nation persists, it seems likely that this industry will continue to decline.

<sup>1</sup>The competitive impact of increased energy prices on New England was estimated by updating the 1971 data on purchased fuels and electricity as a percentage of shipments. The estimated 1974 cost of purchased fuel and electrical energy was obtained by multiplying each industry's fuel mix on a state-by-state basis by New England price indices. National price indices were used to update shipments. Since these data do not reflect fuel conservation or changes in production processes brought about by higher fuel prices, they may slightly overstate the increase in energy costs as a share of total costs. However, the magnitude of the changes is so great that even if such an adjustment were possible, it would be unlikely to change the conclusion that the 1971 to 1974 increase in fuel prices has caused the region significant competitive injury. Arthur D. Little, Inc. has estimated that in almost all cases energy use per unit of output has decreased by a little less than 10 percent. See *Preliminary Projections of New England's Energy Requirements*, Arthur D. Little, Inc., prepared for the New England Regional Commission, November 1974.

<sup>2</sup>Energy costs as a percent of shipments are not available for the New England segment of two industries, petroleum and coal products, and tobacco manufacturing. Accordingly, 18 industry groups are analyzed.



Energy costs are even more important for the pulp and paper industry than for the textile industry. Unfortunately, high cost residual oil is the industry's most important fuel source in New England. As a result, energy costs increased faster for the region's paper manufacturers than those for their competitors elsewhere and are now estimated to be almost 10 percent of shipments. This compares with about 5 percent in the rest of the United States. Thus, current energy costs of New England paper manufacturers seems likely to further erode their competitive position.

*Group 2 — Non-major Employers: Lumber, Furniture, Chemicals, Stone, Glass and Clay.* While energy costs increased more in New England than elsewhere in this group of industries, none of them is a major regional employer. The New England segment of most of these industries is also not energy intensive. However, taken together these industries supply about 9 percent of the region's manufacturing employment and if energy costs remain substantially higher in New England than elsewhere, some employment loss could result.

*Group 3 — Major Employers Which Are Not High Technology Industries: Food; Printing and Publishing; Rubber and Plastics; Primary Metals, and Miscellaneous Manufacturing.* These industries do not fit neatly into any one classification. For our purposes, however, they have several similar characteristics: each industry accounts for more than 4 percent of manufacturing employment in the region; in recent years, their fuel costs increased substantially more here than in the Nation; and in general they cannot be considered high technology industries.

For food and kindred products as well as for printing and publishing, the recent rapid rise in energy costs may not have any significant impact on employment. Since these industries primarily serve local and regional markets, they are not vulnerable to lower-cost competition from other regions. However, the recent escalation in their fuel costs has raised prices for individuals and industries that buy their products.

The region's rubber and plastics industry has suffered substantial employment losses in recent years. In some cases plants have been abandoned in favor of new installations in other parts of the country where unskilled labor costs are substantially lower. Lower energy costs and lower raw material costs are important attractions in other regions. For example, the plastics segment of this industry uses a substantial amount of energy as well as petroleum feed stocks. As shown in Table 8, energy costs in this industry as a percentage of shipments amount to 3.5 percent in New England as compared to only 2 percent in other parts of the Nation. This 1 1/2 percent differential constitutes a significant disadvantage which will put substantial competitive pressure on New England firms in this industry.

*Group 4 — High Technology Industries: Fabricated Metals; Electric and Electronic Equipment; Non-electrical Machinery; Transportation Equipment and Instruments.* Most of these industries have been growing in the postwar period in New England and now provide about 40 percent

of the region's manufacturing employment. They have remained competitive by producing high value products that require little energy and depend on New England's pool of skilled labor. Although energy still remains a fairly low share of total costs in high technology industries in New England, the impact of the increase in energy prices from 1971 to 1974 is far from insignificant.

For example, as a result of energy price increases, energy costs now amount to 1.7 percent of the shipments of New England electric and electronic producers as compared to 1.1 percent in the rest of the Nation. This is true even though New England manufacturers use substantially less energy than those in the rest of the Nation. In effect, these New England firms are paying about twice as much per Btu as are their competitors in the rest of the country.

In order to get some measure of the importance of this energy cost disadvantage, it is useful to compare it with another of the region's disadvantages — high state and local tax burden on businesses. The Pennsylvania Economy League estimates that state and local taxes are equivalent to about 1.26 percent of the average Massachusetts electrical equipment producers' sales. This tax burden is only 10 to 20 percent higher than in most other industrial states.<sup>3</sup> Thus, energy costs are now obviously a much more important disadvantage than state and local taxes for this industry.

A similar pattern holds for the non-electrical machinery industry. Purchased fuels and electricity are estimated to be equivalent to 1.8 percent of shipments for New England's non-electrical machinery producers. State and local taxes were estimated to equal 1.7 percent of sales.

To maintain any manufacturing base at all, New England must hold onto such non-energy intensive high technology industries. By itself, an energy cost differential which is equivalent to less than 1 percent of shipments is not likely to cause any great employment loss in the short run. But over the longer run when firms have more freedom to relocate in order to minimize costs, New England's new energy disadvantage, when added to the region's other cost disadvantages, could have a very substantial impact.

#### IV. Conclusions and Policy Implications

It is impossible to completely eliminate New England's competitive disadvantage in fuel costs. Exploration for oil and gas in the Georges Bank and possibly for coal in the Narragansett area may result in some

<sup>3</sup>Comparative State and Local Tax Burdens on Business, Pennsylvania League for Economy in Government, 1972. These data are for total state and local taxes but do not include unemployment insurance levies. If these levies were included, Massachusetts' competitive disadvantage would be more severe.



new energy sources and should be encouraged. However, most of the region's energy will still have to be imported from other parts of the country and the world. The crux of New England's competitive problem is that most manufacturing energy in the region is supplied by oil while that role is filled by natural gas in the rest of the country. The price of oil has increased substantially since the Arab oil embargo while the price of natural gas has increased much less. At the present time natural gas costs about \$.50 per million Btus at wellhead while residual oil costs about \$1.75 per million Btus delivered at major ports.<sup>4</sup> Therefore, any actions taken to equalize gas and oil prices will work to the region's competitive advantage.

Conceivably, oil prices could be brought closer to the price of natural gas by stringent price controls. However, it is impossible to impose such regulations on residual oil which is mostly imported and therefore not subject to domestic price controls. Most New England manufacturers rely heavily on residual oil.

The most direct way to equalize the cost of energy for manufacturing between New England and the rest of the United States would be a phased deregulation of natural gas prices. Allowing the price of natural gas to rise would increase the energy costs of manufacturers elsewhere, thereby improving New England's competitive position. This action would not impinge on the welfare of the rest of the Nation. New England's improved competitive position would be incidental to the primary benefit of deregulation — increased gas supplies and more efficient use of a premium fuel.

The price of natural gas sold in interstate commerce has been regulated by the Federal Power Commission (FPC) since 1954. Price ceilings set by the FPC became binding in the late 1960s when the demand for gas at the low regulated price started to outstrip supply. Since then there has been an ever increasing shortage of natural gas. Gas shortages are more pronounced in the interstate market than in states with their own supplies where gas sells for as much as four times the FPC interstate ceiling price. Price ceilings established by the FPC have had an effect similar to the Arab oil embargo on areas without their own supplies of natural gas. Newly discovered natural gas is increasingly being made available only in the South and Southwest. In the long run, the effect of current policy will be to force many manufacturers to locate in these gas-producing states.

Bringing intrastate sales under regulation has been proposed as one possible solution. However, there are problems with this approach. Putting price ceilings on intrastate sales would only tend to perpetuate an artificial difference in the cost of energy produced by gas and other fuels.

<sup>4</sup>Because of differences in transportation costs to the ultimate users prices may be considerably closer in some locations.

In many ways, gas is a premium fuel with uniquely valuable characteristics and should be reserved for uses where it is most essential. The present pricing structure for gas subsidizes its use in applications where other fuels could be used just as well. For example, gas is used to produce electric power in the Southwest. If the price of gas were allowed to seek its market level, its use would tend to be reserved for industrial applications such as drying where it is uniquely valuable.

A more serious criticism of further regulation is that it will discourage exploration. The FPC has estimated that even under present regulations demand will exceed supply by 30 percent by 1980.<sup>5</sup> Independent experts have also estimated that deregulation would largely eliminate the natural gas shortage by that time.<sup>6</sup>

While decontrol would be advantageous to the Nation and of particular benefit to New England, it would not be painless. Decontrol would result in higher energy prices to most natural gas users at least in the short run. However, in New England most natural gas is used for residential purposes and the price of the fuel at wellhead comprises only about 15 percent of the cost of residential gas service. Thus a substantial increase incurred in wellhead prices would not greatly increase the cost of gas for home heating.

Moreover, in the long run, decontrol could reduce energy costs to many gas users. As a result of an inability to obtain sufficient supplies in the interstate market, many gas distributors have had to rely increasingly on expensive liquified and synthetic gas. For example, this year some New England utilities were forced to purchase liquified gas at more than three times the price of ordinary natural gas.

By encouraging exploration, deregulation would also make more gas available to substitute for higher cost fuels. Paul MacAvoy, of the Council of Economic Advisers, has estimated that the increase in the supply of gas brought about by deregulation will result in a 1 million barrel a day reduction in residual oil demand.<sup>7</sup> This development would be particularly beneficial to this region.

Deregulation of natural gas is one issue where the interests of New England coincide with those of the rest of the Nation. However, immediate complete deregulation may not be politically feasible or desirable. Sudden decontrol could subject the Nation to a resurgence of inflationary pressure at a highly inopportune time. Phased decontrol allowing prices on new natural gas to be determined by market forces by 1980 could avoid some of these problems and still yield many of the benefits of complete deregulation. If this is not possible, gas prices should at least be allowed to increase much more than they have been in the past.

<sup>5</sup>FPC Bureau of Natural Gas, *Natural Gas Supply and Demand*.

<sup>6</sup>Paul W. MacAvoy and Robert S. Pindyck, *Price Controls and the Natural Gas Shortage*, American Enterprise Institute for Public Policy Research, Washington, D.C., 1975, Chapter 4, p. 31.

<sup>7</sup>*Ibid.*, p. 53.



## BIBLIOGRAPHY

- American Gas Association. *Gas Facts*. 1961, 1963, 1971. (Table 1)
- American Petroleum Institute. *Petroleum Facts and Figures*, 1971. Baltimore, May 1971. (Table 1)
- Edison Electric Institute. *Statistical Year Book of the Electric Utility Industry for 1971*. No. 39, Publication No. 72-25. New York, October 1972. (Table 1)
- \_\_\_\_\_. "Analysis of Fuel for Electric Generation by the Electric Utility Industry: Fuel Burned Under Boilers and by Internal Combustion Engines." New York, 1974. (Tables 2, 7, and 8)
- Electric Council of New England. *Electric Utility Industry in New England. Statistical Bulletin*, 1970, 17th Edition, July 1971. (Table 1)
- Federal Power Commission. "Monthly Report on the Cost and Quality of Fossil Fuels Delivered to Steam-Electric Utility Generating Plants." *FPC News*, 1971-1975. (Tables 2, 7, and 8)
- \_\_\_\_\_. Bureau of Natural Gas. *Natural Gas Supply and Demand, 1971-1990*. Washington, D.C., 1972.
- MacAvoy, Paul W. and Pindyck, Robert W. *Price Controls and the Natural Gas Shortage*. American Enterprise Institute for Public Policy Research. Washington, D.C., 1975. Chapter 4, p. 31.
- U.S. Bureau of the Census. Census of Manufactures: 1947, Vol. I, *General Summary*. Vol. III, Statistics by States, and MC203, *Fuels and Electric Energy Consumed*. Washington, D.C., 1950. (Tables 2 and 3)
- \_\_\_\_\_. Census of Manufactures: 1958. Vol. I, *Summary Statistics*. Vol. III, *Area Statistics*. Washington, D.C., 1961. (Tables 2 and 3)
- \_\_\_\_\_. *Annual Survey of Manufacturing: 1962*. Washington, D.C., 1964. (Table 3)
- \_\_\_\_\_. Census of Manufactures: 1963. *Fuels and Electric Energy Consumed by Manufacturing Industries: 1962*. Series M63(1)-6. Washington, D.C., 1964. (Tables 2 and 3)
- \_\_\_\_\_. *Annual Survey of Manufactures: 1970 and 1971*. Washington, D.C., 1973. (Tables 3, 4, 5, and 8)
- \_\_\_\_\_. Census of Manufactures: 1972. Special Report Series: *Fuels and Electric Energy Consumed and Supplement*. MC72(SR)-6S, Washington, D.C., 1973 and 1974. (Tables 2, 3, 4, 5, and 8)

- U.S. Bureau of Mines. *Minerals Yearbook, 1958*, Vol. II, *Fuels*. Washington, D.C., 1959. (Table 1)
- \_\_\_\_\_. *Minerals Yearbook, 1962*, Vol. II, *Fuels*. Washington, D.C., 1963. (Table 1)
- \_\_\_\_\_. *Minerals Yearbook, 1971*, Vol. I. *Metals, Minerals, and Fuels*. Washington, D.C., 1973. (Table 1)
- \_\_\_\_\_. *Mineral Industry Surveys*. "Sales of Fuel Oil and Kerosine in 1971," October 5, 1972. (Table 1)
- \_\_\_\_\_. *United States Energy Fact Sheets, 1971*. Washington, D.C., February 1973. (Tables 1 and 6)
- U.S. Bureau of Labor Statistics, *Employment and Earnings States and Areas 1939-72*, Bulletin 1370-10. (Table 1)
- \_\_\_\_\_. *Employment and Earnings, United States, 1909-1972* Bulletin 1312-9. (Table 1)
- \_\_\_\_\_. "Retail Prices and Indexes of Fuels and Utilities." 1971-1975. (Tables 2, 7, and 8).
- \_\_\_\_\_. "Wholesale Prices and Price Indexes." 1971-1975. (Tables 2, 7, and 8)



## Discussion

Paul A. London\*

New Englanders have always known that their region had an energy cost problem. Recently, however, economists have begun to probe more fully the nature of that problem. Robert Eisenmenger and Richard Syron have made an important contribution to our understanding of it with their paper, "The Energy Crisis and New England's Economy." I have no major point to add to what they have said and supported; indeed, I have made similar points to more limited audiences and am glad to see that their more complete analysis supports my position. I would like, however, to add a few shadings to their thesis, which I think help to put it in perspective.

First, in my view, our regional energy dilemma grows out of U. S. energy policies of previous decades. I would argue that the inconsistencies of U. S. energy policy during the 1960s are at the root of New England's disproportionately high energy prices rather than recent developments with respect to the OPEC oil cartel. Recent developments have exacerbated our price disadvantage severely because they have highlighted inconsistencies in the policies developed during the 50s and 60s.

The two cornerstones of our national energy policy during the 1960s were the Mandatory Oil Import Quota Program (MOIP) (1959-1973) and Federal Power Commission regulation of the wellhead price of natural gas (1954 - to the present). Of vital importance is the fact that the two programs had opposite effects on prices. One was a price support and the other a price control mechanism. The MOIP kept the U.S. price of oil above world "free market" levels while wellhead price regulation of natural gas kept natural gas prices below the prices of alternative fuels in many areas of the United States. From a political point of view, the MOIP was a victory for producer interests and natural gas regulation (made possible by Presidential vetoes in 1950 and 1956), a triumph for consumers. In fact, the Eisenmenger-Syron data and material developed in my office suggest that New England would have been far better off if these two policies had moved consistently in the same direction, even if this had meant high prices for gas as well as for oil.

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New England leaders in the Congressional delegation and in the business community (for example, the New England Council for Economic Development) focused on the Mandatory Oil Import Program as the key to New England's energy dilemma from its inception in 1959 until its demise in April 1973. They did this for good reason. The President's Task Force on Oil Import Control in 1970 suggested that the cost to the nation's consumers of higher oil prices as a result of the MOIP was \$4.8 billion per year, about \$400 million of which fell on New England. On a per capita basis, New England bore much more than a fair share of the burden.

Eisenmenger and Syron show conclusively, however, that the MOIP and high oil prices were only one blade of an energy price scissor which gave New England disproportionately high energy costs. Because of FPC regulation, the tendency which would normally have operated for MOIP-established oil prices to pull up natural gas prices in other regions was greatly weakened. For example, while oil was selling in New England for 35¢ per million Btus in 1960, natural gas was available in Chicago and Minneapolis for 28¢ or less and in Houston for 19¢. During the next ten years oil prices actually fell due to the ending of import restrictions on residual oil in 1966, but FPC regulation kept natural gas prices from approaching those of oil in most markets.

An interesting question is whether New England would today be in a better position with respect to energy costs had her business and political leaders linked their strong fight to end the MOIP to a similar battle to obtain price parity between natural gas and oil. For fairly obvious reasons, neither New England's gas industry, economists nor politicians by and large saw the region's interests in this light. Instead, many New Englanders who used "free market" arguments against the MOIP supported Federal regulation of natural gas prices. Similarly, many in the producing states who supported the MOIP and who, therefore, defacto favored government price support for oil, wanted the Federal Government to take a hands-off position on natural gas. Almost despite themselves, energy-producing states seem to have gained from their failure to achieve deregulation of natural gas because cheap, easily obtainable gas became a major incentive for industry to locate in these areas. On the other hand, New England, which generally, if not unanimously, supported Federal regulation, seems to have paid a high economic price for its victory.

Now that the New England energy cost problem is better defined and we see that it is not an oil but an interfuel problem, there is still a question as to whether the future development of the region is endangered by the fuel cost differential. Some will argue that the cost differential, although much wider now than at any time since World War II, is less important than before. Eisenmenger and Syron imply that the problem of higher energy costs is important. I certainly believe that it is, but I think this point has to be made with full regard for nuances and possible counter-arguments.



Those who argue against us could take several tacks. One is that no matter what the regional problem, it is morally wrong to support higher natural gas prices. The argument would go that New England's energy costs are admittedly only part of the region's competitive problem and that most New Englanders were following the right path during the 1960s in fighting to lower oil prices without regard to the "subsidy" which price controls on natural gas conveyed to competitors in other regions. They should continue to fight for the lowest possible oil and gas prices.

The problem with this approach as a practical strategy is that there is no possibility of lowering oil prices to anything like the current price of natural gas. While this might have been a possibility during the MOIP days in the 1960s, it is not today. The average delivered price of natural gas to utilities and large industries is now the equivalent of about \$3 per barrel of oil. The oil pricing bill passed on September 23 by the House of Representatives (HR 7014) would do no more than roll some domestic oil prices back to \$8.50 or so a barrel, leaving oil, which New England relies on, two or three times more expensive than gas. And this bill has little chance of becoming law.

Another argument against the Eisenmenger-Syron position is that the regional energy price differential is less important now because the marginal prices of gas and oil are nearly equal. That is to say, it is impossible for firms to flee high energy cost regions like New England and to find low cost gas or other fuels elsewhere. For example, if a plant moved to Texas or another gas-producing state, it might be able to get natural gas, but only at high intrastate prices roughly equivalent to the price of oil in New England, and even this supply would now be available only on short-term contract. Similarly, in Illinois, Minnesota, or South Carolina in the interstate market low-cost interruptible gas is a thing of the past and little if any gas is available on a non-interruptible basis, and certainly not on long-term contract. Indeed a firm moving from New England to these areas most likely would have to buy oil not gas and at prices as high as those in New England, and perhaps with even less assurance of supply.

This is an important counter to the position which I share with Eisenmenger and Syron. I do not think it is a valid counter, however, for at least three reasons. First, Eisenmenger and Syron do not contend that "marginal" costs for new plants are as out of line as are average energy costs, region to region. High energy costs in New England mean that during periods of slack demand, such as we are now facing, companies with production plants in many parts of the country phase down their New England operations first. This may account for a significant part of our region's dreadfully high unemployment. Similarly, in industries like textiles, where New England companies must compete with companies in other areas, the companies in other regions which still have gas on long-term contract (and this means the majority of firms) have important competitive advantages. This may not affect new plants, but it does affect the region's overall economic performance.

Second, location decisions on new plants are no doubt affected by the kind of problem outlined above, albeit indirectly. High costs in large areas of New England's economy have an impact on the costs of government and of private goods and services bought locally. Thus, although a new plant in Texas or Illinois may not get energy any cheaper than in New England, the underlying impact of higher energy costs raises other costs of doing business in the region. The degree to which this is the case is unclear, but there must be a "ripple effect" from higher regional energy costs which is serious and which ought to be examined and understood by regional economists. I assume, for example, that these indirect manifestations of higher energy costs show up in the price of all services in the region including government, and in the cost of living generally, which probably has a major impact on wages.

Third, it is widely understood that management impressions and prejudices play a major role in locational decisions. New England's historically high energy costs contribute to a negative view of the region as a place to do business even though "marginal" energy costs in other regions may not be much lower than in New England. Moreover, even at the margin a cost disadvantage does exist, which is spotlighted by dramatically variant average costs.

I conclude from this that it is important for economists in New England to make the point that the region's competitive position is determined not by the absolute price of oil but by the price of oil relative to other fuels. Political and business leaders understand this well enough when it is a question of the cost of government, welfare, or wages, but the point that energy costs must be seen in the same way has not been widely appreciated. Eisenmenger and Syron make this point, and I hope that others will study their arguments and, if they agree as I do, incorporate them into their thinking and teaching.



## Discussion

James M. Howell\*

I would like to make five brief points on the Eisenmenger-Syron paper and also add three observations of my own. Point number one: I think that the paper does correctly note, but does not emphasize quite enough, that the evolution to higher value-added production and lower operational cost has been going on for quite some time because of unemployment compensation, workmen's compensation, property taxes, transportation costs and so on. For example, my own analysis of factor shares based on the 1963 and the 1967 Census of Manufactures indicates that this shift has occurred even in labor-intensive industries. Certainly in our high technology industries there has been a very dramatic swing away from using labor and other substitutable factors of production and trying to the greatest extent possible to increase the value added, attributing most of it to capital. The fact that this has been a long-term trend which was further accentuated by the OPEC embargo is somewhat overlooked in the paper.

Point number two: One thread that runs through the Eisenmenger-Syron paper — and which I consider fallacious — is the frequent reference to phrases such as "locational disadvantage" in New England or "distance from most national markets." I strongly disagree with this line of thinking although I hear it expressed constantly when talking to businessmen, labor leaders, and others involved in formulating economic policy in New England. To be sure, over the past few decades a considerable amount of spatial redistribution of industry has taken place, but it is important to keep two factors in mind. First, the day of the long-haul industrial migration is over. This conclusion is based on my own analysis and has been subsequently confirmed after talking to numerous chief executive officers and businessmen since my joining the Bank; I think that the increased complexity of the production process and the always troublesome problem with management make the geographically dispersed company difficult to manage. The problems of managing people and processes are becoming sufficiently complex so that there will be an increasing tendency for the present distribution of industry to more or less remain where it is.

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Secondly, I would underscore the geographic consideration, that market access is the key to profitability for a firm. Even with the pattern of spatial redistribution, the Atlantic seaboard states from New England down to Virginia have about \$350 million of personal income each year. Now, for those of you who know a little bit about personal income, that's about one dollar in three in the economy as a whole and all within about a 24-hour radius of Worcester, Massachusetts. I, personally, think the Eisenmenger-Syron paper is mistaken in feeling that the action is in Texas or Idaho. It is still very much on the Atlantic seaboard and we in Massachusetts are still very much in the thick of it.

Let me put this thought in another way. The area from New England down to Washington, D.C. represents roughly the combined income of France and Germany. So despite the industrial migration, I submit that we are indeed still where the action is and a lot of the migration that occurred went to Atlanta, Mississippi, Kentucky and Tennessee in order to sell back into this rich eastern market.

Point number three: I agree absolutely with the paper's principal conclusion that although most New England firms specialize in nonenergy intensive production, it does not follow that high energy costs are not a significant problem for them. Let me go over that statement again because it is a classic example of the negative kind of Federal Reserve writing. The statement is, and I will read it, "Although most New England firms specialize in nonenergy intensive production, it does not follow that high energy cost in the region is not a significant problem." Why don't we start saying some things positively? I do think that this statement is interesting and I agree with it; I shall refer to it again later on.

Now, let me talk about my bank's capital spending survey. The Boston Federal Reserve Bank abandoned the original survey in 1968 and my Bank reinstated it in 1971. It is a regional capital spending survey of manufacturers patterned after the McGraw-Hill survey. We also carried out special energy surveys in the spring of 1974, the fall of 1974 and again in the fall of 1975. According to our survey, in the 12-month period following the OPEC oil embargo, median energy costs in New England manufacturing firms went up 50 percent, and one firm in five had energy cost increases of over 100 percent, and some were as high as 400 percent. Admittedly, energy costs are less than 5 to 7 percent of total cost but when energy costs are rising about 100 percent or so, your total cost is going up 5 percent. Those of us in banking and finance know that the return on stockholders' equity is probably not much more than 5 to 7 percent; therefore, energy increases are wiping out a tremendous portion of the overall profitability of firms. This has really hurt.

Point number four relates to high technology industries. These industries clearly hold a key to our future. The paper mentions SIC codes 34 through 38; I would add 39 because I think it includes some important miscellaneous manufacturing industries. The paper is correct about the energy impact on these industries and also correct, in my opinion, to suggest that we must do everything we can to maintain these industries in New



England's economic base if we are to have a manufacturing base at all. But I'm somewhat troubled about our ability to hold these industries here. The data from our 1975 capital spending survey, based on 356 replies, have not yet been released, but what we have already processed suggests two troubling conclusions.

One of the survey questions asked was "Are you intending or do you intend to cut back your capital spending because of high energy costs?" Eight of the 18 firms indicating they were cutting capital spending because of higher energy costs were in the high technology SIC codes. I think that may be very significant. Then consider the second conclusion, which was in response to question six, "Do you have a planned reduction in your New England operations because of energy costs?" Of the 20 firms that answered they were going to cut back production because of higher energy costs, 10 were in the high technology industries, or again in SIC codes 34 through 39. That is disturbing in terms of our ability to hold these industries and suggests that we need to do more work in digging into their exact nature and which four- or-five digit SIC codes they represent.

Point number five: I do support, as everybody does, controlled deregulation and I offer several conclusions, some of which Paul London has presented more eloquently than I. First, the price of natural gas in Dallas today is higher than in Boston. Second, the rapid increase in natural gas prices in states which produce natural gas has already induced a fairly substantial move away from burning natural gas to reliance on residual oil for generating electricity.

A good example of the trend is the substantial equity position that Mid-South Utilities in Louisiana has taken in the Northeast Petroleum refinery now under construction in Revere, Louisiana in order to be assured of the output of residual oil. The other fact that has not often been mentioned is that the old oil versus new oil issue in time will mean that we will have only new oil, which will be much closer to the world price. That's equilibrating market prices in the right direction. This concludes my comments on the Eisenmenger-Syron paper.

Now I would like to make three comments which reflect my own prejudices. The first relates to our special survey of capital spending. One of the questions we want to address, now that we have collected three data points since the embargo during the fall of 1973, is whether the data suggest perceptible trends in the reduction or increase in capital spending or in firms leaving the region. Briefly, I will summarize the data from spring 1974, fall 1974, and fall 1975. (We did not take a survey in the spring of 1975.) The percent of firms reporting no change in capital spending because of higher energy has remained singularly unchanged: 84 percent six months after the embargo; 83 percent 12 months after, and 82 percent 24 months after. This is interesting; it seems that in the face of their avowed assessment that the energy cost problems have their own sting.

All three surveys also show virtually no change in those firms decreasing capital spending because of increases in energy costs: about 5 to 6 percent in all three surveys. The slight swing from 84 to 82 or no change

was all picked up in an increase in capital spending. For example, in the spring of 1974 only 5 percent of the firms indicated that they were increasing capital spending because of higher energy costs and in the fall of 1975, the survey we are looking at now, this number rose to 8 percent. That's probably statistically insignificant, but it's worth noting that it is rising and not declining. We've done a bit of callback to find out why these firms were increasing capital spending to verify this often articulated view by many of my good friends, the web-footed environmentalists, that they're becoming more energy efficient. We found that not to be true. Most of the firms that are increasing capital spending are buying additional large storage tanks to hoard residual oil!

But my next comment involves the response to question six on our questionnaire, "Do you have a planned reduction in your New England operations because of energy costs?" Here again, it seems to me, the data are rather interesting because overwhelmingly the firms are showing no tendency to scale back their operations in New England due to higher energy costs. If they were starting to do so, we would have seen a more discernible pattern than we have so far.

We did see a slight shift in the fall 1975 survey, two years after the embargo. For example, 97 percent of the firms said "no reduction" six months after the embargo in the spring of 1974. In the fall of that year, 96 percent said "no reduction" in their operations and then in the fall of 1975, 24 months after the embargo, it was 93 percent. That accounts for the drop of three percentage points. We are concerned, as one would suspect, that the planned reduction has doubled from the spring of 1974 to the fall of 1975, from 3 to 7 percent. That's in the wrong direction, but I must say my prior expectations were that it would be far more than that when we started the survey two years ago.

My final observation is actually a more impressionistic conclusion that I could not have made had I not seen the economy in the United States and certainly in New England recently from two rather distinct vantages: one based on eight years in the Federal Government and the other on five years at the First National Bank of Boston. As a consequence of seeing the world from two realities I am persuaded that economists, particularly those in the Federal Government, certainly those in the Federal Reserve System, and often those of the academic variety, really don't fully understand the business and labor realities of our economy, primarily because they have little, if any, contact with the business and organized labor communities. Thus, it is not terribly surprising to me that the Eisenmenger/Syron paper reaches the conclusion that firms ought to leave New England because something in partial equilibrium theory suggests that they will do so.

In actuality they are not leaving, and I'm wondering why not. Over the years I talk to literally hundreds of chief executive officers from all over the region and all over the United States for that matter and they tell me they do feel the pinch of higher energy costs. They know that because they know what the bottom line looks like. But what is surprising is that



most New England chief executive officers — aside from the few who are associated with extraordinarily large companies — know very little about relative regional costs. Even when they do perceive relative differential costs they are ponderously slow in accepting these facts and acting on them.

In conclusion, let's see if we can stand back and take an overview of the Eisenmenger-Syron paper. I think it is a classic example of all Federal Reserve Bank papers — it is written in a library, of course. It represents that overcredited variety of the fear of saying something important; I remember well my two and a half years at the Board of Governors. Yet in the final analysis my real concern today and my earnest admonition and plea to you is that we are faced with the extraordinarily difficult task of trying to understand the future of the New England economy. In the final analysis I suspect that the data that will allow us to unravel the complexities that we've been talking about for the last several years do not exist today.

In the decade ahead we will be creating and collecting data that in the past decade we never dreamed we would even have to be concerned about. Our surveys at the First National Bank of Boston are examples of this. But we need even more data. We need data that we have never collected before, and we very much need the Boston Federal Reserve Bank's help in collecting these data.

In early 1972 I was involved in the creation of the New England Economic Project, called NEEP, a regional data bank which the Federal Reserve Bank of Boston so generously supplied with data. Yet that Bank has shown absolutely no interest in joining the Project. My admonition is let's get the Boston Federal Reserve out of the library and get it to help us in the business community to get to work to solve some of these real world problems.

## Responses to Howell and London

Robert W. Eisenmenger and Richard F. Syron

*Eisenmenger*

Paul London was very generous in his comments since we used many of the ideas that he has been promoting for the past two years. To his credit he advocated natural gas deregulation several years before it became popular. He has done the kind of research that all of us hoped a professional economist would do for the New England congressional caucus.

As for Jim Howell's comments about New England's economic geography, it is true that we are on the northern tip of the eastern seaboard megalopolis where one-third of the Nation's GNP is produced. It does not follow, however, that our economic geography favors us relative to Pennsylvania, West Virginia, Virginia or many other states. The fact is that the southern portion of that megalopolis has many competitive advantages that New England does not have. States in the southern portion have the same access to that full eastern seaboard megalopolis as does New England, but they have lower energy costs, much lower wage rates for unskilled people, and much better access to the central part of the United States. If you take a look at the electrical machinery industry in New England, you'll find that we don't produce a single washing machine, refrigerator, or dryer. If you're going to produce bulky or heavy consumer products for the whole eastern seaboard megalopolis as well as for the interior of the United States, you simply can't afford to locate in New England. You have to locate either in the middle or the southern part of the eastern seaboard's megalopolis or in our industrial heartland in states such as Ohio or Illinois. New England manufacturers are forced by the facts of life to specialize in skill-intensive, high value-added industries because we have numerous other locational disadvantages.

Of course, Texas is not centrally located. But Texas has numerous advantages other than low-cost energy which include low-cost minerals, labor, and a mild climate. That state also has a low cost of living.



*Syron*

I had planned to talk about some of Paul London's more moderate comments first but I would like to switch and take the bull by the horns — Jim Howell. I am glad to see that Jim's survey supports our findings. Jim's right; there are problems with the published data we used. However, our study is based on complete information from the Census of Manufacturers. If the information from Jim's sample of 3 percent of the manufacturers in New England support it, well, I think that says something for his survey. However, I continue to have more faith in complete data than a small sample.

As far as New England's traditional locational disadvantage goes — people tell me all the time that they don't know how Jim Howell has time to do any research (since he runs around so much) and now I know he doesn't do it by reading; he looks at maps. As I stand here and look out the window at all that ocean, I can't help but think that although we are in the midst of what Jim says is the gold belt of this country, it's going to be awfully hard to produce many washing machines on Martha's Vineyard to sell them to the fish, unless we can get someone who is as good a salesman as Jim is. I think I'll leave Bob Eisenmenger to make some comments on his criticisms of our editorial process; it may actually be helpful.

As far as Paul London's critique, his comments about our paper being based on average costs rather than on a marginal basis may have been too easy on us. Our paper is based on average cost data because that is the only available information. I think, however, that if you made a careful reading of the incentives for people to relocate based on marginal costs that, unfortunately, some of the conclusions you would reach would still be much the same. For example, in the electronics industry, 70 percent of the total cost of purchased fuel and energy is for electrical energy. While it is true, if an electronics company decided to expand, say, in New Mexico rather than in New England, that it might not be able to get a lot of natural gas down there, it still could get relatively low-cost electrical power, produced either by coal or by natural gas. Electricity is the most important component of energy costs for many of these high-technology industries. So it's a little bit more complicated than it might seem at first.

Another point that I talked to Paul about, so I'm sort of stealing his thunder on it, is that in many cases, particularly in the kind of recession that we have just had, a company that has plants in many parts of the country has to make decisions about where to close down and where to expand. In that case, they are more likely to look at the average cost of running plants in different parts of the country.