TRUE EXPENDITURES ON ENERGY[1]

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Summary

The true energy cost for the United States in 1991 was $891.1 billion. This compares with a Gross Domestic Product of $5,722.9 billion and represents 15.6 percent of the total.

Introduction

At least one New Energy method is expected to go commercial by the end of 1995(2). The Honorable Robert Walker, chairman of the House Science Committee, has announced a personal interest in the cold fusion area and expects to support this under the Hydrogen Future Act(3). Entrepreneurs interested in developing new energy methods are establishing funding sources to enter the market and there is a need for all of us to have a better understanding of just what we are talking about in terms of the total market. The purpose of this paper is to bring the facts together in one article as a beginning of this understanding.

The basic premise of this paper is that true costs reflect the total price which the consumer and ultimate customer pays. This premise is based on the appreciation that manufacturing industries, commercial businesses and transportation companies do not pay taxes. They merely act as transfer agents in moving money from their customers to the taxing organization. This is different in energy costs in that energy is just one of their raw materials and is treated as such for accounting purposes. Utilities list their taxes under operating expenses along with their fuel used in generation. Operating expenses are subtracted from their operating revenue to determine their net operating income. The true cost of energy to the consumer has to include the price paid plus the franchise charge and other local taxes.

Eventually, the new energy industry is going to sell units which have an initial capital cost and no energy cost. The added capital cost will be in the depreciation which is a part of operating expenses. Depreciation charges in a public utility is in the order of 12 percent of operating expenses. Establishing a depreciation cost is going to be interesting in those energy conversion units which do not wear out. If there is no added cost from energy, there can be no additional operating expenses or taxes placed upon it. Those of us in the-new energy field need to know what the true present day costs really are to use as a basis for future pricing.

In 1991, the most recent year with complete data, the total energy consumed in the United States was 81 quadrillion Btu. This converts to 23.74 trillion kilowatt-hours at 3,412.14 Btu/kWhr. Units are converted to

The Law of Conservation of Energy of physics is not truth. It is just an assumption that is valid in explaining a tremendous amount of natural phenomena. Such an assumption can never be proven since even an infinite number of phenomena that can be explained by it does not prove its universal application. On the other hand, it can be disproved by just a single phenomenon that cannot be explained by the assumption. This disproving does not detract from the validity of the assumption. It just highlights the need or even the existence of another assumption that is MORE valid. This is the case with the assumption of the conservation energy which was replaced by Einstein's more global--more valid--postulation of the conservation of energy and mass. ~

kWhr as the basic energy unit in order to make comparison more simple. For statistical purposes, energy data are collected in the four categories of residential, commercial, industrial and transportation. Each will be corrected to include costs which are paid by the ultimate consumer.

Correction Factors

Gasoline and diesel fuels are the major energy sources for the transportation sector and taxes account for the major added cost. In Florida a gallon of gasoline selling for $1.159 contains 42.3 cents for taxes which cannot be collected in a new energy car with a zero fuel cost. It is assumed, for this analysis, that this mark-up is similar throughout the country and that it is the same for diesel fuel. This brings the correction factor for transportation from taxes to an additional 57.5 percent.

The un-funded debt in the federal budget which will have to be paid in the future is estimated at five percent of the Gross Domestic Product, GDP(4). This should be added to each category of energy which adds cost.

Combustion of all fossil fuels results in air pollution with a concomitant damage to our health and environment. Global warming has a fossil fuel component which has to be acknowledged. A one percent factor is used for both air pollution and global warming.

Local taxes are added to electric power bills as a franchise charge and a gross receipts tax. In Florida, this adds seven percent to the electric power charge.

Nuclear energy, as presently charged, is the lowest cost energy source in Florida. Nationally, it accounted for 21.7 percent of the electric energy supplied or 5.15 trillion kWhr. Unassigned nuclear costs includes the federal nuclear budget which contains $1.1 billion for a National Ignition Facility, inadequate catastrophic insurance for an event like Chernobyl, radioactive waste storage and inactive plant closures. Federal energy subsidies cost between five and $10 billion in 1990 (5). In a book on energy, a past T.V.A. chairman gave the true cost of nuclear energy as 25 cents per kWhr. The average price of electricity sold was 6.7 cents. When the true nuclear cost is used for the nuclear component of electrical energy, this brings the average price to 11.9 cents. This represents an added cost of 78 percent.

Hydroelectric power accounted for 3.1 percent of the energy consumed in 1991 or 0.736 trillion kWhr. Large hydroelectric suppliers, such as T.V.A. and the Pacific Division of the U.S. Army Corps of Engineers, are subsidized by the federal government. A distributor, such as the Washington Water Power Co., has the lowest rate in the nation at 4.3 cents.(6) The effect of the hydroelectric dams on the Columbia River basin has been to decimate the salmon migration population. Over $2.5 billion has been spent since 1980 to halt this decline with marginal results. This cost is expected to go to $0.675 billion a year for the Bonneville Power Administration (7).

As hydroelectric power is such a small part of the total energy consumption, the correct pricing calculation is omitted from this report. The point of including this here is that there are large amounts of federal

~ Einstein's assumption is not true to the same extent that the previous one was not "true".
I sincerely believe that the only way we can learn is through our deductive process. Presenting us with final conclusions is not a way we learn. At best it is a way that we are trained.
At any time our scientific knowledge is simply the current state of the art of our understanding. I do not believe in absolute truths. I fear such beliefs because they block the search for better understanding.
Whenever we think we have final answers progress, science, and better understanding ceases.
Understanding of our world is not something to be pursued for its own sake, however. ~

funds expended in collecting energy which are not charged to energy costs.

Transportation

Transportation accounts for the largest consumption of energy at 36.6 percent. Its reported cost was $171.2 billion and is made up of gasoline and diesel fuels. This represents the fuel money which went to the suppliers before taxes. The fuel correction factors in transportation are: 57.5 percent for taxes, five percent for the federal deficit and one percent for pollution and global warming for a total of 63.5 percent.

The true 1991 transportation energy cost is corrected to $279.9 billion.

Residential

The second largest energy consumption sector was residential at 24.6 percent. Energy sources for this sector include electricity at 32.9 percent, gas at 55.7 percent and fuel oil at 11.3 percent. The total energy consumed was 5.84 trillion kWhr.

Dealing with the electrical component first, this had a residential charge of 8.0 cents. The correction factors are: 78 percent for nuclear, seven percent for taxes and five percent for the national debt for a total of 90 percent. This brings the cost to 15.2 cents and $292 billion for the electrical portion. Gas, natural and liquid, is largest in the residential market with the equivalent of 3.253 trillion kWhr. Expenditures in 1990 were $30.4 billion or 0.934 cents/kWhr. The correction factors for gas are seven percent for taxes, five percent for the national debt and one percent for pollution yielding a total of 1.039 cents and $33.8 billion.

The fuel oil portion of the residential market was 659.9 billion kWhr at a price of 0.956 cents/kWhr. Correction factors for fuel oil include seven percent for taxes, five percent for the national debt and one percent for pollution for a total of 13 percent. This brings the fuel oil cost to 1.08 cents/kWhr and a residential cost to $7.13 billion.

Total residential costs including electrical, gas and fuel oil was $332.9 billion.

Industrial

The third largest sector is industrial which consumed 5.937 trillion kWhr in 1991. Its energy sources were: gas at 37.9 percent, electricity at 11.7 percent and coal at 9.9 percent. The remainder fell in the other fuel category. The industrial sector spent $99.7 billion or 1.68 cents per kWhr. Correction facts used for the total are seven percent for taxes, five percent for the federal deficit and one percent for pollution. This brings the cost up to 1.898 cents per kWhr. The average industrial electrical price was 4.8 cents per kWhr. Correcting this for the nuclear deficit of 78 percent brings this cost to 8.54 cents per kWhr. Electrical costs were $33.3 billion and, when corrected, changed it to $59.25 billion. Non

~ Knowledge should be pursued, I believe, to make our world better--to make life more fulfilling. The secret of being a good scientist, I believe, lies not in our brain power. We have enough. We simply need to look at reality and think logically and precisely about what we see. The key ingredient is to have the courage to face inconsistencies between what we see and deduce and the way things are done. This challenging of basic assumptions is essential to breakthroughs.

ELI GOLDRATT, THE GOAL, INTRODUCTION

electrical costs correct to $99.5 billion giving an industrial cost of $158.75 billion.

Commercial

The commercial sector is the smallest of the four energy consumption sectors at 16.06 percent and 3.81 trillion kWhr. Expenditures were $81.5 billion or 2.14 cents per kWhr. In 1989 the consumption was 47.9 percent electricity and the remainder was from fossil fuel. The electrical correction factors are 78 percent for nuclear, seven percent for taxes, five percent for the federal deficit and one percent for pollution for a total of 91 percent. This brings the electrical costs to 4.07 cents per kWhr and $71.56 billion. The fossil fuel portion is corrected seven percent for taxes, five percent for the federal deficit and one percent for pollution for a total of 13 percent and 2.42 cents per kWhr. This raises the fossil fuel portion from $42.5 billion to $48 billion for commercial energy costs. The corrected commercial cost was $119.6 billion.

So astounding are the facts in this connection, that it would seem as thought the Creator, himself had electrically designed this planet...

NIKOLA TESLA, ELECTRICAL WORLD AND ENGINEER, JANUARY 7, 1905

References

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