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ENERGY EDUCATION: PUBLIC UTILITY COMPANIES' PERCEIVED ROLES IN THE CLASSROOM BASED ON SIZE AND TYPE OF UTILITY COMPANY IN A NINE STATE MIDWESTERN REGION

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Annette M. Schepper

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Richard L. Graham

Major professor

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ENERGY EDUCATION: PUBLIC UTILITY COMPANIES' PERCEIVED ROLES IN THE CLASSROOM BASED ON SIZE AND TYPE OF UTILITY COMPANY IN A NINE STATE MIDWESTERN REGION

By

Annette M. Schepper

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ABSTRACT

ENERGY EDUCATION: PUBLIC UTILITY COMPANIES' PERCEIVED ROLES IN THE CLASSROOM BASED ON SIZE AND TYPE OF UTILITY COMPANY IN A NINE STATE MIDWESTERN REGION

By

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The perceived roles in classroom-based energy education of utility companies in a nine-state midwestern region were the focus of this study. The following characteristics of public utility companies were explored: the location, type and size of utility, the types and extent of energy education provided by the utility, the major characteristics of the educational institutions served by the utility, and the methods by which the educational materials were disbursed.

From this study it was found that: 1) 38.5% of the responding companies had a current, written energy education policy, 2) although more than one-half of the respondents indicated no current policy, over one-half employed personnel whose job description emphasized energy education, and 3) early school years and post-high school years are not receiving a comparable amount of energy education as grades 4-12.

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CHAPTER I

INTRODUCTION

Time is a force in the lives of all. Time involves aging, growing, changing. Aging is inevitiable, growing occurs physically and emotionally, and changing is often undesired though necessitated. Some changes are positive and others are negative. Time and factors created over time caused changes in the production, use, and expenditure of energy -- specifically energy created through the use of fossil fuels.

Early in the 1970's many people began to acknowledge what a few had said as many as 20 years earlier -- that indeed, the world, and specifically, the United States, was in an energy crisis. The United States had hit its peak in production of oil and natural gas and production of these sources of energy would decline in succeeding years. The country was no longer a net exporter of fuels, but net importer and foreign countries were pushing the United States into a very difficult position by raising prices. Energy was an everyday word in the lives of all and an issue to be addressed immediately.

Just as passed time could never be returned, neither would consumed sources of energy be replenished. In the

lives of all, time is finite and the issue of energy had finite boundaries. Time was not an ally and change was no longer a choice. Across the United States, all facets of humanity were forced to deal with the issue of energy. No life was untouched by the situation and many felt the energy crisis in terms of constraints or inconvenience -- gasoline prices escalating and limited mobility for many; some lost jobs; prices for consumer goods raised. Lifestyles were affected and the alarms were sounded for aid. Demand was made for public gas and electric utilities to come to the rescue. They were the providers of forms of energy used by everyone in some aspect of daily living and they were a visible target for consumers. Gas and electric utility companies were charged with making changes and helping their customers to understand and accept change. With the issue of energy and with gas and electric utility companies feeling the demand for solutions, the question of how to solve the problem came to the forefront.

Many paths to solutions were suggested and one of these was energy education. The generally accepted definition of energy as "the ability to do work" coupled with the definition of education as "the imparting or acquiring of general knowledge and development of powers of reasoning and judgment," gave meaning to the term energy education. Utility companies targeted a part of the population they served to receive specific energy education, "the imparting or acquiring of specific knowledge concerning various

aspects of energy." This was to include energy conservation, economics, environmental interaction, production and resources, social and political issues, scientific concepts, history, careers, and safety. Just as health officials today are educating to "Just Say No to Drugs" and educating that "What You Don't Know About AIDS Can Kill You," so utility companies chose to educate about various aspects of energy. Education of students, at any level of formal education, was targeted and supported because students would be future adult decision-makers, because students could influence peers and because the thoughts of students could be altered and molded. By educating a targeted population, company officials hoped that the newly educated would spread the word to other consumers.

As the issue of energy and energy education was confronted by gas and electric utility companies it became apparent that the institutions of education and business/industry should not seek solutions as separate entities but in a combined approach. This combined approach would focus on a human ecological perspective. A human ecological perspective would focus on the educational system and the business/industry system and their relationships. It would also focus on technology in the settings most critical for human development: the family, home, and community.

To resolve the energy issue, gas and electric companies would combine with institutions of education and use a human

ecological perspective to initiate a social change related to energy. When social change occurs, society processes information, receives feedback and interacts between information and action. Changes occur within a social system because of adoption or rejection of new ideas and information. That adoption or rejection has an effect on society. Social change is a result of communication. Communication is education and education is communciation.

Purpose and Significance

The purpose of this study was to investigate public utility companies' perceived roles in energy education in the classrooms in nine midwestern states.

In 1983, a study by Janet White and John M. Fowler, as a project for the National Science Teachers Association, entitled "Energy Education in Schools: Results of a Survey of the Penetration of Energy Education into the Classroom," was conducted to determine the content and extent of energy education into the classroom. The results of this study indicated that energy education in the classroom was considerable and extensive. Additionally, the survey noted that most educators who taught energy did so from a personal belief and not so because of a formal directive. Materials used by these educators were most frequently self-produced; other materials were cited, including those produced by business/industry (specific business/industries not noted); however, the business/industries materials seemed geared for

secondary vs. primary level. Nowhere within this study was a direct involvement of utility companies in energy education addressed.

From that study and using it to provide a preliminary basis for this research, this study involving utility companies and their perceived roles in energy education seemed to be a topic worthy of consideration and examination.

Definition of Energy Education

Education as defined by the Random House College Dictionary, is "the act or process of imparting or acquiring general knowledge and developing the powers of reasoning and judgment."

The simple definition of energy is "the ability to do work." Energy takes a variety of forms: chemical, electrical, mechanical, and thermal.

Energy education is the imparting or acquiring of specific knowledge concerning various aspects of energy. This includes energy conservation, economics, environmental interaction, production and resources, social and political issues, scientific concepts, history, careers, and safety.

While energy education is meaningful for all ages, it is imperative for learners during their years of formal education. The educating about energy should be continual, with each succeeding year building on the preceeding years of knowledge.

Providers of this education should be accepted sources of the facts: educators, researchers, public utility companies, and government agencies. The use of these providers should avoid bias and enable a broad based presentation.

The outcome of the specific knowledge gained by the learner should be learning to use energy in ways that have the least possible impact on the earth, to practice conservation and to discover new energies for the future.

Education concerning energy involves making choices, meeting challenges, applying critical thinking and stimulating creativity. Energy education involves addressing lifestyles to the realization that where there is life, there is energy, but where there is energy there may be life.

Energy education recalls past policies and practices, affirms the present, and foresees the future. This education provides a positive outlook for the future. It needs to be all-inclusive in nature, have content which is precise and be geared toward enabling consumers to make sensible decisions about their futures and lives.

CHAPTER II

REVIEW OF LITERATURE

Energy

In the field of medicine, a large amount of attention is directed toward heart disease, heart problems, and heart conditions. Cardiac patients deal with their condition for their lifetime. If they do not adjust (or modify) their lifestyles to meet their physical problem, their life span may be shortened needlessly.

This medical condition can be likened to what this researcher chooses to refer to as an energy condition. Consumers must adjust their energy lifestyles to the ramifications of the energy condition. While failure to adjust to the condition will not directly shorten the life span of the individual, such failure could eventually shorten the life span of all individuals.

To better understand the energy condition, this researcher believes it is helpful to review the "past" of energy in the United States.

The United States' concern about energy is relatively recent. As a country for slightly over 200 years, we have not had the number of years that Old World countries have

had to be concerned about depletion of non-renewable resources. As a result of not having the many years of depletion the United States has also not had the years to sit and ponder how to do without certain resources and to develop alternate means.

According to a chronology published by National Geographic in its special report in the public interest "Energy" (National Geographic, 1981) the first recorded information about energy occurred in 1750. In 1825, natural gas was extracted in the United States, but was for years considered a nuisance and not really used as fuel until 1925. While the oil industry began in 1859, oil did not dominate U.S. energy sources until nearly 100 years later. By the late 1940's the U.S. became a net importer of oil vs. a net exporter and in 1970, the U.S. oil production peaked. Two years later, natural gas production in America was at its top and Arab nations began to embargo oil to the United States. In a six month period in late 1973 and early 1974, world crude oil prices increased four-fold and the United States was involved in what is now called the energy crisis.

Norman Metzger, author of Energy, The Continuing Crisis, states that technologies in the United States were developed and molded to fit the use of fossil fuels. More fuels were pumped and mined and more and more technologies consumed those fuels.

> Plentiful energy . . . was an American birthright . . . Conservation of energy, and harvesting of

> finite resources, was not considered, thought necessary, or perhaps even wise given the immense resources and industry and the attained standards for living.
>
> Metzger, 1977

Those who study and write about the energy condition often refer to exponential growth and doubling time to aid the reader in understanding the phenomenon of how much our usage of energy sources has increased over a relatively short amount of time. With exponential growth and doubling time, increases in usages or consumption do not grow at the same amount in the same period of time. Rather, beginning numbers double and that number doubles, and that new number continues to double and double and double. An example of exponential growth that is cited in several writings, but which I have not personally verified, involves 1 grain of wheat on the first square of a chessboard. Square 2 requires 2 grains, square 3, 4 grains, square 4, 8 grains, square 5, 16 grains, square 6, 32 grains and so on until by the 64th square, the number of required grains equaled 500 times the 1976 annual worldwide harvest of wheat (Barlett, 1978). It is obvious that exponential growth can quickly lead to enormous numbers and the increase in doubling is about equal to the total of all previous growth. In discussing electrical usage Barlett notes that "many people find it hard to believe that when the rate of consumption is growing a mere 7% per year, the consumption in one decade exceeds the total of all previous consumption." For consumers who have no ideas about exponential growth, the

gravity of the energy condition may seem trivial. For those who do even minimal study on exponential growth and doubling time, the seriousness of the condition is much more pronounced. Yet Barlett notes an equation called EET (exponential expiration time) used to determine the period of time necessary to consume known reserves of a resource and states that "this equation is known to scholars who deal in resource problems but there is little evidence that it is known or understood by political, industrial, business, or labor leaders who deal in energy resources . . ."

Considered an expert on world energy resources and predictions of their expected depletions and discovery, Dr. M. King Hubbert, a research geophysicist, teacher, author, and lecturer, was once looked upon with disdain by many, specifically those in the American petroleum industry. In a 1956 address to the Southern District of the American Petroleum Institute, Hubbert stated that the peak of American petroleum production would occur within 10 to 15 years (Pazik, 1976). Dr. Hubbert noted other facts to his audience and his listeners heard him but vehemently denied what he had to say. During his presentation Dr. Hubbert also presented his now famous "Hubbert Production Cycle Curve," a graph showing how a resource, such as oil or natural gas, will be exhausted. The curve illustrated that production of a resource starts slowly, grows gradually for a period, then escalates and grows very rapidly, peaks and never recovers, and slides down and down toward an end.

Hubbert also illustrated how increasing the estimates of totals of an exhaustible resource to be produced did not dramatically alter the number of years needed to deplete that resource (exponential growth). The Harmless Little Hubbert Curve had a great effect on the petroleum industry and its signifigance is even greater today.

Since the energy crisis of the early 1970's, there have been numerous publications on a variety of aspects of energy. Authors have had their views published in technical and trade publications, as well as in some unlikely places -- for example the article "Our Oil Predicament" by Pazik was published in the November 1976 edition of Fishing Facts. It seems that there is a large amount of information on the subject, but whether the public chooses to educate themselves with this information is questionable. If the adult public is not using the material, that perhaps indicates an even stronger need to formally educate the student public with appropriate subject material.

> School age people are at an age in which they are forming habits of thought, as well as action. If a new energy ethic is to permeate society, it is our student population who will make it happen. The classroom provides the best opportunity for a more intense consideration of energy issues.
> Wisconsin Power and Light Company, 1987

There is no doubt that we are in an energy condition. It was apparent to a few as early as when Hubbert delivered his speech in 1956. It is still apparent today. To what extent we control this condition depends on everyone. Our lives have not been totally up-ended by the energy condition.

> The only SURE way to avoid a catastrophic disruption of our lives is to change from the most wasteful users of energy on earth to one of the stingiest. We need to get off the exponential growth for growth's sake joyride we've been on since World War II . . . This means changing our way of life, our national outlook on people.
>
> Pazik, 1976

Energy Education

> We have seen the past and it doesn't work.
>
> Dwight David Eisenhower

To what reference Dwight Eisenhower made this statement is unknown; however, the quotation could be applied to energy consumption, depletion and conservation and where society stands in its energy survival today. The word energy carries a variety of connotations and invokes a multitude of feelings in people: concern, apathy, fear, ignorance, torment, enticement, abandonment, burn-out. It is this variety of feelings, with no consensus on the subject causing unanimity of action that results in the term energy continuing as vocabulary in our population.

The word energy according to Random House, is derived from the late Latin form energia and the Greek form energeia meaning activity or to be active. The word, in our every day usage, has recently meant oil, gas, electricity, solar, nuclear, wind, geothermal power, as used by consumers in daily living, for the necessities and luxuries of life.

Writings and thoughts on the realm of energy seemed to have increased greatly since the early 1970's and

reflections of the past energy practices, comments on present procedures and predictions for future routines are reviewed and written.

When the now renowned energy crisis of 1973-1974 surfaced, everyone was encouraged to join the cause. During the term of Jimmy Carter as President, his statement concerning energy ". . . the greatest challenge our nation will face during our life-time . . . with the exception of preventing war . . ." was being frequently quoted. Articles from variety of experts - scientists, educators, sociologists, psychologists, politicians, energy consultants, and others - highlighted the dilemma America and the world faced; the ultimatum to the public to make drastic changes in its energy lifestyle was issued.

John Naisbitt, social forecaster and author of Megatrends, noted in that publication that everyone uses energy and "perhaps, because it affects more of us individually than any other social issue, it (energy) is a catalyst for local initiative." "While people may not be bothered by transportation, education, or housing concerns energy is used by all." (Naisbitt, 1982)

Olsen, in a 1981 publication, remarked that the power of persuasion, via mass media and publications, was used to sway persons to the reality and severity of the energy crisis. Olsen further stated that several studies had shown that general energy attitudes did not seem to initiate conservation practices by consumers but social pressure or

belief in a personal duty to do one's part resulted in conservation actions.

Cetron and O'Toole (1982), in reviewing how America and her citizens got into the energy crunch refer to a Bottomless Bucket and a Bottomless Thirst. In that bucket with no bottom, Americans could not satisfy their hunger for energy. The use of energy became more financially appealing and resulted in even greater usage with no attention to a future for energy. The belief yielded that things could only get better, never worse. Ignorance in energy was bliss. Use of energy ran rampant and needs and means of conservation were taboo words. There were a few warnings of an impending energy crisis, as early as the late 1950's, but, those warnings were seen as unfounded like the boy who cried wolf. Everyone blamed everyone else when predication became reality and no one wanted to be held accountable. Essentially, all were to blame for the bind of the energy crisis, and pessimists and optimists alike saw bleak futures in their crystal balls where energy was the topic.

Prior to the early 1970's, little attention was placed on energy - in any realm - or to energy education. When the energy crisis peaked in 1973-1974, some people acknowledged the severity and effects of the problem, both present and long range. The push for energy education was not strong, due to a lack of materials to teach energy education and to public passiveness (Posthuma, 1978).

There seems to be a variety of opinion in the literature reviewed as to who should approach the retraining of consumers attitudes, usages and conservations of energy, and as to how these approaches should be made. For whatever discipline one chooses, there is a variety of supportive material in that area. Accordingly, a number of people (many of whom are educators) believe education is vital in the energy situation.

Skeptics have come to realize the energy problem is real and will become greater in the future. Posthuma (1978) states that today's young people must comprehend energy and all of its ramifications. The need is urgent, as lives depend on it. Posthuma (1978) further states in the National Education Association publication,

> The energy crisis we now face will require not only new technology, but new values and attitudes as well. We must change our habits of consumption. We must approach self indulgence with a new perspective - an understanding that we are members of a human community with a common plight and a common fate . . . Perhaps our schools and colleges need to realize that the energy challenge will confront us all for the rest of our lives, that our environment is shaped by our patterns of energy consumptions and is passed on as a legacy to all of our children . . .

Lillian Clinard and Abraham Farkes (1978), of the University of Tennessee, are staunch advocates of behavioral modifications as a result of attitudinal change. These authors believe this approach of attitudinal change as a result of behavioral modification can be addressed in educating the public, specifically students. Education of

students is approached and supported because students are tomorrow's adult decision makers, because students can influence their own peers and because students' thoughts, attitudes and values are still pliable and moldable, through their daily exposure of educational materials and media.

Two more significant points stated by Posthuma (1978) are: 1) "The thinking seems to have been that the energy crisis was a temporary inconvenience. But time has taught us that what we call 'the energy crisis' is, in reality, a multifaceted and long-term problem. Educational strategies designed to meet the challenge must be created with this fact in mind . . ." 2) "A related point is that an alarmist approach to energy education does more harm than good. Facts learned for the sake of averting a crisis are quickly forgotten when promised disaster fails to erupt on schedule or fails to produce the predicted consequences."

If, as Clinard and Farkes (1978) contend, students are to be energy educated, then those who conduct that education must also be educated. Consequently, several articles have supported energy education. Gerald Marker (1980) notes that " . . . most strategies for resolving the energy situation involve long term solutions and education will play an important role in whatever national energy program is finally adopted."

Crawford (1981) states that because of the abundance of energy sources, because of the international forces, social

attitudes, politics, and economics which effect energy resources, and because of the dynamic situations involving energy use, "educators are frequently reluctant to include energy education in their curriculum . . ." Morris and Jenson (1982) note in their article regarding energy education, that now more than ever energy education is essential and must become part of the school curriculum.

In 1983 Allen says that gestures are inadequate responses to the pressing energy crisis and other environmental issues. We stand at a crossroads where what we do and the courses we take will have an enormous impact upon the future. It is also his opinion that our energy problems are not threats to American materialism, but challenges to a better life in a better community of fellows.

To meet these challenges for a better life the responsibility of providing energy education should be divided among educators, researchers, public utility companies and government agencies. These providers must acknowledge a variety of consumer learning styles and develop teaching methods to accomodate all consumers. As the energy condition changes, energy education must adjust to reflect those changes.

Theoretical Framework

The theoretical framework for this research is threefold. First, the proposed study of energy education

and public utility companies' perceived roles in the classroom incorporates the human ecological approach in a significant way. Human ecology focuses on the individual and reciprocal relationships with other individuals and technology in the settings most critical for human development: the family, home, and community. The use of an ecological framework in this research will strengthen the understanding of the relationship of behavior to environmental conditions and interactions between individuals/families, institutions and organizations (Figure 1).

The second component of this framework is that of a theory of social change. Sociology is the study of human beings as they function in societies and the social relations and institutions in which they participate. Participation in society frequently involves change. These changes are of both a conscious and unconscious nature. According to Rogers and Shoemaker (1971), social change is the processes by which alteration occurs in the structure and function of a social system. They are as follows: 1) invention -- new ideas are created or developed, 2) diffusion -- process by which these new ideas are communicated to the members of a social system, and 3) consequences -- changes that occur within a social system as a result of the adoption or rejection of the innovation.

Dominant in the review of literature on social change is the theory expressed by Bell and Mau (1971). These professors of sociology express social change within a

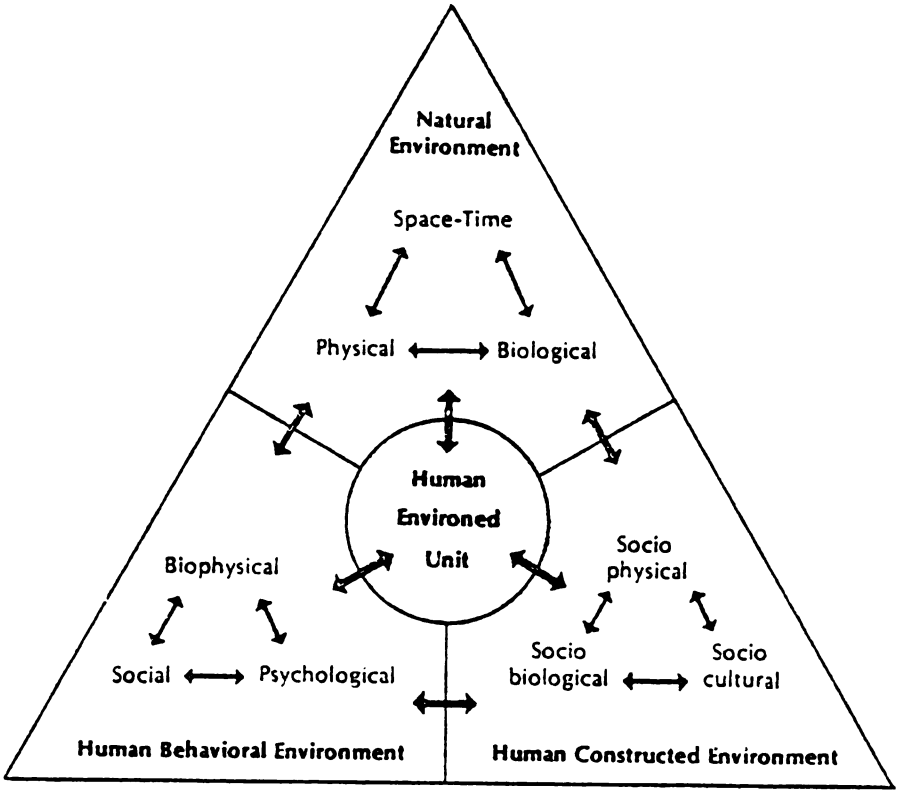

Figure 1.--The Human Ecosystem

"cybernetic-decisional model" (Figure 2). This model is an attempt to convey society as a process, with feedback as a fundamental interaction between information and action. Decisions within the model may be made by any individuals of small or large groups. Highly important within the model are images about the future. This model is perpetual and factors from past and present influence and formulate the future. The scope of an individual and that individual's beliefs and values are paramount in the model. Within this model, feedback is continually evaluated, reevaluated and applied. As stated by Kauffman (1976),

> The difference between human and natural systems stems from the unique human capacity for imagining the future. A thermostat can only react to what is happening at the moment; human beings can pre-react to what they think will or might happen. This introduces a new crucial element to the system, a new kind of loop which depends on feed-forward instead of feedback.

This researcher developed an integration of the human ecosystem model and cybernetic-decisional model to generate a third perspective - The Remodeled Human Ecosystem/Social Change Version. This version illustrates that it is necessary to travel through all stages of the cybernetic-decisional model but each stage is influenced by values and governed by the human ecosystem (Figure 3).

Change occurs when a new idea's use or rejection has an effect. Social change is therefore an effect of communication. Communication is education and education is communication.

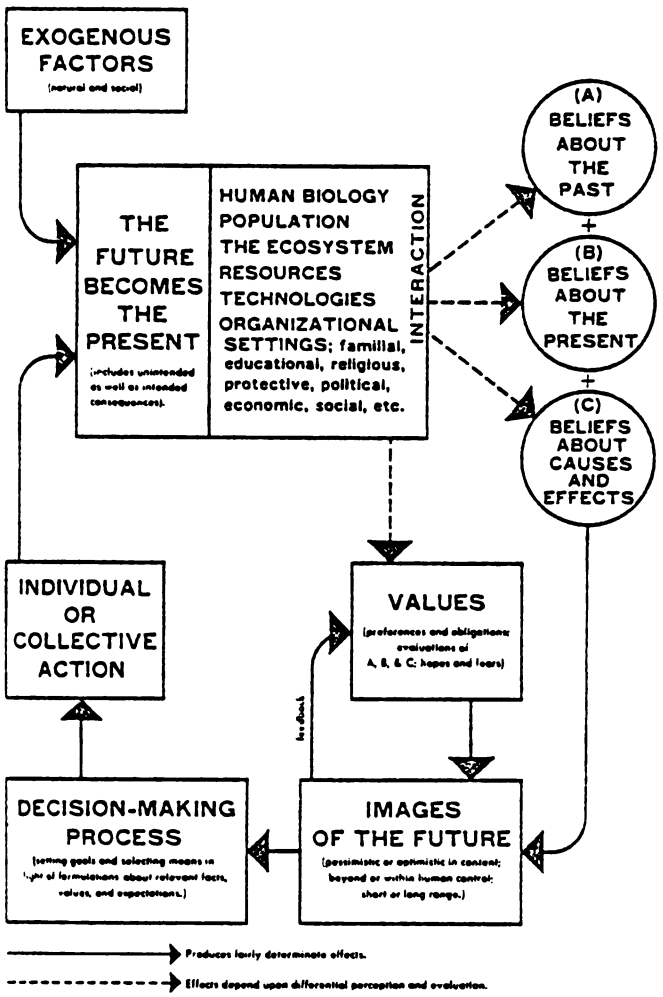

Figure 2.--Cybernetic Decisional Model of Social Change

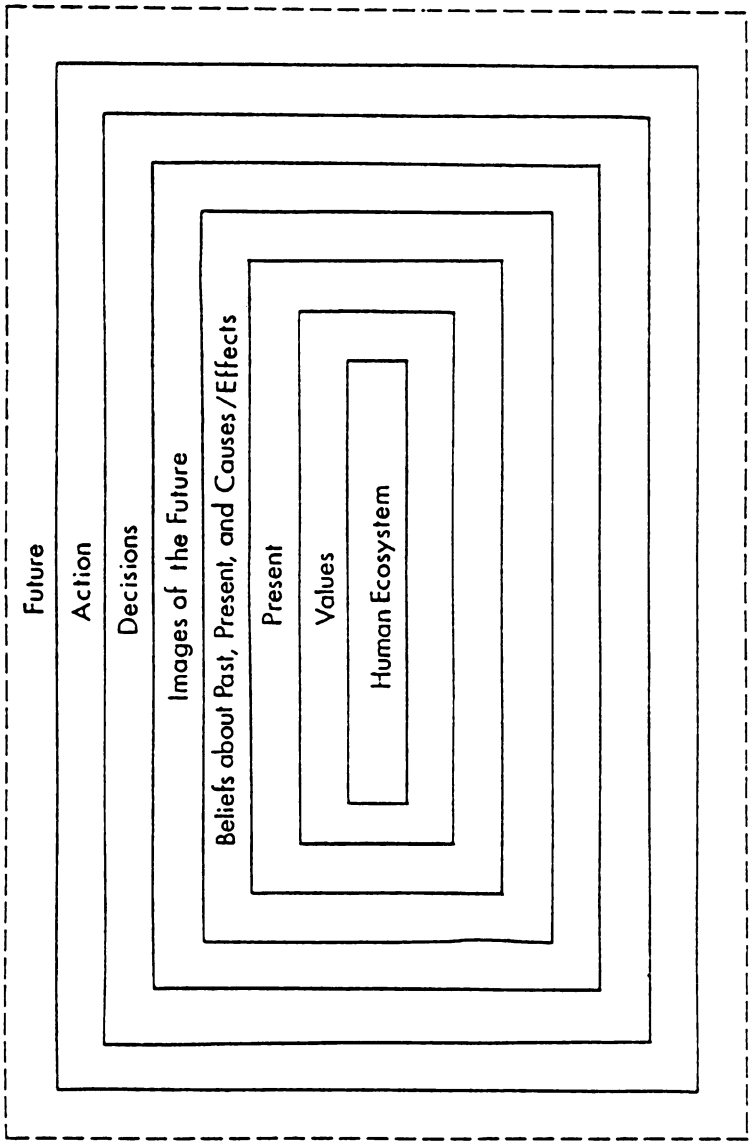

Figure 3.-- The Remodeled Human Ecosystem/Social Change Model

Further review of the literature notes the following. The second half of the 20th century is different from any other period in the history of the human race, different in ways that have important implications for education.

There are the ". . . multiple threats to the survival of the entire human species," (Kahn and Weiner, 1967), ". . . the sharp increase in the rate of social change, both in the U.S. and globally . . ." (Wolsy and McElroy, 1975), ". . . the sheer complexity of society . . . resulting in there no longer being . . . any simple decisions" (McHale, 1969), and ". . . a major increase in the need for anticipatory solutions" (Tugwell, 1973).

According to Kauffman (1976) all of this is particularly a problem for a society like that of the United States, which has been accustomed throughout its history to ignore problems until they reach a crisis point and then react to them with great efficiency. This makes sense, as long as the crises are not severe enough to destroy the entire society. Unfortunately, many of the problems we face today -- such as resource depletion, population growth, famine, environmental disruption, and nuclear proliferation - have a fatal combination of two characteristics: the cost of a full-blown crisis is unacceptably high and, in each case, the point of no return is passed before, sometimes long before, the crisis point is reached.

CHAPTER III

METHODOLOGY

Research Design

This study is comparable to the 1983 study by the National Science Teachers Association. The present study was applied and exploratory in nature. It was non-experimental research with the purpose of investigating energy education and the public utility companies' perceived roles in the classroom of nine midwestern states. The states included were Illinois, Indiana, Iowa, Michigan, Minnesota, North Dakota, Ohio, South Dakota, and Wisconsin. The research setting was natural. The unit of analysis for this study was a utility company as reported by management and/or educational service personnel. The time dimension was cross-sectional.

Within this chapter, the discussion will center on the following points: sample description, survey research method, analysis of data, assumptions, limitations, research questions, and statistical analysis.

Sample Selection

The sample was selected from a nine state midwestern region. The states included were Illinois, Indiana, Iowa,

Michigan, Minnesota, North Dakota, Ohio, South Dakota, and Wisconsin. The utility companies selected were derived from lists made available by The Edison Electric Institute and The American Gas Association, whose objectives are to provide energy information to schools, business, industry, and community agencies. A random sampling would have been implemented if greater than 100 public utility companies had been listed. A method of random sampling was not required due to receiving fewer than 100 names on the lists. All public utility companies were sent a preliminary letter concerning their energy education policy in the past, present, and future. The response to the letter aided in determining the contents of the questionnaire and feasibility of the study. The research method was based on works by Dillman (1978).

Survey Research Method

Collection of Data

Because procedures for conducting mail surveys have limitations, the response rate is sometimes low and confidentiality of the results is often questionable. Dillman proposed the Total Design Method (TDM) which scrutinizes all aspects of the topic in question and of the administrative detail that might affect response behavior. Basic considerations using TDM were: construction of questions, ordering of questions, booklet format, printing procedures, cover letter, follow-up mailings, postage, total costs, and time frame.

The data were collected the months of August and September, 1987. The collection consisted of a preliminary letter, administering of a questionnaire, and follow-up mailings. The data collection material used in this study are included in Appendices 1, 2, 3, 4.

Analysis of Data

Energy education is defined as the imparting or acquiring of specific knowledge concerning various aspects of energy. This includes energy conservation, economics, environmental interaction, production and resources, social and political issues, scientific concepts, history, careers, and safety.

Several variables related to energy education were included in this study. The following discussion operationally defines the variables for the purposes of this study.

Independent Variables

1. **State.**-- A territory defined by a set of boundaries which are determined geographically or by law.

2. **Size.**-- The number of counties in a given state served by a public utility.

3. **Type.**-- The service provided by each public utility company surveyed; gas, electric, and gas/electric.

Test Variables

1. **Energy Education Policy.**-- A procedure or program that directly emphasizes energy education in educational institutions.

2. **Energy-Related Activities.**-- Functions that stress the topic of energy and its importance. Example of these include science and/or energy fairs, workshops for teachers, National Energy Education Day programs, energy-related assemblies, energy-related field trips, career days, Science Olympiad, and teacher panels to aid in development of educational materials.

3. **Energy Education Employee.**-- One whose job responsibilities are or include administering energy education to educational institutions.

4. **Energy Education Institution.**-- An educational establishment that is served by a public utility company's energy education employee.

5. **Energy Topics.**-- Materials that address the subject of energy. These include conservation, economics, environmental interaction, production and resources, social and political issues, scientific concepts, history, careers, and safety.

6. **Energy Material Source.**-- Suppliers of energy-related items which include in-house development, trade organizations, and outside contractors.

7. **Materials.**-- Types of energy-related items provided by public utility companies. Examples are slides, films,

filmstrips, overhead transparencies, audio tapes, computer software, teachers' guides, curriculum guides, and evaluation instruments.

After the data collection period, the raw data were compiled and transferred to coding sheets. With the assistance of a statistician, the data were analyzed using the Statistical Package for Social Sciences (SPSS).

Assumptions

1. Survey research is a valid method of obtaining information from a sample of respondents in an exploratory study.

2. The Edison Electric Institute and American Gas Association are reliable sources for listings of public utility companies.

3. The survey respondents (management and/or educational services personnel) are assumed to be representative spokespersons of the public utilities.

4. The survey was designed so that respondents would be able to record the requested information accurately.

Limitations

As with any project, limitations in this research have been suggested. Each of these limitations could have influenced the data obtained. These limitations are:

1) Length of employment in the public utility by respondent of questionnaire.

2) Effect of time frame of the mailings of questionnaires is not known. Perhaps a time early or late in the school year, when public utility companies would be gearing up or winding down their energy education programs would have been more appropriate.

3) The socio-economic area of the companies and the populations they served were not fully explored. Affluent areas, where education in general receives higher priority, might place more emphasis on energy education.

4) Accuracy of response may be affected by questionnaires not returned and/or questionnaires returned but not answered completely.

Research Questions

Question I. Is energy education provided to schools by public utility companies?

Question II. To what extent do public utility companies provide energy education?

Question III. What are the major characteristics of the educational institutions served by the public utility companies?

Question IV. What types of energy education do public utility companies provide?

Statistical Analysis

Statistics should aid the researcher in discerning the meaning of the data. Historically, statistics have been a

result of classifying, summarizing, and communicating methods and techniques (Steel and Torrie, 1960).

Descriptive statistics involves the collecting and manipulating of data and formulates quanitative information referring directly to samples and indirectly to populations. These procedures effectively lead to a complete description of the data and gives the researcher an accurate foundation from which to make the transformation from samples to populations. Therefore the term descriptive statistics defines the type of statistical analysis in this study.

CHAPTER IV

FINDINGS AND DISCUSSION

This chapter contains the sample description and the results of analysis of the data. Each research question is stated and then followed by the findings and discussion.

Sample Description

The sample was selected from nine states in the midwestern United States. The states were Illinois, Indiana, Iowa, Michigan, Minnesota, North Dakota, Ohio, South Dakota, and Wisconsin (Figure 4).

A total of 77 research questionnaires were distributed to utility companies throughout this region. This selection was based on information from the Edison Electric Institute and The American Gas Association whose objectives are to provide energy information to schools, business, industry, and community agencies.

Some overlap existed concerning the service area of the utility companies. Seventy-seven questionnaires were distributed. The overall number of questionnaires returned was 54 for a total response rate of 70% (Table 1). However, nine of the fifty-four questionnaires represented utilities which served in more than one state.

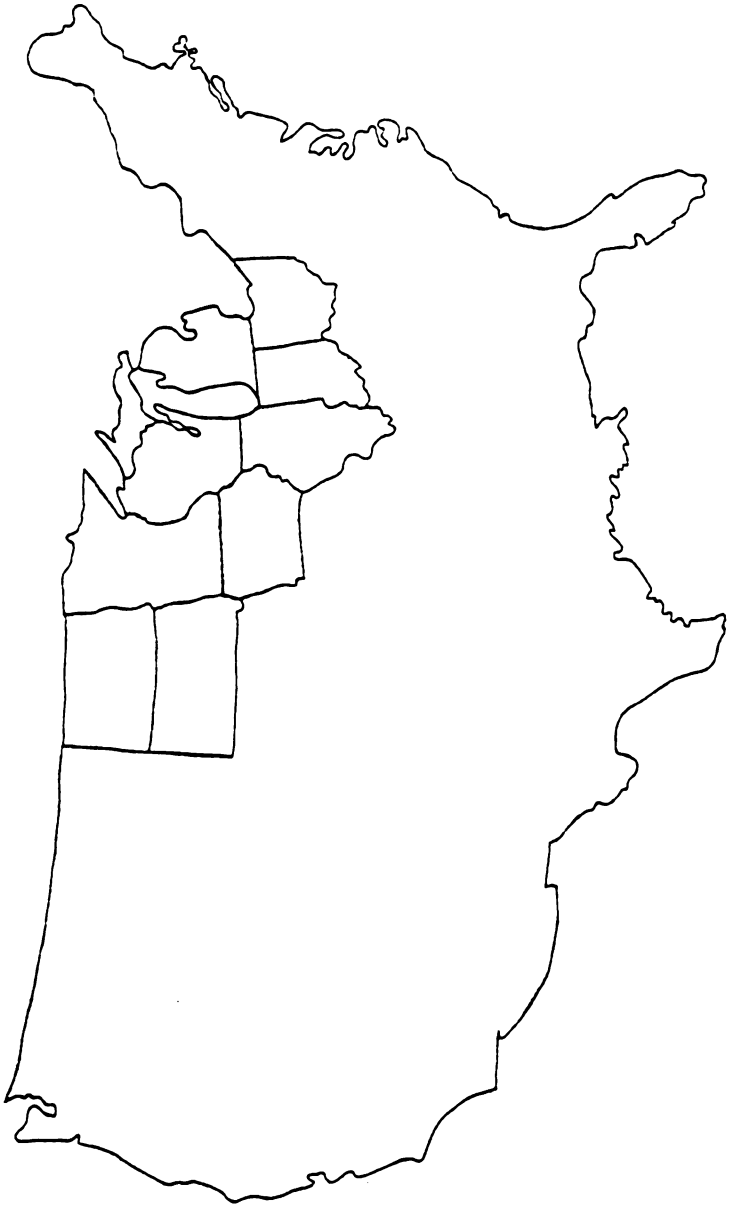

Figure 4.--Nine State Midwestern Region

TABLE 1.--Number of Participating Companies by State Location of Main Office

State	Number of Companies Receiving Questionnaires	Number of Companies Responding	Percent of Total
Illinois	9	7	77.7
Indiana	13	10	77.7
Iowa	10	5	50.0
Michigan	11	7	63.6
Minnesota	6	2	33.3
North Dakota	2	1	50.0
Ohio	11	11	100.0
South Dakota	3	1	33.0
Wisconsin	12	10	83.3

TABLE SUMMARY	Total Number of Questionnaires Sent to Utility Companies	Total Number of Questionnaires Returned	Percent of Respondents
	77	54	70.0

Each utility size was dependent upon the size of service area which was determined by the number of counties served. Small utilities had a service area of 9 counties or less (42.6%), medium sized utilities had a service area of 10-29 (25.9%) counties and large companies had a service area of 30-59 (17.6%) counties. Companies with service areas composed of 60 or more counties were in an extra-large category (9.3%). There were 5.6% of the utilities which did not respond (Figure 5).

The respondents were asked to identify the type of service they provided. Three types were listed: gas (33.3%), electric (29.6%), gas/electric (33.3%), and no response (3.7%). The types of service were almost equally distributed among the utility companies (Figure 6).

The small service areas were 56.5% gas utility companies. The remainder of the service for these areas was equally divided (20.8%) between gas/electric and electric companies. Gas/electric was the major utility company in the medium size service area (52.9%). Electric served 21.4% in a service area of this size and gas served 14.3%. Large service areas were mainly served by gas/electric utility companies (66.6%). Electric utility companies served the remaining 33.3%. The extra large service areas were served by gas/electric (60%) or electric (40%) (Table 2).

Research Question I: Is energy education provided to schools by public utility companies?

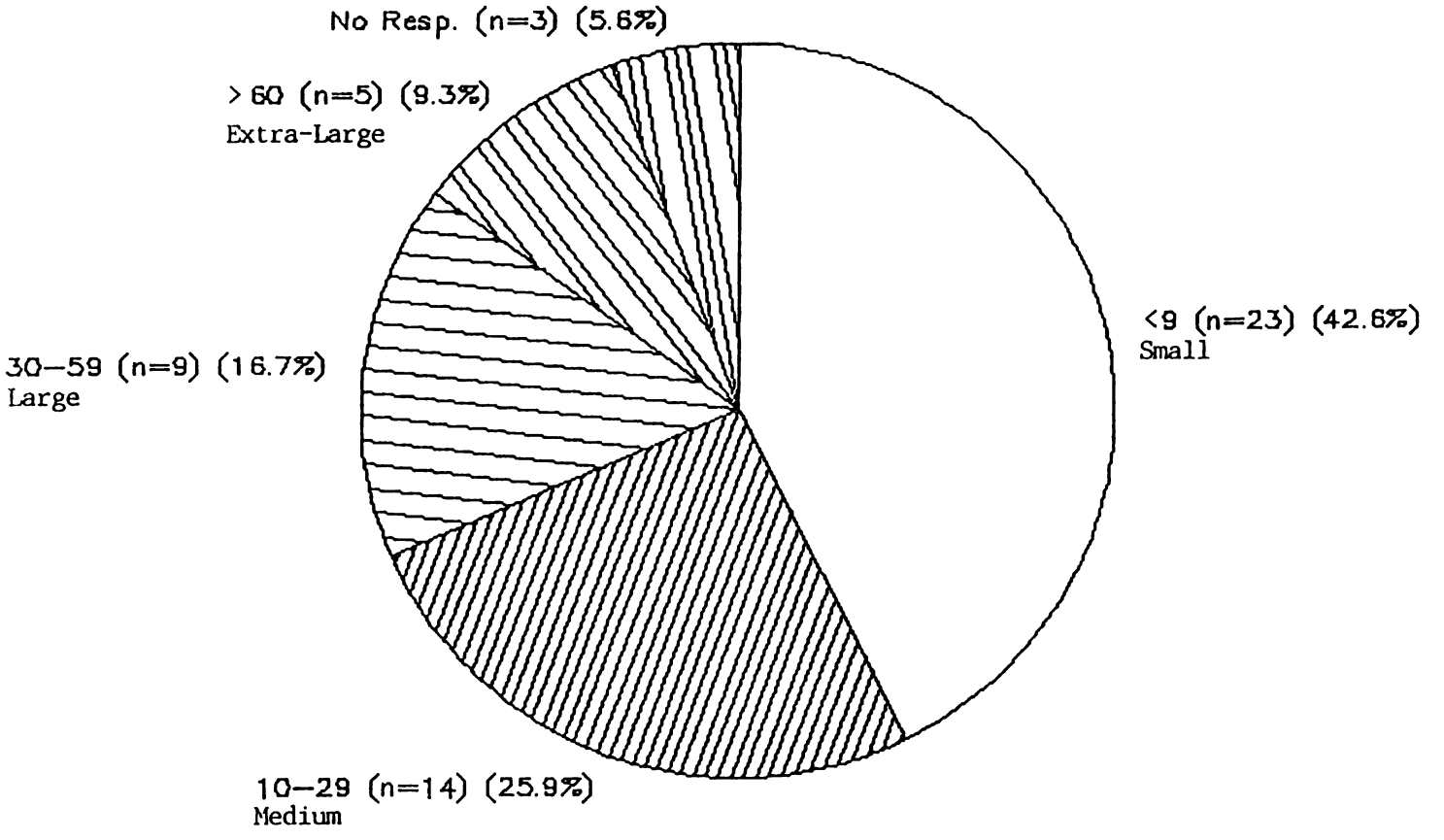

Figure 5.-- Size of Utility Company Based on Number of Counties Served

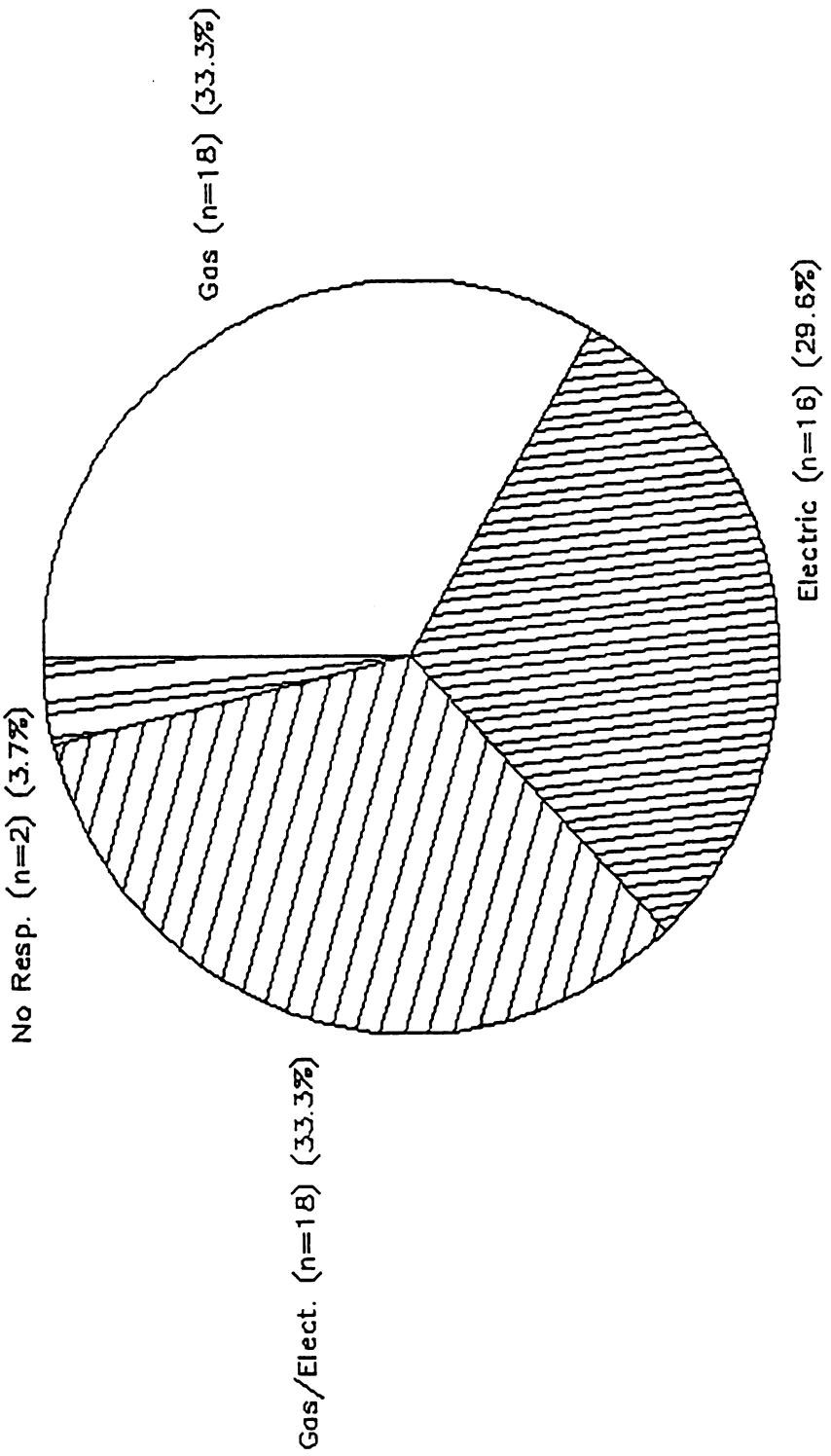

Figure 6.--Type of Service Provided by Utility Company

TABLE 3.--Size of Utility Company Compared to Type of Service

Size	Type		
	Gas	Electric	Gas/Electric
Small < 9 Counties n=23	56.5% n=13	20.8% n=5	20.8% n=5
Medium 10-29 Counties n=14	14.3% n=2	21.4% n=3	52.9% n=9
Large 30-59 Counties n=9	---	33.3% n=3	66.6% n=6
Extra-Large >60 Counties n=5	---	40.0% n=2	60.0% n=3

Currently 38.8% of the utility companies have an energy education policy. The states showing a stronger commitment to energy education were Wisconsin, Ohio, Illinois, and Iowa. Of the respondents answering no to having a current policy 80.7% did not have a policy in the past and 70.9% are not planning a policy in the future (Figures 7, 8, 9).

Having a policy does appear to be related to company size; an increasing trend from small to large companies is noted. (21.7%, 42.8% and 77.7% respectively). However, the extra large companies falls dramatically to 40% (Table 3). The electric utility companies have the largest percentage (62.5%) which have a energy education policy versus 38.8% for gas/electric and 16.6% for the gas utilities (Table 4).

Science/energy fairs, workshops, field trips, and careers days are the energy-related activities most often provided. The activities which have been increasing since 1971 are science fairs, workshops, field trips, career days, and teacher panels. National Energy Day and assemblies show an oscillating pattern. The activity in which there has been no interest is Science Olympiad (Figure 10).

As an overall measure the respondents were asked about the amount of energy education provided since 1970; 63.3% noted an increase. Times of highs and lows were experienced by 17.9%. A total of 5.8% indicated a decrease and 13.5% remained unchanged (Table 5).

Research Question II: To what extent do public utility companies provide energy education?

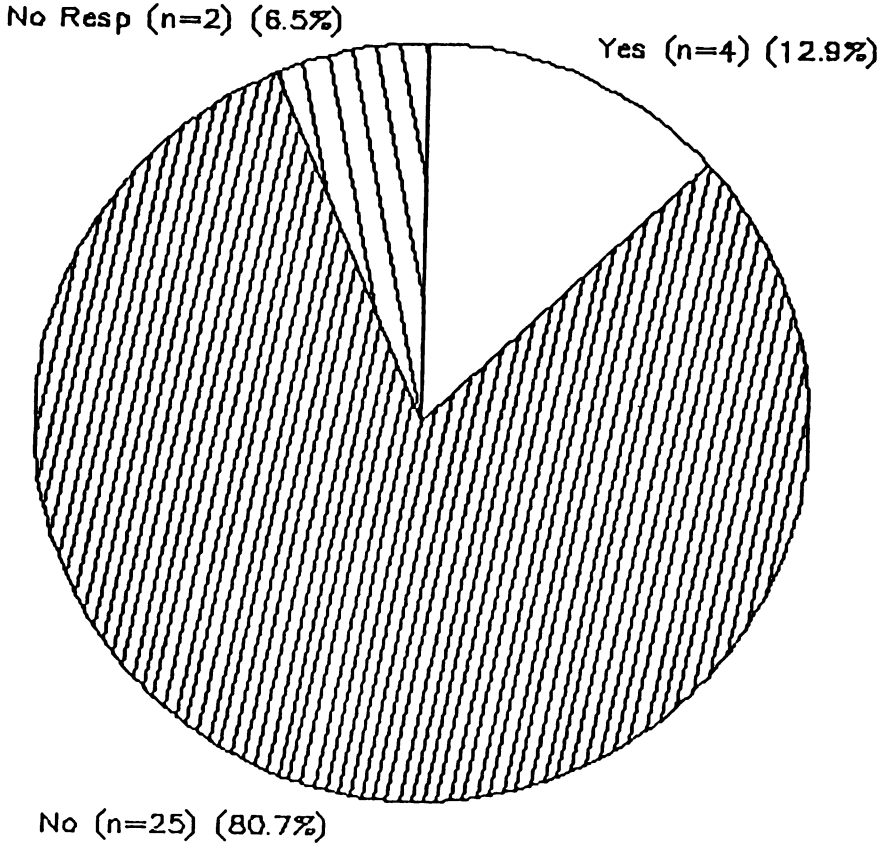

Figure.8--Percent of Companies Not Having Current Energy Education Policy (n=31) by Presence or Absence of Energy Education Policy in the Past

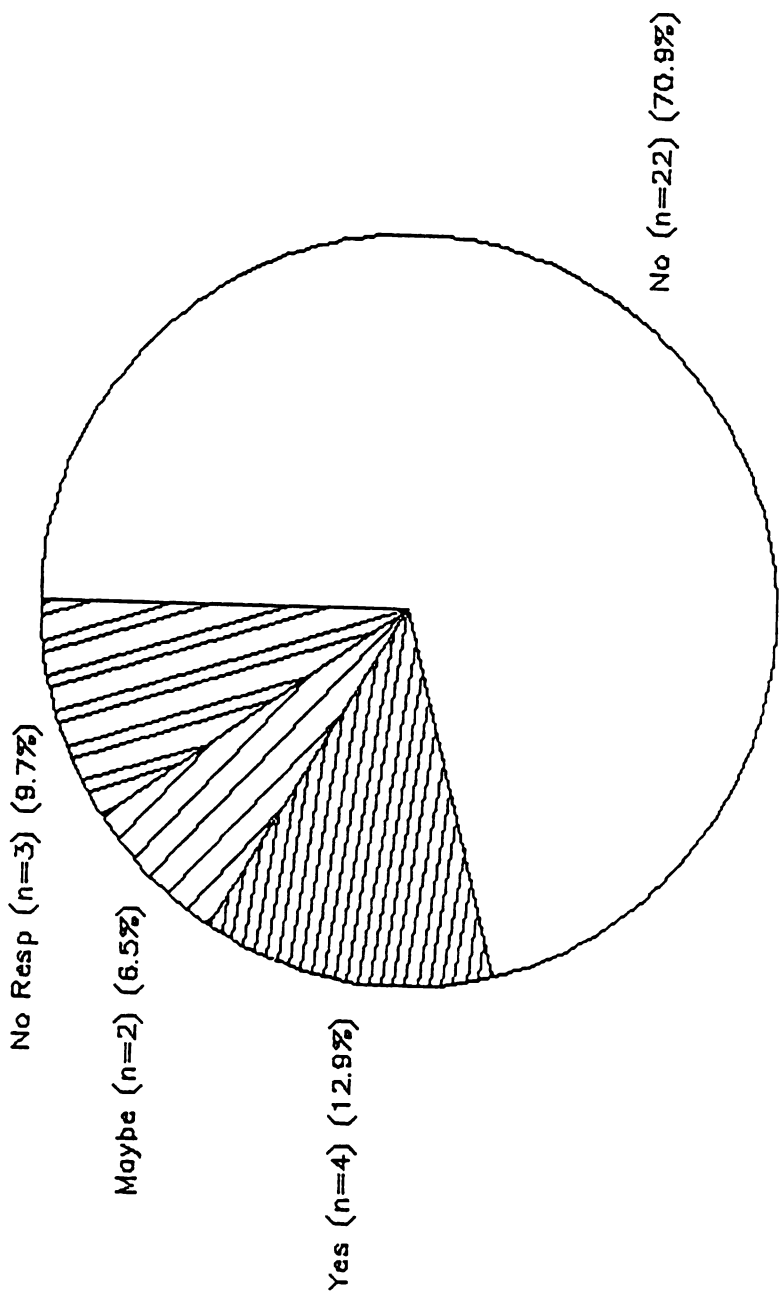

Figure 9.--Percent of Companies Not Having Current Energy Education Policy (n=31) by Plans for Future Energy Education Policy

TABLE 3. --Current Energy Education Policy Based on Size of Company

Size	Total Number of Companies	Number of Companies with Policy	Percent of Total
Small	23	5	21.7
Medium	14	6	42.8
Large	9	7	77.7
Extra Large	5	2	40.0
No Response	3	----	----

TABLE 4.--Current Energy Education Policy Based on Type of Service

Type	Total Number of Companies	Number of Companies with Policy	Percent of Total
Electric	16	10	62.5
Gas	18	3	16.6
Gas/Electric	18	7	38.8
No Response	2	----	----

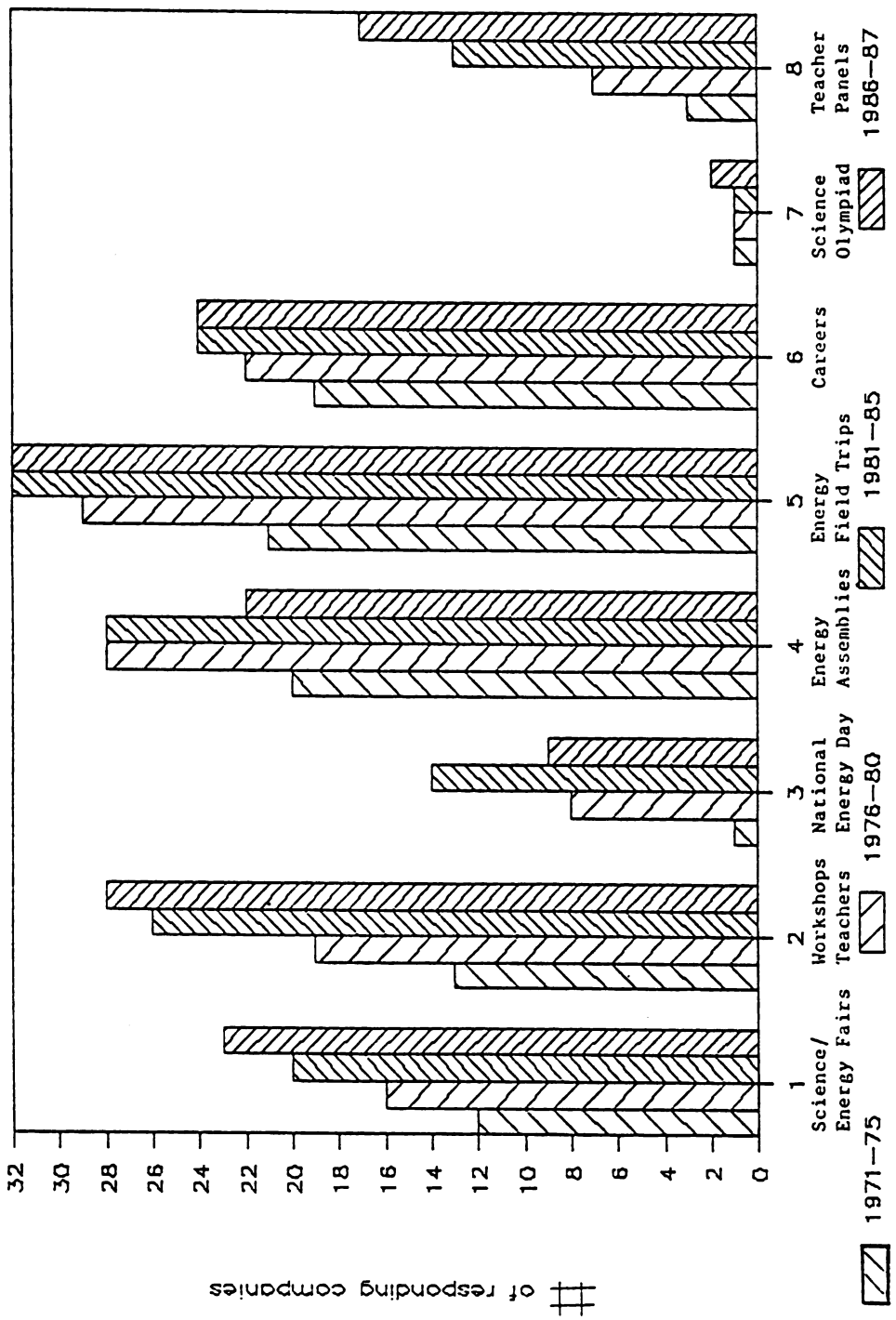

Figure 10.--Energy-Related Activities by Date

TABLE 5. --Energy Education Since 1970

Amount of Energy Education	Number of Companies Responding	Percent of Total
Increase	33	63.5
Decrease	3	5.8
Unchanged	7	13.5
Times of Highs and Lows	9	17.2
Total	52	100.0

The majority (63%) of the respondents indicated that their company has employees whose jobs are energy education. Less than half (37%) of the respondents do not have specific positions for energy education personnel. Of those companies having energy education employees 92% had fewer than five. Total number of respondents reporting were 52.

One half of the energy education employees had a four year college degree. Seventeen percent had an advanced degree while 19.2% employed high school graduates. Other degrees such as vocational/technical and two year college graduates are also accepted with a combined total of 13.4% of the companies responding in this area (Figure 11).

Liberal arts ranked high (56.1%) among the acceptable majors for the post high school graduate. Second highest ranked major was communications at 17.1%, science followed with 12.2% of the respondents. Business and technology were also mentioned as accepted majors with 9.8% and 4.9% respective response rates (Appendix E).

In response to an open ended question regarding energy-related training, over half of the companies (64.7%) offered training for their energy education employees. Conferences and seminars were the most frequently mentioned training activities utilized by companies with a combined total of 75%. Another activity used by 25% of the companies offering training was special training programs. Specific training topics were not named (Appendix F).

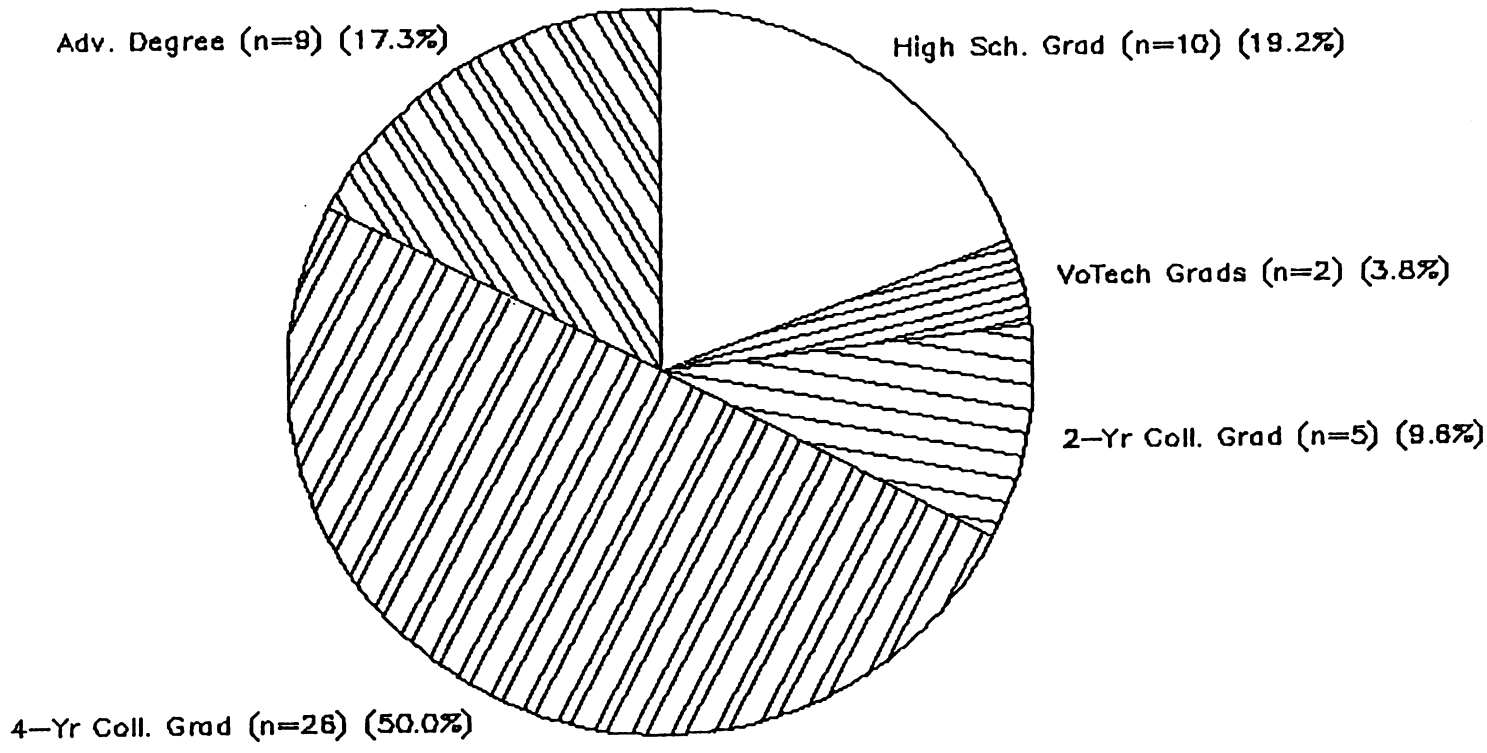

Figure 11.--Educational Background of Energy Education Employee

The levels of institutions in which the energy education employee served were categorized as K-3, 4-6, 7-8, 9-12, vocational schools, junior colleges, and colleges/universities. The average number of institutions served by each education employee was 28 or more for levels K-12. The small decrease to 22 institutions was noted for the vocational/technical, junior college and college/university categories (Appendix G). How these institutions were served was also examined. The majority of the contacts were made through the mail or as a result of outside requests (61% for each). Visits to the institutions were made by 42.6% and phone contacts were 35.2% (Table 6).

Research Question III: What are the major characteristics of the educational institutions served by the public utility companies?

The utility companies provide energy education to the educational institutions of grade levels K through 12 and the higher levels of education including vocational/technical schools, junior colleges, and colleges/universities.

The type of educational institutions served were categorized by location: urban, suburban, small town, and rural. More than half of the utilities served educational districts that were in small towns (61.1%) or rural (55.6%); 44.4% of the utilities served urban or suburban areas (Appendix H).

The enrollment for the schools which were served by the public utility companies was 999 or less for elementary and

TABLE 6.--Method of Contacting Educational Institutions

Method of Contact	Number of Companies Responding	Percent of Total
Mail	33	61.1
Outside Requests	33	61.1
Visit Institution	23	42.6
Phone	19	35.2
Total	54	100.0

middle school. The elementary enrollment was 77% and middle school enrollment was 73%. The majority of the service to the high schools was to schools of enrollments of 1,000 to 4,999 less (44%) and 999 or less (36%). Due to the large non-response rate, these findings should be read with caution (Appendix I).

Research Question IV: What types of energy education do public utility companies provide?

The survey participants were asked if their utility company provided energy-related classroom materials and 87.0% responded yes. None of these companies indicated that there was any charge for the materials. The remaining 13.0% did not respond (Appendix J).

The topics which the materials addressed were compared individually as to what grades used the material as well as what topic was provided within the particular grade levels (Appendix K). Energy conservation was provided at all grade levels. However, there was a decreased noted 72.2% at K-3 and 70.3% at 4-6 to 66.7% at 7-8 and 68.5% at 9-12 and finally 50% at the higher education levels.

Conventional energy was provided at levels 7-8 (66.7%) and at 9-12 (68.5%). This topic was also provided at K-3 with a 46.2% response rate.

Energy safety was addressed at all levels, but was most often provided at 4-6 (72.2%) and 7-8 (70.3%).

Overall the types of energy-related materials available for the classroom varied (Appendix L). The most frequently

provided materials at all grade levels were films, pamphlets, booklets and posters. These materials on the average ranked at 70% usage with the exception of the grade levels above 12 which were ranked at an average of 55% usage.

Teacher guides also ranked high in usage. The grade levels of K-3 and levels above 12 did not use the guides as extensively (59.2% and 33.3%, respectively) as in the levels of 4-12 which 67.0% reported using the guides.

The usage of video tapes increases from K-3 (46.3%) to 9-12 (64.8%). The usage decreases slightly (55.5%) at levels above 12.

The utility companies obtain their energy-related educational materials through several sources. The majority, 40.7% of the utility companies obtain their materials by in-house sources. Trade organizations provide 22.2% of the materials. A combination of trade organizations and outside contractors provided 16.7% of the materials for energy education. The remaining sources were in-house/trade (5.6%), contractor (3.7%) and in-house/ contractor (1.9%) (Table 7).

Potential Factors Affecting Energy Education By Utility Companies

Several factors were listed by the respondents as affecting the company's pattern of an energy education program: financial concerns, management (administration),

TABLE 7.--Sources of Energy Education Materials

Sources of Materials	Number of Companies Responding	Percent of Total
In-House	22	40.7
Trade	12	22.2
Contractor	2	3.7
In-House/ Trade	3	5.6
Trade/Contractor	9	16.7
In-House/Contractor	1	1.9
No Response	5	9.3
Total	54	100.0

company (corporate) policy, switching to nuclear power or the failure to do so, and interest expressed by educators.

A question was asked about the financial status of the company and the financial difficulties encountered. Of those responding, 31.4% indicated no difficulty and 31.4% indicated mild difficulty. Moderate difficulty was experienced by 23.5% while 7.8% experienced severe difficulty. Approximately 6.0% indicated that they could not answer the question accurately (Figure 12).

The impact of the financial position of the utility companies is described in Table 8. The majority (69.4%) indicated no impact regarding the cost of energy and its affect on the company's ability to provide for energy education materials in the schools. In fact, a small percentage (12.2%) indicated that a significant impact occurred regarding this matter.

Although several factors were cited as to being a determining factor in the utility companies' role in energy education, the financial status is not perceived as the major influence in the present or absence of an energy education program.

TABLE 8.--Cost of Energy Impact on Educational Materials

Degree of Impact	Number of Companies Responding	Percent of Total
Significant Impact	6	12.2
Minor Impact	9	18.4
No Impact	34	69.4
Total	49	100.0

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

Conclusions

This research has attempted to add dimension to the study of energy education, that of public utility companies' perceived roles in the classroom. The purpose was to determine to what extent public utility companies participate in energy education and how those companies disburse and promote energy education. Responses to questions proposed for this research are the basis for the following conclusions.

Energy education is not provided to schools by a large percentage of public utility companies. Only 38.8% of the responding companies had an energy education policy. Of the companies which responded negatively to a current policy on energy education, 80.6% had no previous policy and 70.9% have no future goals for an energy education policy. Consequently, it is concluded that energy education has a minor emphasis in the perspectives of most utility companies.

Although more than one half of the respondents indicated no current written energy education policy, over one-half

responding did indicate employment of personnel whose job description emphasized energy education. It is concluded that companies attempt to provide energy education with employees who have no written goals or objectives to facilitate implementation of energy education.

Findings from the questionnaire imply that early school years and post high school years are not receiving a comparable amount of energy education as grades 4-12. It is concluded that possibly formal energy education is initiated too late in a child's school career and diminishes prematurely for those who continue their formal education past high school.

For those utility companies responding positively to an energy education policy, it appears that those companies predominantly have a passive involvement in the education, through use of filmstrips, books, pamphlets, etc. Active involvement in the educational process, using a hands on approach ranks low in the companies' priorities.

Implications

The analysis of the results of this study implies that a clear focus for energy education has not been established to date. Several factors are involved in developing the optimal written energy education policy. Each of these factors would provide a basis for future research.

Government - Federal, State, Local. -- A policy to accommodate each state or region and relating climate, population, and availability of energy source needs to be

government mandated at all levels for written energy education policies. Provisions for regulating, monitoring, and verifying compliance with the written energy education policies need to be established and maintained.

Public Utility Companies. -- To achieve compliance with government mandates, public utility companies have several opportunities for strengthening their position. The companies should study and promote the many facets of energy on an equal basis. To promote energy education the utility company should function as a liason between itself and educational institutions. This relationship can be fostered with the company's knowledge of the emphasis and time-frame of energy education in the state's education curriculum and aided by employment of educators who would function to develop and direct a more active approach to energy education. Related to this would be the company's involvement on teacher panels to explore energy education and company attempts to provide information and updates on energy to the general public, as in a monthly newsletter.

Educational Institutions. -- The role of educational institutions in providing effective energy education across all levels may be enhanced by governmental direction and cooperation with resources outside the educational institution. This would necessitate involvement of public utility companies with the educators and cooperation from both factions to achieve required goals. Educational institutions would also function as a liason between

students and families, providing direction and resources to further energy education beyond the classroom.

Individuals/Families. -- As a result of the structured energy education provided by governments, public utility companies and educational institutions, energy knowledge at an individual or familial level would be improved. The role of the family unit continues to change in society and the adoption of energy attitudes will affect lifestyles.

Each of these factors would provide a basis for future research. Although each is a separate area in need of study and development, it is the culmination of their interaction that will result in an optimal written energy education policy (Figure 13).

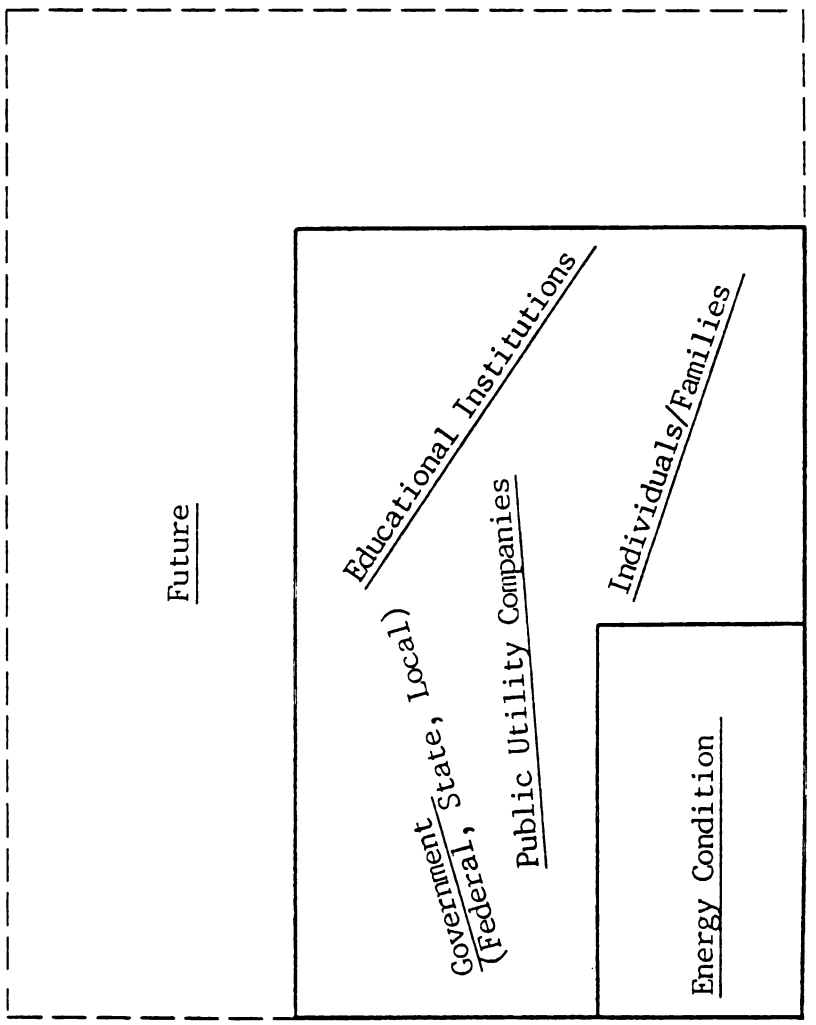

Figure 13.-- Energy Condition Systems Model

APPENDICES

APPENDIX A

Questionnaire

APPENDIX A

Questionnaire

ENERGY EDUCATION: PUBLIC UTILITY COMPANIES' PERCEIVED ROLES IN THE CLASSROOM

An integral part of man's being has been and is his interaction with his environment. In recent years man's attention has been narrowed to critical energy issues. Environmental consumers have an ongoing need for energy education. What role do gas and electric utility companies have in this energy education?

This study is constructed to evaluate the current status of energy education. Please answer all of the questions. If you wish to comment on any question or qualify your answers, please use the margins or a separate sheet of paper.

Return this questionnaire to:
Annette Schepper
1628 South Fifth Street
Terre Haute, Indiana 47802

1. Does your company have a written policy supporting energy education in educational institutions? (Circle the number of your answer)

1. NO 2. YES

If no: Have you previously had such a program?

1. NO 2. YES

Are you planning one in the future?

1. NO 2. YES

2. In which of the following energy-related activities did your company participate?

ENERGY-RELATED ACTIVITY	TIME PERIOD: 1971-1975 NO	1971-1975 YES	1976-1980 NO	1976-1980 YES	1981-1985 NO	1981-1985 YES	1986-1987 NO	1986-1987 YES
1. SCIENCE AND/OR ENERGY FAIR								
2. WORKSHOPS FOR TEACHERS								
3. NATIONAL ENERGY EDUCATION DAY PROGRAM								
4. ENERGY-RELATED ASSEMBLIES								
5. ENERGY-RELATED FIELD TRIPS								
6. CAREER DAYS (INCLUDING ENERGY CAREERS)								
7. SCIENCE OLYMPIAD								
8. TEACHER PANEL TO REVIEW/ DEVELOP EDUCATIONAL MATERIALS								
9. OTHER (please specify)								

3. Does your company have an employee(s) whose job is energy education? (Circle the number of your answer)

1. NO 2. YES

If no: Skip to question 12

If yes: Specify number _____

4. Which of the following best describes the background of your energy education employee(s)? (Circle all numbers that apply)

1. HIGH SCHOOL GRADUATE
2. VOCATIONAL SCHOOL GRADUATE
3. 2 YEAR COLLEGE GRADUATE
4. 4 YEAR COLLEGE GRADUATE
5. ADVANCED DEGREE

5. What majors are acceptable for post high school graduate? (Please specify)

6. Does your company provide energy-related training for your energy education employee(s)? (Circle the number of your answer)

1. NO 2. YES

If yes: Please describe company provided energy-related training of employee(s).

TYPE: _____

FREQUENCY: _____

TYPE: _____

FREQUENCY: _____

7. How many energy education institutions are serviced by each energy education employee?

LEVEL OF INSTITUTIONS	NUMBER OF INSTITUTIONS						
	0	1-4	5-9	10-14	15-19	20-24	25 OR MORE
1. K-3							
2. 4-6							
3. 7-8							
4. 9-12							
5. VOCATIONAL SCHOOLS							
6. JUNIOR COLLEGES							
7. COLLEGES/UNIVERSITIES							

8. How would you describe the educational institutions' districts which your energy educational employee(s) service? (Circle all numbers that apply)

1. URBAN
2. SUBURBAN
3. SMALL TOWN
4. RURAL

9. What marketing methods does your energy education employee(s) use to initiate the energy education program? (Circle all the numbers that apply)

1. EMPLOYEE VISITS EDUCATIONAL SETTING
2. EMPLOYEE INITIATES PHONE CONTACTS
3. EMPLOYEE INITIATES MAIL CONTACTS
4. CONTACT IS BY REQUEST OF TEACHERS

10. What is the average enrollment of the educational institutions serviced by your energy education employee(s)?

NUMBER OF STUDENTS	EDUCATIONAL INSTITUTIONS			
	ELEMENTARY	MIDDLE	HIGH SCHOOL	POST HIGH SCHOOL
1. LESS THAN 999				
2. 1,000-4,999				
3. 5,000-9,999				
4. 10,000-14,999				
5. 15,000-19,999				
6. 20,000 OR OVER (Please specify)				

11. How often does the energy education employee(s) make contact with educational institutions per year?

EDUCATIONAL INSTITUTIONS	NUMBER OF CONTACTS						
	0	1-2	3-4	5-6	7-8	9-10	OVER 10
1. K-3							
2. 4-6							
3. 7-8							
4. 9-12							
5. VOCATIONAL SCHOOLS							
6. JUNIOR COLLEGES							
7. COLLEGES/UNIVERSITIES							

12. Does your company provide energy-related handout material for classroom educators and students? (Circle the number of your answer)

1. NO 2. YES

If no: skip to question 18

13. Indicate types of energy topics your material addresses. (Check all that apply)

TOPICS	GRADE LEVEL K-3	4-6	7-8	9-12	ABOVE 12
1. ENERGY CONSERVATION					
2. ECONOMICS OF ENERGY (COST OF FUEL)					
3. ECONOMICS OF ENERGY (RATE STRUCTURE TO CONSUMER)					
4. ENERGY/ENVIRONMENT INTERACTION					
5. RENEWABLE ENERGY PRODUCTION AND RESOURCES					
6. CONVENTIONAL ENERGY PRODUCTION AND RESOURCES					
7. ENERGY-RELATED SOCIAL AND POLITICAL ISSUES					
8. SCIENTIFIC CONCEPTS OF ENERGY					
9. ENERGY AND HISTORY					
10. ENERGY CAREERS					
11. ENERGY SAFETY					
12. OTHERS (Please specify)					

14. Through what source(s) does your company obtain energy-related educational materials? (Circle all numbers that apply)

1. MATERIALS DEVELOPED IN-HOUSE
2. MATERIALS PROVIDED THROUGH TRADE ORGANIZATIONS
3. MATERIALS PROVIDED BY OUTSIDE CONTRACTORS

15. Which of the following energy-related materials are available through your company for classroom use? (Check all that apply)

MATERIALS	GRADE LEVEL K-3	4-6	7-8	9-12	ABOVE 12
1. SLIDES					
2. FILMS					
3. FILMSTRIPS					
4. OVERHEAD TRANSPARENCIES					
5. AUDIO TAPES					
6. PAMPHLETS, BOOKLETS, POSTERS					
7. "HANDS ON" MATERIALS FOR EXPERIMENTS					
8. VIDEO TAPES					
9. COMPUTER SOFTWARE					
10. TEACHERS' GUIDES					
11. CURRICULUM GUIDES					
12. EVALUATION INSTRUMENTS					
13. OTHERS (Please specify)					

16.

a. List the five most frequently used energy-related materials available through your company.

1.

2.

3.

4.

5.

b. Please provide the following information for each energy-related material:

ASPECT	MATERIAL NUMBER 1	2	3	4	5
KNOWLEDGE/AWARENESS					
ATTITUDE					
BEHAVIOR					
NUMBER OF TIMES USED PER YEAR					
PROGRAM ORIGINATOR					

c. May I receive copies of these five energy-related materials?

1. NO 2. YES

If yes, please forward to me copies of the five materials you listed. I am willing to reimburse your costs and return the items if requested.

17. Does your company charge for energy-related materials?

1. NO 2. YES

If yes, please check all that apply:

_____TOTAL PURCHASE PRICE
_____RENTAL FEES
_____TEACHER FEES

18. Has the cost of energy adversely affected your company's ability to provide for energy education materials in schools? (Circle the number of your answer)

1. NO 2. YES

If yes, please check only one:

_____ SIGNIFICANT IMPACT
_____ MINOR IMPACT

19. Consider your company's energy education program since 1978, would you say the amount of energy education has: (Circle the number of your answer)

1. INCREASED
2. DECREASED
3. REMAINED UNCHANGED
4. TIMES OF HIGHS AND LOWS

20. What are the major factors that have affected your company's pattern of an energy program? (Please specify)

21. How would you describe the financial difficulties of your company? (Circle the number of your answer)

1. NONE
2. MILD
3. MODERATE
4. SEVERE

22. Which state(s) does your company service?

23. How many counties are included in your service area? (Circle the number of your answer)

1. LESS THAN 9
2. 10 - 19
3. 20 - 29
4. 30 - 39
5. 40 - 49
6. 50 - 59
7. 60 - 69
8. 70 - 79
9. 80 - 89
10. 90 - 99
11. OVER 100
(Please specify)_____

24. How many customers are in your service territory? (If none, write 0:

_____ GAS _____ ELECTRIC

25. How many people does your company employ? (Circle the number of your answer)

1. LESS THAN 499
2. 500 - 799
3. 800 - 1,099
4. 1,100 - 1,399
5. 1,400 - 1,699
6. 1,700 - 1,999
7. OVER 2,000
(Please specify)_____

REMINDER

If you answered YES to 16c, please forward to me copies of the five materials you listed. I am willing to reimburse your costs and return them if requested.

Your contribution to this effort is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope (NOT on this questionnaire). I will mail this to you.

APPENDIX B

Questionnaire Cover Letter

1620 South Fifth Street
Terre Haute, Indiana 47802
August 25, 1987

Issues concerning the environment have increased in recent years. Daily reports of environmental damage, misuse, and depletion are presented by the media. Depletion of sources of energy and alternatives for future resources are frequently discussed. Awareness of environmental issues is not sufficient for today's consumer - - the education of consumers on the topic of energy is fundamental in facilitating change. This education can be provided from several sources, including gas and electric utility companies.

Your company is one of a number of gas and/or electric utility companies in a nine state midwestern region. Companies selected are being asked to respond to questions concerning your company's perceived roles in energy education in classrooms. So the results will indicate a true regional sampling, your completing and returning this questionnaire is warranted.

Your responses will remain confidential. An identification number on your questionnaire is for mailing purposes only. This allows check off of your name on the mailing list when you return the questionnaire. Your name will not be placed on the questionnaire.

The results of this research will be made available to gas and electric utility companies in the United States, educators, and interested citizens. You may receive a summary of results by writing "copy of results requested" on the back of the return envelope and printing your name and address below it. Please do not put this information on the questionnaire itself.

Should you have any questions, I would be most happy to answer them. Please write or call. The telephone number is (812) 234-0680.

Thank you for your assistance.

Sincerely,

Annette M. Schepper
Master's Degree Candidate
Michigan State Univeristy

APPENDIX C

Questionnaire Initial Follow-Up Letter

APPENDIX C

Questionnaire Initial Follow-Up Letter

September 14 1987

Two weeks ago a questionnaire seeking your opinion and expertise about your company's perceived role of energy education in the classroom was mailed to you. Your name was selected from a nine state region in the midwestern United States.

If you have already completed and returned it to me please accept my sincere thanks. If not, please do so today. Because it has been sent to only a small but representative sample of public utility companies, it is extremely important that yours also be included in the study if the results are to accurately represent the utility companies of this region.

If by some chance you did not receive the questionnaire, or it has been misplaced, please call me immediately , collect (812-234-0680) and I will get another one in the mail to you today.

Sincerely,

Annette Schepper
Master's Degree Candidate
Michigan State University

APPENDIX D

Questionnaire Final Follow-Up Letter

APPENDIX D

Questionnaire Final Follow-Up Letter

September 24, 1987

In the latter part of August I wrote to you seeking your opinion and expertise regarding your public utility company's perceived role in energy education in the classroom. As of today I have not received your completed questionnaire.

My research topic, energy education in the classroom, was undertaken because of my professional experience with public utility company and because of the need for continued energy education if we as a nation are going to survive and overcome the energy problems.

I am writing to you again because of the significance each questionnaire has to the usefulness of this study. Your company was selected from a nine state region in the midwestern United States. In order for the results of this study to be truly representative of the opinions of the nine state region, it is essential that each person in the sample return the questionnaire.

In the event that your questionnaire has been misplaced, a duplicate is enclosed.

Your cooperation is greatly appreciated.

Sincerely,

Annette Schepper
Master's Degree Candidate
Michigan State University

APPENDIX E

Majors Acceptable For Post-High School Graduate

APPENDIX E

Majors Acceptable for Post High School Graduates

Majors	Number of Companies Responding	Percent of Total
Liberal Arts	23	56.1
Communications	7	17.1
Business	4	9.8
Sciences	5	12.2
Technology	2	4.9
Total	41	100.7

APPENDIX F

Energy-Related Training For Energy Education Employee

APPENDIX F

Energy-Related Training For Energy Education Employee

Company Response	Number of Companies Responding	Percent of Total
Yes	22	64.7
No	12	35.5
Total	34	100.0

Type of Training	Number of Companies Responding	Percent of Total
Conferences	6	37.5
Seminars	6	37.5
Special Training Programs	4	25.0
Total	16	100.0

APPENDIX G

Average Number of Contacts to Institutions

APPENDIX G

Average Number of Contacts to Institutions

Level of Institution	Number of Companies Responding	Average Number of Contacts
K-3	30	5.6
4-6	30	5.6
7-8	30	5.6
9-12	28	4.7
Vocational/ Technical	22	2.5
Junior College	22	2.5
College/University	22	2.5

APPENDIX H

Educational Institutions' District Locations

APPENDIX H

Educational Institutions Districts Location

Type of District	Number of Companies Responding	Percent of Total
Urban	24	44.4
Suburban	24	44.4
Small Town	33	61.1
Rural	30	55.6
Total	54	100.0

APPENDIX I

Educational Institutions' Enrollment

APPENDIX I

Educational Institutions Enrollment

Number of Students	Elem. School	Middle School	High School	Post High School
Less than 999	77% n=24	73% n=19	36% n=9	9% n=2
1000 thru 4999	13% n=4	19% n=5	44% n=11	23% n=5
5000 thru 9999	0% n=0	0% n=0	4% n=1	27% n=5
10,000 thru 14,999	0% n=0	0% n=0	4% n=1	23% n=5
15,000 thru 19,999	3% n=1	4% n=1	0% n=0	14% n=3
21,000 and over	7% n=2	4% n=1	4% n=1	4% n=1
No Response	23	28	23	22
Total	54	54	54	54

APPENDIX J

Energy-Related Educational Materials

APPENDIX J

Energy-Related Educational Materials

Company Response	Number of Companies Responding	Percent of Total
Yes	47	87.0
No	5	9.3
No Reponse	2	3.7
Total	54	100.0

Company Response	Number of Companies Responding	Percent of Total
Yes	---	---
No	47	100.0
Total	47	100.0

APPENDIX K

Topics Addressed in Energy-Related Materials

APPENDIX K

Topics Addressed in Energy-Related Materials

Topics	Grade Level				
	K-3	4-6	7-8	9-12	Above 12
Energy Conservation	72.2% n=39	70.3% n=38	66.7% n=36	68.5% n=37	50.0% n=27
Economics of Energy Cost of Fuel	9.2% n=5	25.9% n=14	48.0% n=26	7.4% n=4	42.6% n=23
Economics of Energy Rate Structure	3.7% n=2	5.5% n=3	22.2% n=12	46.1% n=26	46.3% n=25
Energy/Environment Interaction	24.0% n=13	48.0% n=26	55.5% n=30	64.8% n=35	40.7% n=22
Renewable Energy	24.0% n=13	46.2% n=25	57.4% n=31	62.9% n=34	40.7% n=22
Conventional Energy	46.2% n=25	27.7% n=35	66.7% n=36	68.5% n=37	48.0% n=26
Energy Social/ Political Issues	1.9% n=2	3.7% n=4	25.9% n=14	53.7% n=29	37.0% n=20
Scientific Concepts	13.0% n=11	16.7% n=22	50.0% n=27	53.7% n=29	37.0% n=20
Energy and History	13.0% n=11	37.7% n=20	50.0% n=27	46.3% n=25	31.5% n=17
Energy Careers	9.2% n=4	18.5% n=10	29.6% n=16	50.0% n=27	27.7% n=15
Energy Safety	42.6% n=37	72.2% n=39	70.3% n=38	64.8% n=35	46.3% n=25

APPENDIX L

Types of Energy-Related Materials

APPENDIX L

Types of Energy-Related Materials

Material	Grade Level				
	K-3	4-6	7-8	9-12	Above 12
Slides	29.6% n=16	37.0% n=20	46.3% n=25	53.7% n=29	38.8% n=21
Films	68.5% n=37	64.8% n=35	68.5% n=37	68.5% n=37	53.7% n=29
Filmstrips	50.0% n=27	51.8% n=28	42.6% n=23	35.2% n=19	20.4% n=11
Overhead Transparencies	5.5% n=3	9.3% n=5	12.9% n=7	14.8% n=8	9.3% n=5
Audio Tapes	22.2% n=12	25.9% n=14	24.1% n=13	22.2% n=12	20.4% n=11
Pamphlets, Booklets Posters	70.4% n=38	74.1% n=40	74.1% n=40	72.2% n=39	57.4% n=31
"Hands-On" Material for Experiments	14.8% n=8	29.6% n=16	31.4% n=17	25.9% n=14	12.9% n=7
Video Tapes	46.3% n=25	55.5% n=30	64.8% n=35	64.8% n=35	55.5% n=30
Computer Software	16.6% n= 9	29.6% n=16	38.8% n=21	40.7% n=22	16.6% n=9
Teachers' Guides	59.2% n=32	66.7% n=36	68.5% n=37	68.5% n=37	33.3% n=18
Curriculum Guides	22.2% n=12	22.2% n=12	27.7% n=15	29.6% n=16	14.8% n=8
Evaluation Instrument	27.7% n=15	29.6% n=16	29.6% n=16	25.9% n=14	12.9% n=7

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