Federal energy policies : a family impact statement
by Peggy Strong Anderson

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Home Economics
Montana State University

Abstract:
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The sample encompasses the sum of 288 parents with dependent children. Questionnaires were distributed throughout public schools in Livingston, Montana. The self-designed instrument evolved from the energy package President Carter presented to Congress in September of 1977.

Results of the research indicate that various policies are more adaptable to the greater sample population than others. Those policies recognized as important by the tested group were weatherstripping practices, consumer representation in utility decisions, and a utility statement schedule which reveals present and future rates. Participants definitely resist government advice about individual conservation in the home, increased rates by State Regulated Utilities for pollution control, and a tenfold tax increase on natural gas and oil in six years.

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Signature Peggy Strong Anderson

Date August 2, 1978

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Chapter 1

Introduction

At some point in time most societies must recognize a worldwide shortage of petroleum and fossil fuels. Our national statistics indicate recoverable oil to be 40 billion barrels and recoverable gas to be 250 trillion cubic feet (TCF) with known recovery techniques. These facts prove that the United States oil supply will last seven years and gas eleven years if American energy consumption continues at the present rate (The Energy Index, 1976, p. 45). President Carter emphasized the urgency of these facts in his recent national energy policy act (H.R. 8444, 1977). Goals of the legislation include: a 2% reduction of energy growth, a 10% reduction of gas usage, 400 million tons of coal to be produced for future use, and solar energy to be placed in 2.5 million homes. The family, states Hill, is "the bottleneck through which all trouble passes" (Sussman, 1968, p. 441). Because of this, these energy facts will have impact on family life.

Theory and Supportive Research

The United States imported 30% of its petroleum in 1973. As projected, this may increase to 60% between 1980 and 1985. Including the expense of transportation and production, foreign fuel cost is yet less than domestically produced fuel. In order to stabilize prices and later increase them, the Organization of Petroleum Exporting Countries (OPEC) have organized themselves as a monopoly power. Today these

countries have potential to dictate the price they desire. This subjects the United States to interruption of foreign fossil fuel imports (Mancke, 1974, pp. 17-18). Because these uncertainties exist, energy policy guidelines must be carefully designed (Minge and Oaks, 1976). According to Hill, in order to function, families need to see how this is relevant to themselves (Sussman, 1968, p. 440). A careful analysis by families will reveal the impact of policies on family structure.

Our economy has been built upon the premise that low energy prices create more opportunity for economic and social growth. As a result, our society has become conditioned to inexpensive comforts (O'Toole, 1976). They are willing to pay the cost for luxuries. Who wants to walk several miles when they could ride? Who wants to sit shivering in homes with a temperature of 60^{o} F? Who wants to stop using a color TV, dishwasher, air-conditioner, or other luxuries? United States citizens have not faced the fact that use of convenient, energy-consuming devices places a heavy demand on resources and our resources are not infinite (Christianson and Clark, 1976). Conservation efforts are required, many of which must be practiced in family homes through the decision of family members to reduce their consumption of energy and materials.

Jerry Toner and John McBride reviewed policies in Montana relating to energy consumption for the purpose of defining conservation guidelines within the state. Other social studies in Montana include the appointment by Governor Thomas Judge of a Citizen's Advisory Committee for the

purpose of making energy decisions about coal gasification and gas shortages within the state and a design for car pools in Billings, Great Falls, and Helena, Montana. Dr. David Ambros of the University of Nebraska analyzed consumer perception of electricity rate schedules in Nebraska. He found that when consumers are given recessional bloc energy rates, the opposite of declining bloc rates which become lower in price with greater amounts of energy used, the consumers will not necessarily change the amount of electricity they use (Energy Research Information, 1977). In Montana, no study has investigated the family as a unit and Federal policies as the basis of impact. Hence, in compliance with Governor Judge's request for new university energy research, this study was developed.

Purpose

In the framework of this present historical era, this research project has investigated the impact of energy policies on family behavior. Selected policies include the following taken from Governor Tom Judge's News Conference Message of the Summer of 1976:

1. Energy must be conserved.
2. Energy plans need to consider the future.
3. University systems need to incorporate energy research into their programs.

President Carter's September 7, 1977 energy policy package makes these state goals more specific. From these federal policies the investigator designed a questionnaire. From various statistical analyses, the investigator has formulated several statements of policy impact on family life. The statements of impact assume the policies will be anacted at a later date. These impact statements were based on the following:

1. By January 1, 1980, residents must be informed of energy saving devices and instructed in energy saving activities within their households.
2. An advisory committee shall be established for consulting the Federal Power Commission. The following number represent the various groups: three utilities,

five state regulatory authorities, three consumers (industrial and residential), and one conservationist.

3. Electricity rates will be established according to the time-of-day so that costs of service reflect the determined rate. Any consumer who desires cost effectiveness, can acquire metering if he is willing to pay for it.

4. Costs which are the result of pollution control can be recovered by each State Regulated Utility through increased cost to the consumers.

5. Each Regulated State Utility will, after 90 days when the title will take effect, publish a simple statement of the present and proposed rate schedule to the consumer.

6. For solar and wind expenditures, 30% credit is given if qualified expenditures are not greater than $1,500 and 20% credit if expenditures exceed $1,500 but not $10,000.

7. A tax is imposed on natural gas and oil with the price of oil ranging from $.30 (per barrel) in 1979 to $3.00 (per barrel) in 1985 with natural gas increases of like proportion.

For each of the above selected policies, a statement of impact was developed making use of the following objectives:

I. TO IDENTIFY THE RESPONDENT'S PERCEPTION OF FAMILY BEHAVIOR IN RESPONSE TO THE FORMULATION OF THIS PARTICULAR POLICY.

II. TO ANALYZE THE FAMILY'S INTEGRATION OF CONSERVATION PRACTICES WITHIN THE HOME AS REQUIRED BY THIS PARTICULAR POLICY.

III. TO INVESTIGATE THE IMPACT OF FEDERAL ENERGY POLICIES ON THE RESPONDENT IN TERMS OF AGE, SEX, COMPLETED EDUCATION, NUMBER OF CHILDREN LIVING AT HOME, AND INCOME.

Limitations and Delimitations

Questions chosen in respect to specific policies are delimited in number. These questions include only a minute sector of an infinite set of questions. Similarly delimited are statements of impact and the given natural resource availability of the region.

Several limiting factors restrict the study. The study itself is confined to a school district area, a given population size of parents with dependent children, and to the context of a specific time. Families must assume a hypothetical conception of enacted policies which are not yet in effect. Finally, past literature fails to include impact studies of federal policies on family life, placing limits on the review of literature.

Definition of Terms

1. authority - determines control of power to protect or insure survival.

2. conservation - acting to conserve or keep from destruction or decay; to be responsible for acting; to modify or restrain the environment.

3. consumer - any person who buys goods or services for his own purposes, not resale.

4. crisis - an historical turning point when a decision must be made for better or worse.

5. energy - the capacity for available power.

6. family - a closed or semi-closed system composed of kinship ties which carries out relevant functions.

7. family home - any building that is used for residential occupancy.

8. rate - rate refers to the demanded price when electricity or natural gas is sold.

9. regulated utility - a public utility which has its rates set by a State Regulatory Authority.

10. reserves - deposits of fuels which can be identified and recovered with reasonable costs.

Chapter 2

Explanation of the Policy

Limitations of the energy supply may make Americans more conscious of their duties as citizens to the government or of their patriotic allegiance to the United States. The concluding phrase of the American Pledge of Allegiance is, "one nation, under God, indivisible, with liberty and justice and freedom for all" acquires an austere meaning to citizens as a ritual only, not a pledge by which to live. The practice of duty to one's own government for freedom, justice, and equality separates Americans as a united people from other nations. Yet, the limited supplies of national resources will give the American people a new perception of freedom in the very near future. Tilton describes freedom of the past as "a human need to capture energy at low costs" (1974, p. 86). Freedom to all was defined as the equal ability to obtain luxury and comfort through material means from an abundant energy supply. Evidence of encouraged social use of energy was the fact that those families with highest incomes consumed the most energy by using planes, taxis, and owning many cars etc. (Newman, 1975). The American people as a total energy consumptive unit use 1/3 of total world expenditures for energy annually, although America comprises only 6% of the total world population (Newman, 1975, p. 6). In the past, national policy or lack of policy prompted energy use, for in early American

history energy consumption distinctly divided the poor from the rich. Those considered richest owned labor-saving devices: irons, refrigerators, mixers, sewing machines, toasters, hair dryers etc. before their "less rich" neighbors owned them.

In the future, the external condition of limited supplies will be imposed on all social classes. Justice will be seen as either reward or punishment to participants in the energy crisis as they either waste or conserve energy. Equal opportunity will be given to all social classes to reorganize their family structure according to these external conditions. Freedom will be granted to those participants who conserve because there will be no need for the constraints of an energy policy. Higher costs of energy will then encourage conservation, thus freeing more energy to more people for more time.

The severity of resource scarcity will indicate types of reorganization social classes will need to take within their structure. The poor have always been externally limited by income. Their activities, which are learned through tradition, have become patterned ways to conserve energy. For example, instead of owning cars, the poor have had to use the energy conserving practices of walking or using public transportation. Wit the on set of limited energy resources, the government will justly help the poor through various programs of subsidy. Government aid will equalize justice and permit freedom of opportunity

for energy use by the poor. The middle class are less restricted by the external condition of income than the poor classes. Middle class activities will necessarily be restructured to conserve energy through group effort. For example, the middle class may organize car pools for work and marketing. By organizing car pools, using public transportation, and living in multi-family housing units, energy is conserved, individual costs for energy are lowered, and the entire group benefits. Another way of equalizing freedom and justice is the practice of group competition for solar-heating units as the middle class is given tax benefits by the government. Most of the upper class have not been accustomed to external constraints. Yet, as limitations on energy use increase, energy will cost more. The rich will pay luxury taxes on luxury items such as boats, planes, and heavy cars. These tax restrictions may cause the upper class to maintain goods they now own instead of purchasing newer models. The upper class may be more restricted in travel. With less gas, there will be less available means of travel. Yet, as gas limitation increases, the upper class may redirect their attention to home and community needs for energy-saving practices. Hence, in time, the three terms; equality, freedom, and justice may acquire new meaning. Equality may mean that all socio-economic classes will be externally limited. Although these limitations may cause fear and disorganization, as class groups restructure activities for the purpose of conserving resources, each class will gain some awareness of

problems confronting other groups. All three groups may receive tax benefits for constructing alternative heating systems rather than gas or electricity. All socio-economic classes, as the result of higher cost energy resources, may create enough public concern for ways the community could conserve that eventually more energy will be freed for all, thus allowing "liberty and justice for all".

Need for Energy Policy

Exchange is basic to all societies and to some degree all interpersonal contracts lead to exchange. In addition, exchange has always been transacted between people and within societies for different reasons. For example, exchange in primitive societies was usually transacted in order to receive the highly regarded social values of honor, honesty, bravery, compassion, and generosity. In advanced societies like the United States, however, exchange has usually been transacted in order to obtain profits instead of some other less practical social value (Strauss, 1974, p. 3).

In the 1960's our national leaders in the United States, representing the American people, believed in the supreme value of profit because the energy supply was abundant. In the 1970's those national leaders, representing the citizens, have had to alter their philosophy to reflect the limited supply of useable energy within the U.S. boundaries (Miller, 1976). For instance, oil purchased from the Mediterranean Countries

does not produce profit. Therefore, at meetings between leaders of those countries the values of honesty and conservation mean more than profit. Justice, integrity, and concern for scarcity of raw energy resources leads to a willingness to exchange goods and services at the expense of the profit motive. Indeed, the recent trend toward limited supplies of energy has forced a value change from profit-seeking to the more humane values of sharing and conserving natural resources.

Because exchange is basic in all interpersonal relationships, the institution of the home is where exchange is first encountered. In time, extensive family interaction will focus the meaning of exchange from the family as a microscopic social unit to society as a whole. Reasons for exchange practices within the family structure transfer to society. If exchange does not lead to profit within the family structure, then exchange will lead to the development of other social values. With the onset of limited energy supplies, the value gained from exchange will be determined by authority figures in the family. Those who have the role of decision makers are the family leaders. These leaders can exchange their past identity as energy-abusers, which has created crisis conditions, to an identity as conservers of energy and supporters of conservation policies. According to Lezzle, Heilbronner, Falk, and Ferkiss, this exchange can remove the need for crisis reactions of family members (Ritz and Trites, 1977). By conserving, family members

receive in exchange for the practice of conservation, a social value. Effort is honored by other family members. As families work together for social values, those family units will shape the needs of the future.

History of Energy Policy

Aristotle describes history as the order of facts unique to a particular era. Without a plan or law to remind people of wrong activity, historical order assumes its own direction. In the American past, historical order creates economic opportunities through low cost energy. Thus low cost energy uncontrolled by law became the historical description of order. The American people see no wrong in wasting energy at low costs. History in America reflects this waste through the following facts. In 1900 America, kerosene and candlelight provided reading light. Many Americans split wood for winter storage. Perishable goods were cooled in underground cellars. Housewives cooked by fire. Children walked to school. Motorbuses and trolleys appeared in colonial America by the 1920s-1930s. By 1925, 53% of American homes were wired for electricity. Natural gas came into American homes in the 1930s. While only 181,000 owned cars in 1910, this amount rose to two million by 1920. Now 4/5 of all homeowners own automobiles. In 1910, 10% of the population owned radios, while by 1925, 46% of all Americans owned radios. Radio advertisers in 1922 encouraged Americans to buy electrical

appliances. At that time, 8% owned clothes washers; 80% do today (Newman and Day, 1975). During American colonial history most homes were energy poor. Within sixty years, cheap, available energy cut time and effort cost of rigorous tasks. However, as Karl Marx suggests, the growth of an economy is more predictable than political events. The Arab oil embargo of 1973 was an event which offset the growth of the economy. Similarly, organization of monopoly power of the Organization of Petroleum Countries (OPEC) was an unpredicted event. Yet, because government did not control fossil fuel resources, energy at low cost was yet supplied. Tuve suggests that "when resources are plentiful, scarceness seems remote to the individual or nation" (1976, p. 134). As a result, our society did not foresee a need for energy policy design. Without policy control, Americans became accustomed to energy at low costs as a style of life. As Darmstadter states, "Policy can alter public decisions about energy, yet advice alone will not alter a style of living" (1975, p. 9). Without law and enforcement or benefits offered from the law, energy will not be controlled. On the other hand, Kornhauser suggests that "to dislodge inactivity of policy planning of the past, policy makers may become predisposed to act more and more extremely in time" (1959). As law is imposed and energy prices rise, people become aware of wasteful energy use and energy's value to a style of life.

History of Energy Policy in Government

Energy has become a nationally recognized problem in the United States. President Carter in 1977 established a new cabinet position for energy and this office is evidence of national attention given to depleting resources. Before the creation of this Office, energy offices and programs were described as "gaius petronius" or massive movement with unclear direction. For example, the Federal Energy Administration (FEA) by 1976 had 3,200 employees (Kulter, R. & Vogsly, W., 1976). Originally this organization was a Special Committee of Energy composed of three members: John Erlichman, Henry Kissinger, and George Schultz. Recently, the FEA completed a study called Project Independence by 1985 which "studied" energy independence by 1985, yet offered no clear plan of action. Later, however, some offices were delegated certain directional powers. The Federal Energy Office was given control over oil prices. A Committee on Energy was established to give information to the President. The Federal Power Commission was given power to regulate energy supply. Domestic resources were controlled by Energy Resource and Development. The Office of Conservation and Environment was given power to study the effect of government policy's impact on the environment (The Energy Fact Book, 1976). Finally, in the span of six years, energy limitations have forced the government to discover new methods of energy control which are finalized in the formation of a cabinet position through presidential appointment.

Other historical development in government is the transposition of policy design from that which the government has propagated traditionally. According to Swanson, it has been the conventional practice of government bureaucracy to "use theory to explain reality" (1976, p. 54). In the past ten years, bureaucracy has employed imprecise and presumptive terms to suggest energy shortages. United States citizens could not be definitely confident in respect to the energy supply because of the vague terms used to describe the situation. This hypothetical vagueness did not persuade Americans that the United States may face a future energy crisis because daily lives of citizens did not demand adaptation. Government theory did not activate conservation practices. However, recent federal policies construe practical guidelines which offer incentive to citizens so they can specifically alter their life style. For example, by installing an electrical ignition system in their furnaces, families act in a clear-cut direction toward energy conservation. Another variation in policy device from customary practices of government is the projection of supply impact on the future of the United States. Fisk states, "Policy is poorly conceived given only the circumstances at hand" (1974, p. 115). In the past ten years, the government did not endeavor to regulate energy supply. As a result of the 1973 Mid East conflict, the United States reacted to the specific event by establishing a 55 mile per hour (MPH) speed limit. However, no particular legislation took account of the future energy needs of

Americans so that scientists, industrialists, and citizens objectively station themselves in the very position of future generations. A confirmed number of solar homes, 2.5 million, by the determinate year, 1980, projects goals which are operational for researchers. Another diversion from customary government routine is the exodus from centralized decision making to decentralized decision making. Formerly, energy legislation was a centralized adjudication judged by Congress. As previously mentioned, Congress, acting as a centralized magisterial body, fixed the speed limit at 55 MPH. All Americans must comply with this central ruling. Recent federal policies propound several options for family conservation discretion. Because family groups are small, the determinations will presumably be more workable for that group. Hence, decisions become decentralized, not centralized. This technique of resolution supports Manke's statement: "Even though energy conditions are caused externally, family decisions about energy must be made privately among family members" (1974, p. 40). Finally, one concluding visible transition from government conventions is the transformation from standards to a tax credit system as motivation to diversify. According to Manke, standards are unyielding and actually suffocate incentive to alternate home features for energy preservation. Nevertheless, newborn federal policies inspire incentive to change from gas and electric heating-systems to solar-heating systems. Reward is adduced for conversion and not punishment, if there are not transposi-

tions. In summary, recent federal policies furnish an active base from which families make significant discriminations for themselves and for their posterity.

Present Family Conservation Practices of Energy

Literature lacks comprehensive studies about family conservation practices. Families in past United States history have been encouraged by government to use greater amounts of energy. In 1920, United States citizens consumed 19,768 trillions of British Thermal Units (Btus) for energy needs. In 1973, the amount of American energy consumption increased to 75,561 trillions of Btus. Per capita, energy consumption increased from 185.7 millions of Btus in 1920 to 359.1 millions of Btus in 1973. Before 1973 citizens were not aware of any need to conserve energy. Therefore, literature lacks research into procedures for energy conservation by families. The majority of surveys after 1973 include ways industry can save energy and scientific endeavors to discover different energy resources as means of conserving the American gas and electric supply. In general, the immensity of the problem required technical and far-reaching resolutions. Past history reveals that the institution of the family adapted to societal demands. The institution of the family has not been recognized as a potential force of resource that can significantly affect society's economy itself. In the future, efforts by families to conserve energy may determine the economic and social survival of society.

Inadequate studies about present conservation practices have limited the investigator to one study entitled, "The Energy Policy Project". The study, initiated by the Ford Foundation, includes 1,500 households. Statistical records under the major heading of this portion of literature review are taken directly from this study (Newman and Day, 1975).

The investigator will explain family practice of conserving energy using federal policies as basis of change from conservation practices currently taught in the home. The following list of questions indicate the kinds of energy problems people today must face.

1. What present characteristics of houses prevent energy conservation?
2. What alteration in house structure will families possibly make to conserve energy?
3. What are present home weatherization practices in the United States?
4. What present programs allow citizen participation in energy needs of their community?
5. How will peak hour use of electricity affect present conserving efforts?
6. What income class is immediately profited through peak hour electric rates?
7. Why does pollution require control?
8. What income class is advantaged through pollution control at the present time?

9. What are present family behaviors regarding transportation?

10. What are present appliance-use practices among families?

11. What present appliance features prevent energy conservation?

Fifty-six percent of all personal energy is employed in the home and 44% is used for transportation purposes. Of all home energy, space heating uses 34%. Appliances utilize 15% personal energy. Waterheating employs 8% personal energy. Cooking and refrigeration account for 3% personal energy each (p. 33).

American houses utilize 1/5 of all the personal energy expended in the United States. Because houses demand a significant proportion of American energy, home conservation features can have significant impact on the communities, the cities, and the states in which participants reside. However, certain housing characteristics are more arduous to alter than others and these features should be appraised before new houses are fabricated.

Antecedent families did not comprehend the importance of energy conservation in house construction. Housing trends encouraged intensive utilization of energy. These features were oftentimes burdensome to alter after the house was constructed. One laborious differential to transform is the building's foundation type. Slab foundations are the least energy-conserving because they supply less

protection from the chilled ground than crawl space and basement foundations. Although crawl spaces, especially when insulated, offer more protection than slab foundation, insulated basements offer the most preservation. In 1966, slab foundations were built into three out of ten new one-family houses. In 1971, four out of ten new one-family houses had slab foundations. Only 6% of all new single-family houses had basement foundations in 1973.

Insulated attics above the house also safeguard buildings from the weather. The Federal Energy Administration (FEA) reports this about insulation: "If attic insulation were added to the 15 million single-family homes that need it, we'd save about 8% on your heating oil each winter day" (Tips for Energy Savers, 1977, p. 12). Garages furnish protection which are less operative than insulated attics. Although the addition of attics or garages are more easily alterable by families than house foundations, minute fuel savings would presumably not allow families to erect attics as an investment. The choice to accomodate an attic in houses should be effectuated previous to house construction.

Amount of floor space also accounts for energy consumption. Researchers find that a one story house with 1,500 feet of floor space consumes more energy because more surface area is exposed to the ground than a two-story house with the same amount of floor space. A two-story house would use about 20-25% less energy because that much less surface

is exposed. The verity that reduced floor space will save fuel supply should also be premeditated before the house is fabricated.

Insignificant features such as apertures in the house are similarly formidable to transform after the house is constructed. Numerous windows and/or massive size of windows permit heat escape. This loss can be precluded through the addition of multiglazed windows and doors or through heat absorbing or heat-reflected, glazed and coated windows. Furthermore, metal frames around windows also allow more heat to escape than do wooden window frames.

Space heating now uses 35% of all home energy. Family discretion of the type of heating system they prefer can significantly affect the amount of energy that particular homes uses. Researchers find that electric heating systems consume twice as many Btus as other sytems. This too is untoward to modify after the house fabrication. However, scientists are discovering new ways to transform this amount of energy expenditure. Newman and Day suggest that family owners of massive homes could place several thermostats in various rooms to permit particular heating of those rooms in use.

Most unalterable energy consuming features in houses are the outcome of centralized decisions of contractors rather than the determination of individual families. During the period from 1966-1971 researchers discovered that of all new one-family houses, 42% were those houses constructed by residential builders on their land and sold to

prospective buyers. Only 3% of new one-family houses were built on land according to the owner's specification. Contracted houses on massive land tracts are built to save expenses and time. Consequently, these houses were built with slab foundations and electric heating systems. The selling feature was a central air-conditioning unit which consumes an intensive amount of energy. During this period, slab foundations and electric heating systems were placed in more than 80% of all new one-family houses.

These energy-intensive distinctions in homes are arduous to alter once the house is erected. However, families often make basic preferences which pertain to energy use which the members can alter. For example, most families choose the house type which restricts energy conservation, the single unit house, and most families are not willing to transpose their volitions. Because single detached unit family homes are less protected from the weather than the multi-family living complexes, these houses also take advantage of more energy use. Records from the Bureau of Census testify that 3/4 of all American families in 1973 inhabited single unit houses. In 1920, 2/3 of all Americans populated single unit family houses. The tenor in multi-family living complexes shows a decent from the 1920 figures. Of all Americans, 33% occupied apartment complexes in 1920. In 1973, 20% of all Americans dwelled in multi-family composites. Researchers find that a heightened number of Americans live in mobile homes. In 1973, 4% of all Americans

inhabited mobile homes. Mobile housing offers the least protection from weather because it is detached, poorly insulated, and heated with electricity.

A majority of families can also select the climate they desire to occupy, yet most families do not consider energy conservation as a decisive factor for climate choice. Researchers divide climate into four zones according to the amount of heating degree days used to warm family homes. These territories are the Northeast, the NorthCentral, the South, and the West. Areas which include more heating days may also be areas in which the majority intend to weatherize their homes. For example, residents within a city of 10,000 heating days such as Grand Forks, North Dakota, will be more decisively weatherized than New Orleans residents which report 1,500 heating days. It follows that families may not decide to dwell within warmer regions to save energy. However, families in cold regions may select devices for house transformations to preserve the fuel supply.

Families will more likely adjust home features as members view conservation exercises a practical investment against soaring fuel prices. The alterable features which relate to all households at the present time are weatherization and furnace transformations. Investigators discover that such modifications can be significant if numerous residents participate in a given area. For example, researchers calculate that the city of Boston could save 6 million Btus per established

storm window. Annually New York City could liberate a similar amount of energy and Dallas could preserve 1.7 million Btus per storm window inducted. Investigators claim, in time, the addition of storm windows in a cold region such as Boston could be a worthwhile investment. If the house contains air-conditioning, the window will pay for itself in ten years. Those most in need of storm windows, low income persons, cannot afford the investment at the attendent time. Proposed policies would extend loans to the impoverished, thus enabling them to effectuate this weatherization transition. Low cost storm window installation is also conceivable for low income groups. Researchers calculate that a house with 14 windows can install storm windows by taping plastic tightly to seal from heat departure during cold weather for $10. In addition to storm windows, house insulation may prove an invaluable investment against soaring fuel prices. Investment payoff for insulation is contingent upon analagous programs such as the one instituted by Michigan Public Service. Homes in need are insulated by natural gas compancies for 20% downpayment and a 1% interest rate after three months of no charge. Because of lessened fuel bills, insulation installment could pay for itself in one year. House size, insulation amount, and type all vary insulation requisites.

Another alterable housing feature which may pay off as investment, furnace changes, has been technologically advanced by science, yet the public is unaware of these promotions. The appliances have entered the

market within the past five years. One device, the electrical or mechanical ignition system, would permit the household head to turn off his own pilot light during the summer. Savings of natural gas could be substantial if all household heads turn off their pilot lights during tepid months. For example, researchers find that in the summer of 1972, of those 43.2 million households with gas heat, 31% turned their pilot lights off. Those household heads whose pilot light remained on in all likelihood did not wish to make the incommodious call to the gas company. Some gas companies charge to do the service, which would make the insubstantial savings of $5 totally insignificant. The cost of installing an electrical ignition system demands a long-term investment dependent upon natural gas price inflations. Nonetheless, investigators discover that 1% of all personal energy depleted in households may be preserved through joint effort of turning pilot lights off.

Another energy conserving investment, insulating household water heaters, entails some exertion. Those families who own clotheswashers and/or dishwashers may invest wisely by insulating their water systems. Researchers discover that a 1969 quick recovery electric water heater consumes 52 million Btus. This amount is considerably more than the natural gas 1971 model water heater which uses 32 million Btus. In 1973, 34% of single family homes utilized electricity to heat water and 56% of single family homes used natural gas to heat water. Owners of both varieties of systems could furnish profitable savings for their

families. Owners of electric heating systems may want to consider changing to a natural gas system of heating water for more substantial savings.

Family Participation in Community Conservation

Especially in Montana, community decisions about energy conservation at this present time are critical. National efforts to conserve our natural gas and electric reserve depends on Montana's willingness to exploit her coal resources until solar research is perfected. This insinuates that in Montana by the year 2000, coal production may inflate from 58 million tons per year to 393 million tons per year (Christianson and Clark, 1976). Major community transformations could meddle with the environmental balance. Coal development produces air pollution. Slurry-mining interferes with the supply of water. Strip mining of coal could damage habitat. New railroad transportation systems could divide the land. Future decisions will have impact on family life in Montana. Yet, families as microscopic social units usually do not have representatives or spokesmen to defend the rights of that group. Various represented interest groups do have a spokesman and families are often persuaded to polarize their opinions with one of these groups. As a result, for example, Friends of the Earth speak for the interest of that group. Yet, few heads of households speak totally for the regard of the family.

Certain community programs do provide family participation in community resolutions. In 1974, Henrietta Schilit outlined practical steps for family decision making in community crisis situations. These steps include:

1. Community needs are voiced by some outside community expert. These needs could include: a new type of transportation system within the city, and introduction of new types of solar-heating systems etc.
2. Local newspapers and radio broadcasters inform the community of the needed adaptation.
3. Local families themselves must define the problem and list alternative resolutions.
4. As representatives of the community, the selfappointed families present the problem in a way evident to their community members.
5. The problem's resolution depends on bargaining with final compromise.
6. Goals first established at the outset are evaluated upon the accomplishments at the outcome.

In summary, Schilit says, "As the crisis is acted upon as a collective body, the outcome will offer better solutions" (1976, p. 34).

Peak Hour Electricity

The United States presently uses a "declining block rate" to price electricity. This method of rating electricity establishes lower price rates for the greater amount of electricity consumed. Consequently, Americans who use the most electricity also pay the lowest prices. On the other hand, low income families who use the least electricity pay the highest prices. As energy prices rise, the injustice of this system could significantly reduce low income resistance against price rise. The system is similarly unjust because declining bloc rates do not teach the public energy conservation. Instead, the system encourages free use of electricity.

Several alternatives could replace the declining bloc system. Economists suggest the antithesis of the declining bloc system. Low rates would be paid for the first bloc for electricity and increase in price per more electricity used. Those income groups who use the most electricity would then pay the highest rates of electricity. Although this system justly removes the disadvantage from the poor, industry itself may suffer serious consequences. Another system adopted by France and proven workable in that country is called "peak hour" electrical-rating system. This type of energy rating system is advantageous to several social and income groups. These three: the low income, the metropolis area, and industry are a few among several. The system

encourages higher prices for electricity when electrical demand is greater than at other times. Those who use electricity when the electrical demand of their community is low, pay low rate energy prices. Hence, low income families have means of cutting costs by altering their activity schedules. For example, these families could heat their homes and have meals at odd hours which differ from other family schedules. This alteration in activity may benefit this group more than others because manual labor, such as factory assemblage can independently fit into an odd-hour schedule. Office work often depends on the schedule of the general public. Industry must find benefits to change its schedule to fit the needs of its workers. If industry seeks lower rates at low demand time periods, its schedule will fit the needs of its workers. Finally, the peak hour use of electricity determinately benefits the region. Residents in the expanse of Livingston would not discover the same advantages as residents in the area of New York City. Numerous residents who participate through altered activity cycles would save an ample amount of electricity for the municipality as insurance against the future.

Because of past mediocre planning, peak hour electrical use in megalopolis areas may not be as advantageous as this system can be. For example, new single unit houses constructed on large tracts of land by contractors offer similar energy intensive features. The features of electric heat and central air conditioning do not allow flexible energy

use. If some houses used natural gas in lieu of electricity, the total community could be assisted.

The system could offer other gains in addition to lowered rates for lower electrical peak use. The idea of neighborhood is extended when neighbors have some reason to establish contact (Young, 1973). Communities will discover the need to study the activity cycle patterns. Thus, United States citizens will somewhat become aware of their neighborhood's daily activity. Researchers claim that neighborhoods grow as neighbors establish contact with each other. Although community activity schedules do not insure physical contact, the awareness of one's community may be incentive to develop incremental contact until the community is appreciative of one specific need of one family member in the community.

Present Conservation Practices of Families Regarding Pollution Control

Pollution control is not always affiliated with preserving energy. For example, pollution devices for cars deflate the fuel economy 5% in most automobiles. However, both pollution control and conservation work for the common good of all people. In response to the need to save energy, automobile manufacturers may produce lighter-weight cars. Pollution control devices do not reduce mileage if the car is extremely light weight. Or, scientists may eventuate a more refined fuel to prevent pollution which does not reduce mileage. Therefore, the two

working together can offer more opportunity as a mutual bond, than they would travail as separate entities.

All programs which teach conservation of energy also teach pollution control. By using less energy, citizens pollute less. Yet, there is discrepancy (among industry especially) about what is energy conservation. Industry assumes a similar view as the government; coal resources must save the supply of gas and oil until the United States can perfect solar research.

Most American citizens are cognizant of the detrimental consequences of coal combustion on health. Researchers figure that an industrial plant which functions by burning coal with one percent sulfur content yields 38 pounds of sulfur dioxide per ton of coal. The most lethal of all pollutants, sulfur dioxide, is notably virulent when it combines with particulates. The greatest aggregate of particulate and sulfur dioxide is found near coal-burning industries. Particulate dispersion is principally ample if the coal possesses high ash content. This pollutant impairs the lungs and the heart. Potential explicit damage can result in bronchitis, emphysema, and lung cancer. Damage to the environment is equally profound. Sulfur dioxide released into the atmosphere frequently returns as sulfuric acid (Newman, p. 106).

Low income groups in metropolitan areas must dwell in the sections most polluted, the central cities. Nominal housing and employment opportunities suppress the low income group in the central city.

Because this group actually uses the slightest amount of energy, poverty families are least accountable for the pollution problem.

Pollution can be managed. In 1969, the government enforced regulations in order to diminish pollution. Studies by William Druvant verify that the District of Columbia did reduce pollution through standards for incinerators. In 1969, only 6% of the population of the District of Columbia were below the 1969 standards. By 1973 pollution had been reduced 2,444% in the District of Columbia. Low income groups relished the pollution-free atmosphere high income groups likewise found pleasurable (Newman, Chapter 16).

The penalties of pollution are costly. In 1970, $12.3 billion dollars were expended for pollution control. Of the figure, $4.6 billion were health forfeits. Property penalties accounted for $5.8 billion dollars of the quotation. Material damage accounts for $1.7 billion. Crop damage accounts for $2 billion dollars (Newman).

The Federal government would manipulate the pollution of utility industry by distributing costs upon the entirety of citizens within a given territory. In order to control pollution, utility industry could augment rates to those it serves. Because utilities are regulated monopolies, utility industry would be compelled to discuss new ways to master pollution in place of expanding its size. The policy also delegates power to industry of utilities to raise price rates for that one particular reason. Absence of the policy may prevent stock holder

investment in the self-regulated utility because dividend returns would be low.

A common misconception is that the natural world propounds cost-free service. Americans must realize that in order to have pure air, they must pay for it.

If consumers do not pay for clean air, then it is given no value measurable through monetary costs. If rates go up as a result of pollution control, consumers could take an active role in discussing low cost pollution equipment which must meet federal standards. Furthermore, citizens who conceive that the fuel bill is partially utilized for health advantages could oversee utility industry activities.

In Montana, the land has been free of pollution and exploitation of most types of industry. Most citizens are not aware of industrial costs. The costs of all types of industry in this spacious and sparsely populated land are extremely high. Montanans must substantially value their health and their environment.

Literature lacks reviews about the practice of conservation and the consequence of published rate schedules. Studies are also deficient in respect to the exercise of conservation as the product of tax credit for solar and wind heating systems.

Transportation and Family Conservation Practices

The automobile symbolizes the vehicle which brought prosperity to America. This prosperous economic innovation did transform the American

culture. In lieu of an agriculturally based economy, America became industrialized. This transition has had impact upon American families, American communities, and national unity in the United States. In fact, transportation itself has created unprecedented international dependencies which are imitated in family life. Milton Yinger states that this turning point in economies is "from subsistence to complex interdependent processes that bind several nations together" (Edwards, 1969, p. 271). According to Yinger, families of the past valued traditional practices and "the substance which could insure continuity to generations" (Edwards, 1969, p. 271). Sons of farmers considered other options beside farming as possible vocational alternatives. Fifty years after the automobile became prevalent in the United States, Goode says this about family behavior, "We are witnessing a remarkable phenomenon; the development of similar family behavior and values among much of the world's population" (Edwards, 1969, p. 380).

Conservation of gasoline had not been exercised by families to any great extent until after 1973. After that time, Federal law restricted speed to 55 miles per hour (MPH), and gasoline sale on Sundays, which forced families to conserve. Yet, various income levels rely on the automobile for status. Those most affluent use the most gasoline. Researchers estimate that the prosperous use five times as much gasoline as low income families. Because there is great discrepancy among income groups according to gasoline consumption, transportation policy will be

explained more completely according to demographic factors that influence conservation practices.

Tax on Oil and Natural Gas and Present Family Conservation Practices

Researchers estimate that 15% of all personal energy is used by appliances. Modernized designs of appliances have increased the amount of energy they consume. All other major appliances, except the stove, utilize more energy than they consumed in 1950. Regular refrigerators and automatic clothes washers consumed much more fuel than those appliances utilized in 1950. Regular refrigerators mobilize 59% more fuel and regular freezers employ 39% more fuel. Two conclusions for the enhanced fuel consumption are convenience features and massive appliances. For example, the elementary 1950 home cabinet freezer using 620 kilowatt hours per year was superceded by the 1969 freezer using 860 kilowatt hours per year. Similarly, the 1950 simple wringer washer which used 45 kilowatt hours per year was supplanted by the automatic clothes washer which used 103 kilowatt hours per year (Newman, p. 58).

Table 1 and 2 signify the trend in natural gas and electrical use by various appliances. These tables are followed by a list of annual energy requirements of small appliances.

TABLE 1

Trend in Estimated Annual Use of Natural Gas by Appliance, Selected Years, 1960-1971 (therms)

Appliance	1960	1966	1971	Percent Change 1960-71
Range				
Apartment	a	74	88	19
House	100	106	105	5
Refrigerator	120	a	a	a
Clothes dryer				
Gas pilot	85	90	75	-12
Electric pilot	45	52	60	33
Gas light	a	183	181	-1

a = Not available

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