

Public Perceptions and Preferences on Energy Policy

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This paper presents selected results from a secondary analysis of public opinion surveys of national probability samples and state/local samples relevant to energy policy choices. The data base includes some 2000 items from nearly 600 separate national surveys conducted between 1979 and 1991. Verbatim trend items have been traced over time, permitting trend analysis. Patterns of findings in other survey items have been identified. This analysis permits identification of changes in public opinion relative to energy during the past 10-15 years with confidence that results are based on a pattern of results, not simply results from a single survey.

The paper addresses the following questions:

- (1) How has the public's definition of the energy situation changed over the last 15 years? This includes perceived severity of the energy problem, its significance relative to other problems, and its perceived impacts.
- (2) What are the public's preferences with respect to energy supply and demand alternatives?
- (3) What are the public's perceptions with respect to the link between energy consumption and environmental problems such as global climate change?
- (4) What actions has the public reported to increase residential efficiency and use of renewables?
- (5) What are the public's policy preferences with respect to energy use in buildings? Any changes in perspective are discussed.

The paper updates a major review of public opinion about energy published in the late 1970s. Significantly more surveys have been included in this comprehensive new review.

Introduction

In the years since the Arab oil embargo (1973-74), the public has been confronted with a roller coaster of energy events. On the positive side, after the 1973-80 period of "energy crisis," much of the public seemed reassured by the Reagan administration's emphasis on energy production, falling oil and gasoline prices coupled with plentiful supplies, and stabilizing utility bills following deregulation of natural gas prices. More troubling energy-related events, however, included Three Mile Island (3/28/79), Chernobyl (4/26/86), the Valdez oil spill (3/24/89), the onset of Desert Shield (8/6/90), and the Gulf War (1/17-2/27/91). Policymakers and economists have long argued that the public would lose interest in energy efficiency and the use of renewable energy technologies as the price of oil stabilized at record low levels (in real dollars) and as utility costs leveled out after dramatic increases in the late 1970s. And some evidence exists that earlier gains in energy conservation in buildings

and transportation are being eroded as consumers seemed to relax their vigilance toward the energy situation. In the past few years, scientists have stressed the relationship between energy production (particularly the burning of fossil fuels) and potentially serious global change, such as acid rain, stratospheric ozone depletion, and the greenhouse effect. Yet, the National Energy Strategy, released in February 1991, called for both energy supply and demand side actions, and it remained unclear to what extent the public made any connection between energy decisions¹ and environmental degradation.

The National Renewable Energy Laboratory (NREL/ formerly the Solar Energy Research Institute) published a major review of public opinion about energy in 1979 and updated it in 1980 [1; 2].² NREL is updating these reviews to generate information that can help policy-makers decide among energy efficiency and renewable

energy policy options [58]. Using the type of information in this review, the congruence of policy options with public preferences can be assessed [3]. Understanding perceptions about efficiency and renewable technologies, policies, and programs forms a framework against which policies to encourage technology adoption can be evaluated. Generating information on perceived risk relative to energy supply alternatives is pertinent to fuel cycle analysis. Factors affecting consumer decision making with respect to energy-related purchases and lifestyle behaviors can increase the accuracy of market penetration estimates and aid in modeling the potential for efficiency and renewable technologies. And whether energy behavior and environmental problems are linked in the public mind is important information for both public and private-sector policymakers seeking to posture policy decisions accurately in relation to the public will.

The paper presents selected findings on the public's definition of the energy situation, including perceived severity and salience of the nation's energy problem and expectations for the future.³ The public's preferences with respect to energy supply and demand alternatives are traced over time. Perception of the link between energy consumption and environmental problems such as global climate change is described. And finally, the public's self-reported behavior and policy preferences with respect to building energy technologies are discussed.

Method and Limitations

This updated review and analysis of public opinion on energy relies on more data than had been available earlier. On-line search capabilities simplified the basic procedure. In 1990, the Roper Organization developed an on-line data base (Public Opinion On-Line) to include contents of public opinion polls back to 1940. Indexed by search descriptors, this data base is available through the DIALOG on-line data base service. On-line searches were performed for items relating to energy, environment, transportation, buildings, and alternative fuels, as well as for specific policy alternatives, such as energy efficient mortgages. Searches were focused on the period 1979 through 1991.⁴

Simultaneously, researchers contacted the 50 state energy offices asking for energy-related surveys conducted in their states and localities over the past decade. In addition, colleagues at the U.S. Department of Energy (DOE) and NREL supplied studies of which they were aware. Most of the data base is comprised of national probability samples of adults in the United States conducted by major polling organizations such as Gallup, Roper, Harris, and Yankelovich/Clancy/Shulman. Another 60 studies involved

sampling of adults or other groups at the state or local level; however, only some of these studies were incorporated into the analysis when this paper was prepared. The methodological quality of the national surveys included was reviewed and judged to be sufficient to warrant drawing conclusions from the body of data.⁵

Researchers sorted items into end-use sector categories, grouping together items pertaining to the four energy end-use sectors--buildings, transportation, utilities, and industry (including solid waste management)--and then sorting by policy type, fuel type, or technology. Where data were available, these categories were further sorted into questions relevant to decision factors, knowledge and information, and behavioral intention and action. Other types of items were sorted into such categories as environment and the Gulf War. Items were arranged in reverse chronological order. Verbatim trend items⁶ were identified and grouped together to permit trend analysis. Each survey in the study was assigned a study number, which was recorded on a numerical list of surveys. Appendix A lists surveys included in this paper. This list identifies the author or polling organization, sponsor, population sampled, ending date of data collection, type of sample, sample size, and release date. At the end of the sorting process, which took several months, the entire body of data was sorted into usable categories ready to be analyzed.

Any secondary analysis⁷ of survey data is limited by the questions polling organizations included in their opinion surveys. Gaps in the analysis can occur because questions were not asked. In this paper, items exemplary of the major points are included that best represent the direction of public opinion in each topical area.

Selected Findings

Definition of the Energy Situation

Most people in the late 1970s did not believe there was an energy "crisis," but instead perceived a serious national energy problem. Inflation, unemployment, and crime were grave concerns at that time. The nation's energy problem was considered of middling importance, while majorities foresaw future energy shortages and rising energy costs. Many consumers believed the energy situation had been "contrived" by oil companies for their own benefit.

A number of surveys since then have asked respondents to gauge the seriousness of the nation's energy situation. Figure 1 presents data on the perceived severity of the U.S. energy situation, with data beginning in February 1979 and ending in February 1991. While item wording

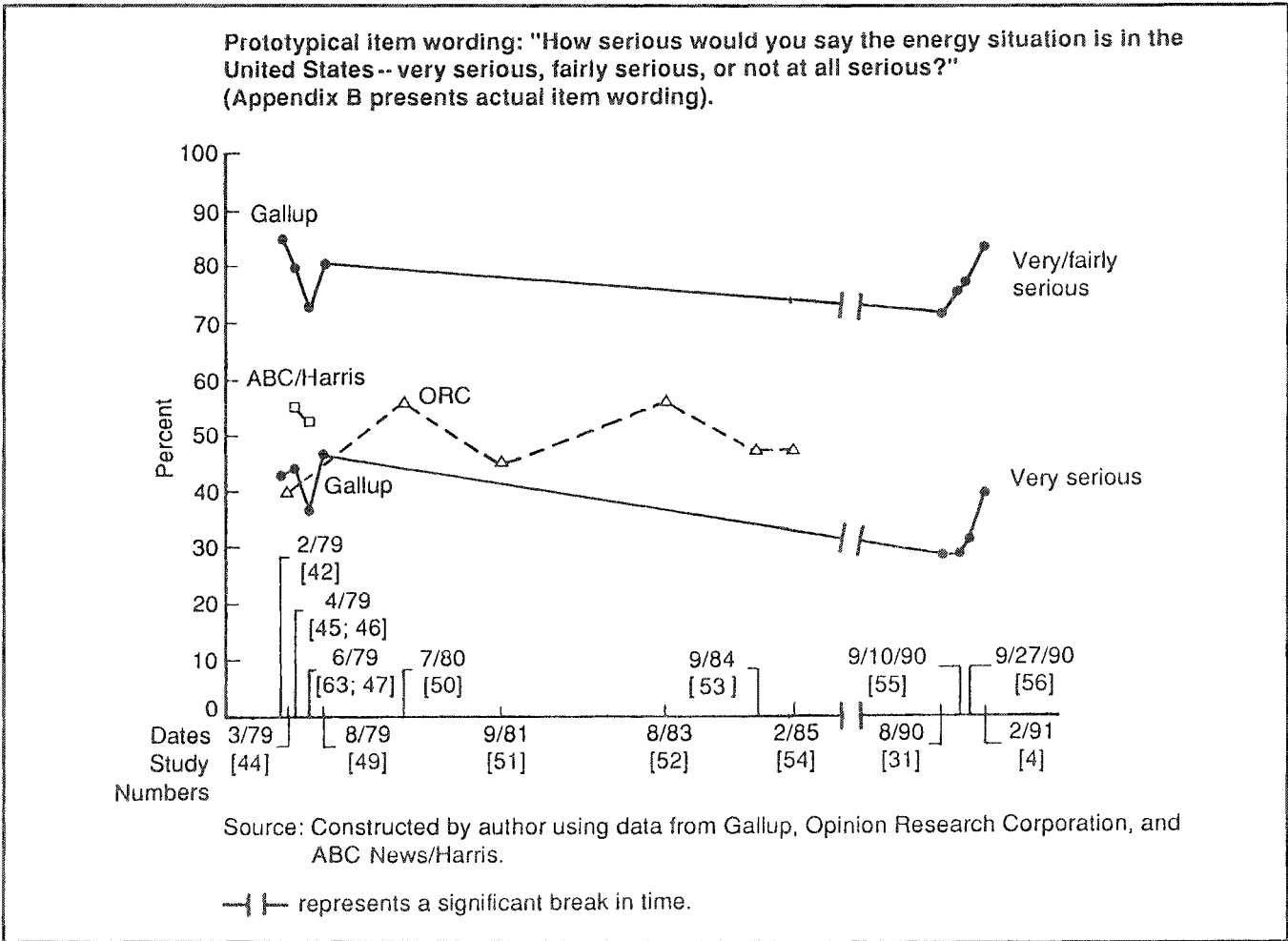


Figure 1. Trends in Perceived Severity of the U.S. Energy Situation

was not identical for each of these items, it was similar enough to use the results to assess opinion over time.

The surprising feature of this trend is its consistency, and the fact that perceived seriousness has been increasing. Concern was highest in 1979, 1983, and 1991. However, those expressing the view that the energy situation is "very serious," "somewhat serious," or "fairly serious," remained at high levels ($\geq 75\%$) throughout the period under study. In 1991, toward the end of the Gulf War, Gallup reported that 84% judged the energy situation as "very serious" or "fairly serious" [4]. The energy "roller coaster" seems to cause people to retain caution in their assessment of the seriousness of the energy situation. This caution is in evidence despite low gasoline and oil prices, stable utility costs, and plentiful supplies.

How confident are the public about future energy security? The pattern emerging from the data is that people are

more confident about the adequacy of energy supplies in the relatively short term, and less confident about energy security 20 to 50 years out. Confidence in near-term energy security has been increasing. While half of respondents in 1979 thought that a severe energy shortage was "very likely" within a year, this dropped to 19% in 1989. Proportions indicating that a severe energy shortage was "very likely" or "somewhat likely" dropped from 79% to 51% between 1979 and 1989 [5; 6; 7; 8; 9; 10; 11; 12]. The proportion increased 17 points, however, between March 1989 and September 1990. To speculate, this may have occurred because of developments at that time in the Persian Gulf.

Conviction that energy will continue to be a long-range problem is increasing. When Research/Strategy/ Management (RSM) asked: "Some people say the 'energy crisis' like the United States experienced in the 1970s--things like gasoline shortages, sharply higher prices, and oil supply

disruptions--will not happen again. Other people say we will once again have periods of energy crisis, just as we did in the 1970s. Which view is closer to your own?" [19; 60]. In 1981, 60% said it will happen again; in 1988 and in 1990, two-thirds said it will happen again. The likelihood that the public will perceive a serious future energy problem increases as the time lengthens.

The ranking of national problems has changed somewhat in the last decade. Emerging as the most significant problems currently appear to be: (1) the state of the U.S. and local economies (including the federal deficit, government spending, unemployment, poverty, and homelessness); (2) the state of education in the country, particularly primary and secondary education; (3) crime, drugs, and the association between the two; (4) health care and health

care costs; and (5) the environment. Energy problems seem to have fallen off the scope in terms of salience. The data to support this are relatively numerous [18; 19; 21; 25; 26; 27; 28].

Preferred Energy Supply and Demand Alternatives

Most of the public has selected renewable energy technologies and energy efficiency as the most preferred or most realistic forms of energy, and this has been true for the past 15 years. Figure 2 documents the trend in responses to Roper's item: "Which of these energy sources do you think are realistically possible to use for replacing foreign oil during the next five years?" [5; 6; 7; 8; 9; 10; 11; 12; 29; 57]. Multiple responses were

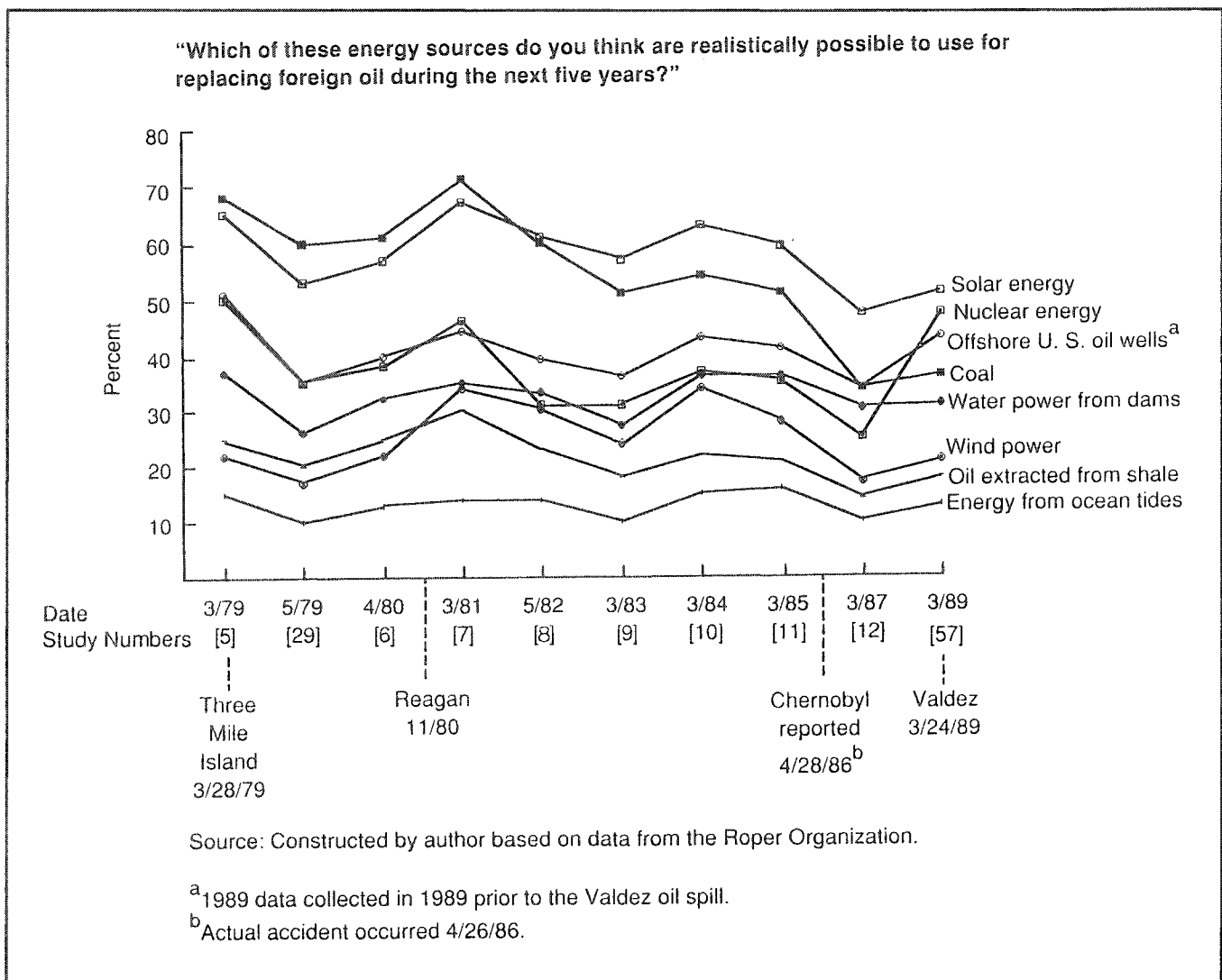


Figure 2. Preferred Energy Supply Alternatives 1979 - 1989

possible. In 1979, 68% selected coal, followed by solar energy (65%), offshore U.S. oil wells (51%), and nuclear energy (50%). By March 1982, solar energy (61%) passed coal (60%) in being selected a realistic source. The last data in this sequence were collected in March 1989, prior to the Gulf War. Solar energy remained at the top of the list (51%) followed by nuclear energy (47%), offshore U.S. oil wells (43%), hydropower (31%), and coal (36%). To speculate, the increase in selection of nuclear energy might be a function of concern about greenhouse gas emissions from fossil fuels. However, other recent data on nuclear energy suggest that the majority of the public considers nuclear energy to be a high-risk technology and does not favor its use [58]. Those results would suggest that the finding on nuclear energy shown in Figure 2 could be an anomaly. A more definitive reading of comparative public preferences on nuclear energy in the context of global warming awaits future poll data.

In March 1987, when a different item asked which energy source a half-sample of respondents⁸ would like to see developed to "replace foreign oil five years from now," 54% selected solar energy, 30% selected hydropower, 22% selected wind, and 16% energy from ocean tides, all of which are renewable energy technologies [12]. Unfortunately, Roper did not include energy efficiency among the response options. However, another survey found that in 1990, 75% of the public selected renewables and 67% selected energy conservation as the preferred areas for R&D funding. By comparison, about a quarter selected nuclear energy and another quarter selected fossil fuels [19].

Taken together, this and other evidence shows that, when cost or price information is not included, renewable energy and energy efficiency have been the favored energy alternatives since 1977 and that they remain so today. The data appear to show a decrease in public preference for fossil fuels (except natural gas) and nuclear energy, except for the 1989 data shown in Figure 2. This would be consistent with increasing environmental concern (greenhouse effect, oil spills, nuclear accidents). This preference for renewables and efficiency is a persistent trend over the past 15 years. Adoption of conservation and renewables in residential buildings may have slowed, but it is not due to changes in public preference for these energy options relative to other options.

Energy and Environmental Concerns

Polling data were gathered in 1990 on the public's greatest environmental concerns. Consistently, air and water pollution, exposure to hazardous and toxic wastes, waste disposal, and the greenhouse effect are the public's central

environmental concerns. Table 1 shows the results from a March 1990 Roper poll [20]. The concerns mentioned most frequently, among 29 identified concerns, included hazardous waste sites, water pollution, occupational exposure to toxic chemicals, oil spills, destruction of the ozone layer, and nuclear power plant accidents. The top concerns were hazardous waste sites, water pollution, toxic chemicals, and oil spills. The greenhouse effect was 19th on the list with 48%, while acid rain was 22nd, with 40% identifying it as "very serious." Indoor air pollution was 26th, with 22% mentioning it as a "very serious" concern.

Table 1. Top Environmental Concerns (March 1990)

Problem	Percent
Active hazardous waste sites	67
Abandoned hazardous waste sites	65
Water pollution from industrial wastes	63
Occupational exposure to toxic chemicals	63
Oil spills	60
Destruction of the ozone layer	60
Nuclear power plant accidents	60
Industrial accidents releasing pollutants	58
Radiation from radioactive wastes	58
Air pollution from factories	56
Leaking underground storage tanks	55
Coastal water contamination	54
Solid waste and litter	53
Pesticide risk to farm workers	52
Water pollution from agricultural runoff	51
Water pollution from sewage plants	50
Air pollution from vehicles	50
Pesticide residues in foods	49
Greenhouse effect	48
Drinking water contamination	46
Destruction of wetlands	42
Acid rain	40
Water pollution from city runoff	35
Nonhazardous waste sites	31
Biotechnology	30
Indoor air pollution	22
Radiation from x-rays	21
Radon in homes	17
Radiation from microwave ovens	13

Source: Roper cited in *Statistical Record of the Environment* p. 720. [20]

Cambridge Reports identified similar concerns in a national poll taken in September 1990 [21]. When

respondents were asked to identify the single most important environmental concern, air pollution was the most frequently mentioned response at 13%. Other top problems were water pollution (8%), just "pollution" (7%),⁹ and the greenhouse effect (7%). Cambridge Research also asked a detailed question asking respondents to rank "potential threats to the overall quality of the environment: from "no threat at all" to "a large threat" [21]. Table 2 presents the results. The most threatening concerns--selected by more than half of the sample--were water pollution, air pollution, high-level nuclear waste, ozone depletion, loss of wilderness areas, nonrecyclable packaging, landfills, oil spills, chemical plants, and acid rain.

An NBC News/*Wall Street Journal* survey repeated a 1990 item verbatim in 1991: "Which one of the following environmental problems do you think is the most serious facing the country today? Which one is the next most important?" [22; 23]. Table 3 summarizes the results. Hazardous waste, air pollution, solid waste, and water pollution were the problems mentioned most frequently. Concerns that appeared to be increasing were solid waste, water pollution, global warming, and the perspective that all of the environmental concerns were equally important.

When asked whether they had ever heard of global warming and the greenhouse effect in December 1990, 86% of a national sample said that they had [19]. The proportion of a national sample of residential electricity users in

Table 2. Perceived Threats to Environmental Quality

"I am going to read you a list of potential threats to the overall quality of the environment. Please use any number from 1 to 7, where 1 means "no threat at all" and 7 means "a large threat" to tell me how much you think each problem threatens the overall quality of the environment. The more you think the problem threatens overall environmental quality, the higher the number you would give it." (September, 1990)

Environmental Threat	% Selecting 6-7 (large threat)	Mean
The pollution of our rivers, lakes, and oceans	75	6.1
Air pollution	71	5.9
High-level nuclear waste	66	5.9
Depletion of the ozone layers in the atmosphere	57	5.6
Air pollution caused by cars and trucks	55	5.5
Loss of wilderness areas	55	5.4
The use of packaging and other materials that cannot be recycled	54	5.5
The disposal of solid waste in a landfill	54	5.5
Oil spills	54	5.4
Chemical plants	53	5.4
Acid rain	50	5.4
Using additives and pesticides in food production	46	5.2
Low-level nuclear waste	45	5.1
Threats to endangered animal species	45	5.0
Global warming from the greenhouse effect	42	5.1
Oil refineries	24	4.4
Electricity generating plants	16	3.9
Electric and magnetic fields from electrical transmission lines	10	3.5
Electric and magnetic fields from household appliances	7	2.9

Source: Constructed by author using data from Cambridge Reports/Research International [21].

Table 3. Perceived Severity of Environmental Problems

"Which one of the following environmental problems do you think is the most serious facing the country today?"

Category	Most Serious		Second Most Serious		Total "Most" and "Second Most" Serious	
	1990	1991	1990	1991	1990	1991
Hazardous or toxic waste	26%	21	15	20	41	41
Air pollution	17	13	23	21	40	34
Solid waste and garbage	16	16	14	16	30	32
Water pollution	15	12	21	19	31	36
Destruction of our natural resources	--	15	--	12	--	27
Destruction of our natural areas	7	--	7	--	14	--
Global warming	7	9	6	11	13	20
All equally important	11	13	--	--	11	13
Totals	100	100	100	100	200	200

Source: Constructed by author using data from Hart and Teeter Research Companies [22; 23].

September 1990 seeing various energy sources as "no environmental threat at all" were as follows [21]: solar energy (52%), hydropower (32%), natural gas (11%), nuclear energy (6%), coal (4%), and oil (3%). This is the most recent data on this point.

Within the general area of energy-environment trade-offs, in July 1991 an NBC News/Wall Street Journal survey asked a national sample: "Some steps to reduce our dependence on foreign energy sources also have some harmful effects on the environment. Please tell me whether you think this action would or would not be worth it to reduce our dependence on foreign energy sources" [22]. Table 4 shows the results. Majority opinion on these options was divided, except that a sizable majority (85%) said vehicle fuel efficiency was worth higher costs.

When asked whether they would favor or oppose as part of a national energy strategy a policy of "increasing use of coal even if this caused some environmental damage," 74% said they were opposed [19].

Environment Opinion Study, Inc. conducted a survey in 1990 that asked: "Fuels like oil and coal not only pollute the air but also lead to a build-up of carbon dioxide in the

Table 4. Dependence on Foreign Oil versus Environment Trade-offs

Trade-off	% Saying "worth it"
Require cars to be more fuel-efficient and pollute less, even if it makes them more expensive	85
Delay new restrictions of the amount of pollution that can be given off by coal-burning power plants	52
Allow more exploration and development in protected wilderness areas	51
Require cars to be more fuel-efficient and pollute less, even if this means they will be smaller and less safe	51
Loosen restrictions on offshore oil drilling	43

Source: NBC News/The Wall Street Journal [22].

atmosphere, which causes global warming. One proposal for reducing this build-up is to impose a special tax on factories and powerplants that produce carbon dioxide emissions. Do you strongly favor, somewhat favor, somewhat oppose, or strongly oppose this proposal to enact a special tax on carbon dioxide?" [24]. The total favoring a carbon tax was 70% (36% strongly), while 25% were opposed.

Some of these choices favor environmental values, while others favor economic values. More analysis will be done to discern the pattern of public preferences in terms of energy-environment trade-offs [58].

Buildings Conservation Behavioral Intention and Action

No solid trend data using verbatim items replicated over time were available on self-reported conservation behavior. This suggests that polling organizations themselves and poll sponsors had decided that public opinion on energy efficiency was not of enough importance to continue to collect data consistently on it. The data available are based on various questions asked of national and local samples selected in different ways. Evidence on this is thus approximate, at best.

The amount of conservation behavior being practiced, as estimated through self-report--either through lifestyle or through investments in retrofits--appeared to increase in the late 1970s to the mid-1980s and has been decreasing recently. The earlier review reported that most people said they were practicing some form of residential energy conservation [64]. The practices mentioned most frequently were those that were more convenient and less costly, such as turning down the thermostat and turning off lights and appliances when not in use.

Taken together, data from national and state samples seem to indicate a pattern in which somewhat larger (though still low) proportions of the public during the early to mid-1980s invested in somewhat more costly items that would reduce a homes' use of utility-supplied energy than in the late 1970s. These items ranged from attic insulation to energy-efficient appliances, and even solar energy systems. Mentioned most frequently in these studies were the relatively less expensive measures--insulation, caulking, weatherstripping, water heater wrapping, window screening devices, and clock thermostats [1; 30; 31; 32; 33; 34; 35; 36; 37; 38].

In 1990, however, self-reported conservation actions and investments were minimal. When Gallup asked a national sample: "Do you happen to be doing anything to reduce

your use of energy--that is, your use of gasoline, electricity, or natural gas?," more than one-third reported that they were not doing anything at all [31]. Actions being taken were the easiest to do (turning off lights and turning down the thermostat), just as they were in the seventies. Another survey by NBC News/*Wall Street Journal* found that, when asked whether they took steps to reduce the use of electricity and gas in their homes, 68% said "regularly" and 22% said "occasionally." Only 5% said "never" [23]. In March 1990, Gordon S. Black/*USA Today* asked: "How much does your household cut back on heat in the winter "or air conditioning in the summer to conserve energy?" [39]. More than half (52%) said they cut back "somewhat"; 30% said "a great deal," and 5% said "not at all." Clearly, the urgency to engage in conservation has decreased markedly, at least as measured by the poll data on conservation behavior.

To speculate, some of this decline could be attributed to the fact that many households had already undertaken energy efficiency measures. These people would not be repeatedly reporting installation of insulation, for example, in response to surveys assessing conservation behavior. Some evidence for this can be found in the data on household energy consumption. Morrison (1992) reported that, since 1980, per household energy consumption has been reduced by 16.7%; concomitantly, the number of households grew by 13.5% [59]. Total U.S. household energy use was 10.9 quads¹⁰ in 1979 and 10.2 quads in 1990, a 6.4% decrease, despite the increase in number of households [59].

Some evidence suggests that the public may be willing to increase conservation activity once again, should energy shortages occur. In September 1990, NBC News/*Wall Street Journal* asked a national sample: "Let me read you a list of ways people conserve energy. For each one, please tell me if you are likely or unlikely to try to conserve in this way if there is an energy shortage" [40]. Three-quarters of the sample said they were likely to use less heating fuel and air conditioning, while 62% said they would use appliances less.

Nevertheless, the voluntary practice of energy efficiency and investment in energy-conserving features and solar energy systems seems to have declined. The phaseout of the energy conservation and solar energy tax credits has no doubt contributed to this situation, as have relatively low energy prices. However, these factors appear to be only part of the story. The other part appears to be a public perception of institutionalized inefficiency.

Reasons to engage in energy efficiency practices and to invest in efficiency and renewables have not been

systematically studied at the national level for several years. The smattering of poll data available suggests a perception of relatively unimportant reasons for conserving. For example, a 1990 national poll found that majorities said investment in efficiency and better energy use habits would save less than 10% of their utility bills [19]. Barriers to household efficiency, however, seem significant. A 1989 poll found that pluralities said "business and industry priorities" (38%) and "decisions made by government" (29%) were "the biggest obstacle to the country using energy more efficiently" [61]. Other major barriers are the up-front cost of energy improvements and what might be termed the "hassle factor" in arranging for energy improvements [19, 35, 30, 62]. Responses to these and other polls seem to indicate that individuals find it costly and time consuming to overcome institutional obstacles to efficient household energy use.

Buildings Policy Preferences

A number of items in recent surveys have queried people on their attitudes toward buildings-related policies. Results of these touch on actions the federal government could take to foster buildings energy efficiency. In December 1990, RSM and Greenberg/Lake, The Analysis Group asked a national sample:¹¹ "Let me read you just a few more policies the government might try as part of a national energy strategy for the future. For each one please tell me if you would strongly favor, somewhat favor, somewhat oppose or strongly oppose it as part of a national energy policy" [19]. Table 5 shows the results.

The National Energy Strategy (NES), issued in February 1991 [41], recommended an initiative to develop the broader application of mortgage financing incentives for energy improvements in housing. Clearly, such a policy to develop energy-efficient mortgages is congruent with national opinion. Although the NES did not call for the conservation and solar tax credits to be reinstated, such a policy would also likely find widespread public acceptability.

Cambridge Reports conducted a national survey on utilities and the environment in September 1990. Making the energy-environment connection for its sample, it asked: "Next I am going to read you a list of several things electric companies could do to protect and improve the environment. While all of these things may be important, I'd like you to tell me exactly how important each is to you personally. Please use any number from 1 to 7, where 1 means one of the less important and 7 means one of the very most important things electric companies could do to protect and improve the environment" [21]. A number of the options listed pertain to buildings efficiency. Table 6 shows those options along with the mean responses.

The actions perceived as most important for utilities to take relevant to buildings and appliances were chlorofluorocarbon (CFC) phaseout, promoting energy-efficient building codes, and providing information on weatherization and other low-cost measures. Among these options, load control devices were seen as less important.

Table 5. National Energy Strategy Policy Preferences for Buildings

<u>Item</u>	<u>Strongly Favor</u>	<u>Somewhat Favor</u>	<u>Total of "Strongly" and "Somewhat" Favor</u>
Requiring new homes financed by FHA and VA mortgages to meet federal standards for energy efficiency ^a	68%	23%	91
Re-establishing federal tax credits for consumers who use renewable energy sources such as solar or wind power	54	32	86

Source: Constructed by author using data from Research/Strategy/Management and Greenberg/Lake, The Analysis Group [19].

^a Note: Of 19 energy policy options presented, this one was favored by the highest proportion of respondents.

Table 6. The Most Important Buildings Utility Actions to Protect and Improve the Environment

<u>Utility Action</u>	<u>Mean</u>	<u>Proportion Responding 1-2 (less important)</u>	<u>Proportion Responding 6-7 (most important)</u>
Phasing out use of CFCs and other chemicals that can harm the ozone layer	6.0	5	73
Promoting building codes that require proper insulation and other energy-efficiency measures	6.0	4	72
Providing information about weatherization and other low-cost measures that can improve the energy-efficiency of homes	5.8	3	64
Promoting use of energy-efficient lighting	5.7	5	62
Offering rebates or loans to help customers buy energy-efficient heating and cooling systems or other major appliances	5.7	5	62
Developing electric "smart" houses that allow customers to monitor and automatically regulate their use of household appliances	5.5	7	55
Promoting electric heat pumps to replace less efficient heating and cooling systems	5.4	6	53
Directly controlling customers' major appliances to reduce demand for electricity at certain times	4.2	26	28

Source: Constructed by author using data from Cambridge Reports [21].

In 1987, Gallup/League of Women Voters asked a sample of public interest leaders and a sample of energy industry leaders about whether the government should take a more active role in energy policy or whether energy supplies should be determined by the marketplace [42]. Four policies relevant to buildings were included in this survey, and virtually all of the public interest leaders and majorities of the industry leaders supported them. These were, with the proportions of, first public interest, and second industry, leaders supporting them:

- Develop more incentives for energy-efficient buildings and homes (99%, 83%)
- Increase R&D funding for energy-efficient technologies (100%, 94%)

- Educate the public about energy conservation (100%, 94%)
- Increase R&D funding for alternative, renewable energy resources (98%, 64%).

These policy actions are congruent with public preferences to implement financial incentives, such as the solar and conservation tax credits and energy-efficient mortgages.

Conclusions

The public has continued to view the energy situation as serious, although energy is not currently seen as a highly salient national problem. The public has exhibited

preferences for renewables and energy efficiency for the past 15 years, at least in response to polls. Its major environmental concerns include air and water pollution, exposure to hazardous wastes, waste disposal, and global warming. Preliminary evidence suggests a tug-of-war in the public's mind between energy-environment trade-offs; however, some evidence exists that preferences for policy choices favoring the environment over energy supply development are increasing. Financial incentives and regulation to encourage energy efficiency and use of renewables are residential buildings policy options that the public clearly favors.

Energy efficiency practice in U.S. residences may not be as bad off as these results might suggest. Household energy consumption has continued to decline since 1980. Many households obviously took action to retrofit their dwellings, at least up to a point. A good many retrofits have already been accomplished. To speculate, further retrofits might not seem as cost-effective to newer home occupants, particularly with current level utility costs. In the meantime, building practice has continuously improved the operating efficiency of new housing.

Voluntary residential energy conservation practice and investment seem to have declined in the past few years, despite the continued persistence of concern about the energy situation and public preferences for energy efficiency and renewables. The public is supportive; institutional barriers may be hindering more widespread household involvement in efficiency practice and investment. "Institutionalized inefficiency" may be a significant obstacle to more cost-effective adoption of efficiency and renewable measures. If this is true, we should be looking for ways to make efficiency and the use of renewables as easy as or easier for consumers to use than inefficiency and the use of utility-supplied energy from conventional sources.

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Endnotes

1. Energy decisions at all levels, such as by individuals, households, utility companies, builders, automobile manufacturers, oil companies, government entities, and other private and public sector organizations.
2. The 1992 ACEEE Summer Study management gave the author permission to use proprietary names in this paper. They also gave permission to use a numbered citation system because of the large number of references to surveys.
3. The findings selected were those thought to interest the Summer Study audience. They represent the patterns of results from the full array of national survey available on these points. Data are not omitted that would change the results. Reference 58 presents the data in full on these and many other topics.
4. The survey organizations did not include all of their most recent data in the data base. Researchers used libraries and contacted polling organizations to obtain some of the more recent data. However, it would be reasonable to assume that recent survey items exist that were not located and included in this current analysis.
5. Researchers obtained "boilerplate" descriptions of sampling procedures from survey organizations. Surveys that used the usual probability sampling procedures employed by major national polling organizations were judged to be of sufficient quality to include in the review.
6. Verbatim trend items are questions that were repeated word for word in multiple surveys over time, usually asked of national samples drawn in identical or similar fashion.
7. A secondary analysis relies on already collected data.
8. A half-sample occurs when one question is asked of half of a polling organization's normal national

probability sample; an alternate question is usually asked of the other half-sample. The two questions would normally be rotated. The half-sample is still a national probability sample; however, the sampling error would be somewhat higher than for responses from the full sample.

9. Mentioned by 5% or fewer: recycling, disposal of waste, lack of landfills, cleaner drinking water, water and air pollution, trash disposal, waste management, oil spills, industrial waste, deforestation, acid rain, car pollution, using up natural resources, litter, ocean dumping, insecticides, other. Twelve percent said they didn't know.
10. Quad = one quadrillion Btu.
11. The other 17 policy options in the item included both demand reduction and supply increase options; however, none of them were directly buildings options. The full set of options is reported in Farhar 1992 [58]. It was interesting that regulation options were most frequently favored for demand reduction, while incentive options were most often favored for supply increase.

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Appendixes

Appendix A. Survey Study List

See Table 7.

Appendix B. Item Wording for Figure 1

Gallup

"How serious would you say the energy situation is in the United States--very serious, fairly serious, or not at all serious? [42; 46; 47; 49; 31; 55; 56; 4]

Opinion Research

"From what you have heard or read, how serious would you say the need is to save Corporation energy--would you say it was very serious, somewhat serious, or not serious at all?" [44; 50; 51; 52; 53; 54]

ABC News/Harris

"How serious do you think the basic energy problem is in the country today--very serious, only somewhat serious or hardly serious at all?" [48; 63]

Table 7. Survey Study List

Survey Number	Author or Pooling Organization	Population or Area Sampled	End Date of Data Collection	Sample Size	Release Date
1	SERI/Gallup (Farhar-Pilgrim & Unseld)	National homeowners	11/24/8	2023	1982
4	Gallup Organization	National adult	02/10/91	1013	2/20/91
5	Roper Organization	National adult	03/31/79	2004	4/79
6	Roper Organization	National adult	04/05/80	2002	4/80
7	Roper Organization	National adult	03/28/81	2000	4/81
8	Roper Organization	National adult	03/27/82	2000	5/82
9	Roper Organization	National adult	03/26/83	2000	5/83
10	Roper Organization	National adult	03/24/84	2000	5/84
11	Roper Organization	National adult	03/30/85	2000	6/85
12	Roper Organization	National adult	03/28/87	1980	6/87
13	NBC News/ <i>Wall Street Journal</i>	Registered voters	04/15/86	2239	4/23/86
14	Louis Harris & Associates (Sponsor: Business Week)	National adult	04/22/86	1877	6/9/86
15	Penn & Schoen Associates (Sponsor: Texaco, Inc.)	National adult	08/19/90	677	8/23/90
16	ABC News (Sponsor: Money Magazine)	National adult	01/10/88	513	1/10/88
17	Louis Harris & Associates (Sponsor: Food Marketing Institute)	Shoppers	01/26/82	1003	10/83
18	Hart and Teeter Research Companies (Sponsor: NBC News, <i>Wall Street Journal</i>)	Registered voters	03/19/91	1505	3/29/91
19	Research/Strategy/Management & Greenberg/ Lake - The Analysis Group (Sponsor: Union of Concerned Scientists & The Alliance to Save Energy)	Registered voters	12/11/90	1200	1/11/91
20	Arsen J. Darnay, ed. compilation of various survey results, compilation	National adult	1992	--	1992
21	Cambridge Reports	National residential electricity customers	09/17/90	1250	1990
22	Hart and Teeter Research Companies (Sponsor: NBC News, <i>Wall Street Journal</i>)	Registered voters	07/29/91	1004	8/5/91
23	Hart & Teeter Research Companies (Sponsor: NBC News, <i>Wall Street Journal</i>)	Registered voters	04/16/90	1001	4/90
24	Martilla & Kiley and Market Strategies (Sponsor: Environment Opinion Study, Inc.)	National voters	07/01/90	1004	8/90
25	<i>Washington Post</i>	National adult	06/19/88	1012	6/88

Table 7. Survey Study List (contd)

Survey Number	Author or Pooling Organization	Population or Area Sampled	End Date of Data Collection	Sample Size	Release Date
26	Gallup Organization (Sponsor: Times Mirror)	National adult	02/05/89	2048	3/89
27	Gallup Organization (Sponsor: Times Mirror)	National adult	05/22/88	3021	5/88
28	Opinion Research Corporation (Sponsor: Council for Advancement & Support of Higher Education/New England Board of Higher Education)	National adult	10/07/85	1004	10/85
29	Roper Organization	National adult	05/05/79	2007	6/79
30	Institute for Social Research (Sponsor: U.S. Department of Energy Connecticut Office of Policy and Management, Energy Division)	Connecticut residents	11/85	519	3/86
31	Gallup Organization	National adult	08/12/90	1227	8/15/90
32	Alice M. Crites <i>et al.</i> (Sponsor: Nevada Cooperative Extension)	Nevada LIHEAP participant households	06/88	293	9/24/90
33	Strategic Consumer Research (Sponsor: Public Utilities Commission of Ohio)	Ohio utility customers	05/89	3600	1989
34	Office of the Consumers' Council	Ohio utility customers	08/87	812	10/87
35	Graptine Company (Sponsor: Iowa Energy Policy Council)	Iowa households	12/81	605	8/82
36	Eagleton Institute of Politics (Sponsor: New Jersey Department of Energy)	New Jersey households	11/81	1216	3/82
37	Genereux, John P. and M. Michel (Sponsor: Iowa Energy Policy Council)	St. Paul, Minnesota residents requesting home energy audits	03/82	50	5/20/82
38	Roper Organization	National adult	07/17/82	2000	8/82
39	Gordon S. Black Corporation (Sponsor: U.S.A. Today)	National adult	03/28/90	850	3/28/90
40	Hart & Teeter Research Companies (Sponsor: NBC News, Wall Street Journal)	Registered voters	09/18/90	1508	9/90
42	Smith and Loveland (League of Women Voters)	Energy leaders & Gallup omnibus survey	04/30/88 12/87	271 1013	7/88
43	Gallup Organization	National adult	02/26/79	1534	2/26/79
44	Opinion Research Corporation	National adult	03/18/79	1015	4/79
45	ABC News/Louis Harris & Associates	National adult	04/09/79	1200	4/30/79
46	Gallup Organization	National adult	05/04/79	511	5/20/79
47	Gallup Organization	National adult	06/04/79	1511	6/4/79
48	ABC News/Louis Harris & Associates	National adult	06/17/79	1496	7/2/79
49	Gallup Organization	National adult	08/06/79	1562	8/6/79

Table 7. Survey Study List (contd)

<u>Survey Number</u>	<u>Author or Pooling Organization</u>	<u>Population or Area Sampled</u>	<u>End Date of Data Collection</u>	<u>Sample Size</u>	<u>Release Date</u>
50	Opinion Research Corporation	National adult	07/31/80	1010	8/80
51	Opinion Research Corporation	National adult	09/20/81	1004	10/31/81
52	Opinion Research Corporation	National adult	08/16/83	1000	9/83
53	Opinion Research Corporation	National adult	09/26/84	1019	11/84
54	Opinion Research Corporation	National adult	02/26/85	1003	4/85
55	Gallup Organization	National adult	09/11/90	1031	9/90
56	Gallup Organization	National adult	09/30/90	1000	9/90
57	Roper Organization	National adult	3/18/89	1977	6/89
60	The Analysis Group	Registered voters	09/88	1001	9/88
61	Research/Strategy/Management (Sponsor: Union of Concerned Scientists)	Registered voters	11/04/89	1200	11/89
62	Smith, Wil J., Frederick A. Zeller, Joyce A. Coombs and Paul J. Martin (Sponsor: West Virginia Governor's Office of Community and Industrial Development, Fuel and Energy Office)	West Virginia households	06/87	1029	9/87
63	Yankelovich/Clancy/Shulman (Sponsor: Time, Cable News Network)	National adult	04/11/91	1000	5/16/91