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AUTHOR	Cobb, Thomas B.
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ABSTRACT

The general procedures, techniques for implementing, and results of a citizen-based "grass-roots" program in Ohio for the development and analysis of community energy policies are described. The program emphasizes citizen input and employs the nominal group process to build consensus. Small group discussions are used to generate solutions to local problems which arise from increasing energy costs and resource scarcities. A computer model is used to educate participants about the consequences of continuing historic energy use patterns and to analyze the potential impacts of policy choices on community lifestyle. Policy analysis is performed by a cross-impact procedure and results are graphically displayed for instantaneous feed-back to participants. The program was used with success in six counties of northwest Ohio where it led to the development of community energy action plans, citizen energy task forces, and improved energy awareness. Developers of the program believe that it is beneficial and effective because it can lead to the development of policies and actions which are both supported and promoted by local citizens and it can be used to elicit citizen acceptance of and participation in an already-enacted community energy plan. (Author/DC)

COMMUNITY ENERGY POLICY PROJECT*

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Thomas B. Cobb
Director
Energy Studies Program
313 Hayes Hall
Bowling Green State University
Bowling Green, OH 43403
Tel: 419-372-2624

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COMMUNITY ENERGY POLICY PROJECT*

Thomas B. Cobb
Energy Studies Program
Bowling Green State University
Bowling Green, Ohio 43403

ABSTRACT

A citizen-based "grass-roots" program for the development and analysis of community energy policies has been developed and applied with success in Ohio. The program emphasizes citizen input and employs the nominal group process to build consensus. Small group discussions are used to generate solutions to local problems which arise f[illegible]reasing energy costs and resource scarcities. A computer model is [illegible]o educate participants about the consequences of continuing historic energy use patterns and to analyze the potential impacts of policy choices on community lifestyle. Policy analysis is performed by a cross-impact procedure and results are graphically displayed for instantaneous feed-back to participants.

The program has intrinsic educational value and is practical both for the offerers as well as the participants. It can lead to the development of policies and actions which are both supported and promoted by local citizens; alternately, it can be used to elicit citizen acceptance of and participation in an already-enacted community energy plan. The program has been used with success in six counties of northwest Ohio where it has led to the development of community energy action plans, citizen energy task forces, and improved energy awareness. The general procedures, techniques for implementation and results of the Ohio program are described.

BACKGROUND AND NEED

In the book Energy Future,[1] Stobaugh and Yergin allude to the frustration and virtual impossibility of developing understandable and acceptable national energy policies in the face of conflicting and often contradictory information from scientific and expert sources. Indeed, these authors go so far as to suggest that citizens should not expect rational policies in such an atmosphere; and they identify the energy crisis more as a crisis of our political system than one of resources. In the United States, as in many other countries, we are painfully aware of such political controversies in matters involving energy - *e.g.* nuclear vs. non-nuclear electric generation; environmental protection vs. regional development; price controls and regulation vs. free enterprise; ownership and control of energy resources vs. social equity; etc.

In an atmosphere of conflicting and contradictory information, the opportunity is great for proprietary interests to prevail and for policy choices to be made on other than rational grounds. The incentive to maintain the status quo is enhanced, and the likelihood of effecting rational citizen response to impending change is diminished. Such difficulties are discussed by Botkin, *et al*, in the Club of Rome Report,[2] where "maintenance" learning is distinguished from "innovative" learning. In their definition, societies traditionally are conditioned to "maintenance" learning, *i.e.* to a process whereby individuals learn established rules and procedures for dealing with known and recurring situations in order to *maintain* the status quo. Society adapts to the new situation only as much as necessary, crisis situations prevail, and the individual suddenly is controlled by external events. Accordingly, we have learned to develop and accept a sort of "crisis mentality" and have established political and social structures to deal with events on this basis.

In contrast to adaptive behavior, Botkin, et al suggest that a new type of learning, anticipatory learning, is necessary to minimize irrational reactions to unexpected catastrophic events. A key element in developing anticipatory learning is participation by citizens in decisions which affect their future. For example, the establishment of values and priorities in the use of energy resources is an area of decision-making which should involve the affected citizens. More often than not, such decisions are local in nature, and involve value judgments which may not be transferred easily from one community to the next. Participation by local citizens in such decision-making is crucial to the creation of meaningful and acceptable public policies.

To involve citizens substantively in energy policy-making activities, information about the issues must be provided from credible sources. Participating citizens should have an opportunity to discover solutions for themselves and to build consensus. An opportunity to explore the consequences of their own decision-making also should be included. The Community Energy Policy Project described below contains all of these features. Through the use of group process techniques and computer simulation, it provides a means both for developing consensus and for evaluating the consequences of selected policy options.

THE OHIO COMMUNITY ENERGY POLICY PROJECT

The Ohio Community Energy Policy Project was conceived in 1978 and initiated in the Spring of 1979 with the assistance of a grant from the Community-Service Continuing Education Division of the U.S. Office of Education. Project interdisciplinary staff included five faculty from

Bowling Green State University, advisory panels from local communities and graduate assistants who managed the computer programming and group dynamics exercises. From May, 1979 through March, 1981, one regional, six community, and several follow-up workshops and seminars were held on the campus of BGSU and at other sites throughout northwest Ohio. Over 350 citizens were involved in the local workshops which are the focus of this paper.

The Kane Policy Impact Analysis Simulation Procedure (KSIM)[3] was used in the workshops to focus discussion in the workshops, and as a means for analyzing current lifestyle, trends, and probable effects of the decision-making process. Using KSIM the consequences of selecting various policy options can be displayed instantaneously and graphically. A time scale of 20 years was used to assess the impacts of the proposed policies.

THE PROCEDURE

A. Limiting the Problem

To limit the scope and geographical boundaries of the problem, the county was selected as an appropriate geographical and political subdivision. This decision was prompted partly by the manner in which data was available. Different orientations within the same county proved to be a minor problem. For example, residents in the eastern half of one county primarily were factory workers who commuted to the nearby city of Toledo for employment; residents of the western half were principally farmers. Such inconsistencies surfaced in several instances, but none threatened the program's success.

B. Community Lifestyle

To define current lifestyle for the community, and to provide a consistent basis for analyzing historical trends and measuring the results of policy implementation, a set of variables was developed to reflect the socio-econonomic and cultural atmosphere of the locale. Citizens from 12 counties in northwest Ohio assisted project staff in developing a suitable list of eight items. These are noted in Table 1 and were selected from about 60 socially relevant lifestyle elements which were suggested.

Obviously this list does not exhaust the possibilities, nor does it necessarily represent the optimum set of variables for describing a particular community. Rather it is a reasonable set of sociological factors which may be used as a basis for establishing current status and for measuring change. Some of the factors are easily quantifiable; others are not. The KSIM procedure permits the user to include both objective and subjective variables within the same model.

C. Defining the Variables

Once the lifestyle factors or variables are identified, precise definitions must be created, and associated data collected, in order to define the range and initial value. Some factors such as population permit reliance on quantitative data for their definition. Other factors such as social harmony must be based on subjective judgment.

To prepare the lifestyle factors for computer input, a dimensionless relative scale of (0-1) is used. The procedure for doing this is well-described in Kane's original paper and elsewhere.[3-6] Reasonable high and low limits for each variable are identified from historic trends; and the current value represents the state of the variable as a fraction of the (0-1) range. An initial value of .75 therefore would represent a starting point of 75% of the defined range. Note that zero on such a scale does not represent zero in an absolute sense but rather just the minimum value for the defined range.

Some of the sources used for defining lifestyle variables are listed in Table 2. Source reliability varies greatly, so these must be used with discretion. Often one community must be compared to others that are similar. For example, the crime rate in urban counties should be compared to other urban areas of similar population, not to rural or suburban counties with vastly different lifestyles.

D. <u>Constructing the Basic Model</u>

Once the variables have been selected, defined, and appropriately quantified, the interactions must be described to develop a model of system changes over time. The KSIM model used in this study is a simple deterministic simulation procedure which uses a set of first order non-linear differential equations to describe the system evolution. KSIM is not the only model which can be employed. In fact the program can be duplicated without any model. However, models are a convenient and useful tool for focusing discussion, limiting the problem, educating participants, and illustrating impacts in graphic form dramatically and rapidly.[7]

The KSIM model takes into account the binary interactions between system variables through the use of a fixed "cross-impact matrix". This matrix, which becomes a focal point for group discussion, is simply a table of numbers whose values represent the directions and strengths of interaction between system variables. Working in small groups, participants in the Ohio program initially assigned values for the elements of this matrix. In this way, the model incorporates the perceptions of local citizens as to the status and interrelatedness of the lifestyle factors.

Elements of the impact matrix were limited to values of 1, 2, or 3 to represent weak, moderate, or strong interactions, respectively, between system variables. Positive or negative entries represent enhancing or inhibiting influences, and zeroes denote no interaction at all. An example base case matrix is shown in Table 3. Fractional entries represent averages from the reporting groups. The matrix elements and initial values of the system variables are used as input for the KSIM computer program. The computer numerically solves the equations and provides graphical output. Sample graphs obtained by using the matrix given in Table 3 are shown by the solid curves in Figure 1. This set of graphs is referred to as the base case model because it represents a no-action, status-quo model and a baseline against which the result of action programs can be measured.

E. Interpreting and Using the Model: Incorporating Policies

To analyze the effects of implementing a chosen policy or action program, the model is expanded by adding columns to the impact matrix to allow for inclusion of policy options. Again, entries in these new columns are developed through small group discussion during the workshop. Policy discussions focused on four central themes:

1) Alternate energy sources
2) Energy education
3) Conservation
4) Transportation alternatives

Participants were required to develop a rationale for each policy recommendation and to suggest actions for local implementation. Small group discussion leaders assisted in evaluating the relation of individual policies to the set of lifestyle factors. A policy impact matrix for an example program is shown in Table 4. Modified graphs, illustrating the effects of the proposed policies on the previous system, are shown by the dashed curves in Figure 1.

THE OHIO EXPERIENCE

Six counties in northwest Ohio were selected for community workshops. Workshop sites were selected on the basis of local interest. They were held in urban, suburban, and rural locales, representative of the region. The schedule of workshops and locations is shown in Table 5.

Thirty to forty citizens attended each workshop. Participants were recruited to represent all facets of community life. Prior to each workshop, project staff members met with a local planning committee to request assistance and to determine unique features and issues of local concern. One week before the workshop, resource packets were sent to participants containing definitions of lifestyle factors, local statistics and a base-case model pertinent to their county.

At the workshop, participants were divided into small groups of 6-8 persons and were assigned at least one of the four general policy areas. Each group discussed, and through consensus, developed specific programs for their community. Each small group was moderated by a leader from the

BGSU School of Speech Communication trained by the project staff. Policies developed in small groups were reported to the main assembly in order to share information and to obtain feedback and critique from the total audience.

The KSIM cross-impact matrix was used to assess the impact of each proposed policy on the lifestyle variables. These data were fed into the computer for immediate feedback. The computer produced on-the-spot graphical outputs which were compared with the base-case model graphs. Participants could then judge for themselves the potential effects of implementing the policies. After viewing the graphs, participants were given an opportunity to modify their policy choices. In this way, the computer simulation enabled participants to prioritize and develop more acceptable policies.

RESULTS OF THE OHIO PROGRAM

An abbreviated list of policy and action programs suggested by participants at these workshops is given in Table 6. Many recommendations were made by more than one group.

Overall, workshop participants felt there was a need for increased public awareness about energy and more credible information on current energy issues. Many voiced distrust in government or energy-supply industry plans to solve their problems. Most policies reflected the need to use formal and informal educational institutions and tools to increase awareness, and to provide practical information as a basis for informed decision and action.

While many felt that only economic incentives or sanctions would motivate increased conservation, the need for lifestyle adjustments and value changes also was stressed. Participants felt that conservation efforts and alternative energy development should be viewed in a more positive manner. In this way, conservation would arise from voluntary compliance rather than through a mandated restriction of choice.

Sample recommendations are listed in Table 6. The general results may be summarized as follows:

1. Alternate energy sources: For most communities the use of such sources is considered too long term to be of benefit for the solution of problems of immediate concern. Currently available alternate fuels are generally not considered cost-effective. The most common suggestions for stimulation of alternate fuel development were tax incentives and low interest development loans.

2. Energy Education: All workshop participants felt that education, both formal and informal for all ages, would increase public awarenss of energy supply, use, and available alternatives, and also would create a more positive public attitude towards action. The most prevalent suggestion for formal education was to introduce energy curricula in grades K-12 - also in adult education and in technical schools and universities. Media and speaker bureaus were suggested to help to put practical energy information in the hands of the people.

3. Conservation: Participants viewed conservation and improved energy efficiency as necessary for managing current energy use. Building code modifications, community conservation goals, and public recognition for conservation efforts were recommended to promote energy efficiency.

4. Transportation: Participants favored public transportation systems, van and carpools for employees. They recommended efforts to change public attitudes so that biking and walking would be enhanced and unnecessary auto use discouraged.

SUMMARY AND CONCLUSIONS

We feel these workshops and the associated processes are unique and beneficial for adult education and citizen involvement programs. Not only does the process develop a meaningful list of policy recommendations for community action, but it also produces a highly informed group of local citizens who are more receptive to peer judgment, more aware of energy problems as they relate to personal lifestyle, and who are more likely to participate in future community activities. Since the policies selected are produced from small groups representing typical population segments of the community, the recommendations are representative of local needs and should be acceptable at that level.

Implementation of the proposed policies rests with the citizens in the communities and with the respective bodies of authority. Following each workshop in Ohio, copies of the policy recommendations along with an analysis of the likely impact were sent to local and regional government officials. Some local suggestions have resulted in long range actions. Continued contact with the local groups has been fragmentary but positive. BGSU continues to assist these communities as a part of our institutional mission of service to citizens in this region.

For those who would be interested in developing a similar program, the Energy Studies Program at BGSU has developed a Training Manual to assist in the planning and execution of such a workshop. This manual may be ordered from: Energy Studies Program, 313 Hayes Hall, Bowling Green State University, Bowling Green, Ohio 43403. Telephone: 419/372-2624.

FOOTNOTES AND REFERENCES

Footnotes

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7. Such programs are available from several sources. The one emphasized here was obtained from the Center for Technology Assessment and Policy Studies, Rose-Hulman Institute, Terre Haute, Indiana, 47803.

LIST OF TABLES

FIGURE CAPTION

TABLE 1

Lifestyle Factors Used in the Ohio Project

Population	Social Harmony
Employment	Environmental Quality
Education	Family Energy Expenditures
Community Services	Transportation

TABLE 2

Data Sources Useful for Assessing Lifestyle Factors

Factor	Source
Population	U.S. Census Report City-County Data Book Survey of Buying Power Planning Commission Documents
Employment	Bureau of Employment Services Chamber of Commerce Planning Commission Reports
Education	State Dept. of Education National Education Association Discussions with local residents and school officials National Center for Educational Statistics
Community Services	Local Service Agencies Planning Commission Community Action Commissions County Health Department Parks and Recreation Welfare and Employment Agencies
Social Harmony	Chamber of Commerce Local Government Local Enforcement Agencies Community Action Commissions Crime Statistics Local Newspapers Labor organizations
Environmental Quality	Regional Planning Commission Regional EPA Office Audubon & Sierra Clubs Parks & Recreation Commission County Extension Agent League of Women Voters
Energy Expenditures	Statistical Abstract of U.S. State Deptartment of Energy Department of Commerce
Transportation	State Dept. of Transportation Bureau of Motor Vehicles State Department of Energy Chamber of Commerce Planning Commission Reports

TABLE 3

Example Base-Case Matrix for KSIM Model

Affect this lifestyle indicator ↓ / How will changes in this indicator →	Population	Employment	Education	Community Services	Social Harmony	Environmental Quality	Family Energy Expenditures	Transportation
Population	.3	2	-1.5	.1	.2	-1	-.5	.3
Employment	.3	.5	1	.5	.5	-2.2	-2.2	1
Education	.3	.3	.5	.2	.5	.2	-3	.2
Community Services	-1	1	.4	.4	1	-1	-2	.4
Social Harmony	-2.5	1	.5	.6	.6	.5	-2.8	.6
Environmental Quality	-2.2	-2.5	1.6	1	.5	.6	1.5	-1.5
Family Energy Expenditures	2	-.9	-.9	2	0	2.7	-.9	2
Transportation	-1.8	1	1	1	0	-1.1	-2.5	1.4

Inhibiting		Enhancing
-3	Major	+3
-2	Moderate	+2
-1	Minor	+1
0	None	0

TABLE 4

Example Policy Impact Matrix for KSIM Model

How will changes in this policy → / Affect this lifestyle indicator ↓	ALTERNATE SOURCES	EDUCATION	CONSERVATION	TRANSPORTATION
Population	0	0	0.5	1
Employment	1	0	0.5	0
Education	2	1.5	0	0
Community Services	1	0.3	1	0.9
Social Harmony	1	2	2	2
Environmental Quality	0	1.2	0	1
Family Energy Expenditures	-1	-2	-.5	-.5
Transportation	-1	1.5	1.5	0.8

Inhibiting		Enhancing
-3	Major	+3
-2	Moderate	+2
-1	Minor	+1
0	None	0

TABLE 5

LOCATIONS AND DATES OF WORKSHOPS FOR OHIO PROJECT

WORKSHOP DATES	WORKSHOP LOCATION	FOCUS OF STUDY	COUNTY CLASSIFICATION
OCTOBER 25-26, 1979	LIMA	ALLEN	URBAN
NOVEMBER 15-16, 1979	SANDUSKY	ERIE	SUBURBAN
FEBRUARY 14-15, 1980	BRYAN	WILLIAMS	RURAL
MARCH 13-14, 1980	WAUSEON	FULTON	RURAL
APRIL 17-18, 1980	TIFFIN	SENECA	SUBURBAN
MAY 8-9, 1980	FREMONT	SANDUSKY	SURBURBAN

TABLE 6

Sample Policy Recommendation of Ohio Programs

Policy Category	Recommendations
Alternate Energy Sources	Property and municipal income tax incentives for solar, wind, biomass, recycling Low interest loans for alternate energy source private sector investors Local citizens groups to provide energy audits, workshops, feasibility studies Favorable zoning and building codes
Energy Education	Energy education K-12 Expansion of technical energy courses in all post-secondary and correspondence institutions Local energy awareness seminars and workshops for all Business supported scholarships for energy resource development Energy information articles in local media Speakers bureau and energy information center Energy events calendar featuring energy fairs, tours, forums
Energy Conservation	Conservation clearinghouse to disseminate pamphlets, etc. Annual awards for energy saving in residential, commerical and industrial areas Display of architectural designs that conserve energy in public buildings and newspapers Development of a model energy conservation community Waste heat-conversions for commercial or residential heating
Alternate Modes of Transportation	Community supported public transport system Car and van pooling incentives Sidewalk maintenance Publicity to encourage walking and biking Construction of satellite commuter parking lots, bikeways and bicycle parking Mini- or shuttle-buses for central area transport Staged elimination of private vehicles in congested areas

FIGURE 1

EXAMPLE OF KSIM MODEL RESULTS