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THE UTILIZATION OF SCIENTIFIC KNOWLEDGE: A CASE STUDY OF "ENERGY FROM THE WEST"

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A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

By

Larry B. Parker

Norman, Oklahoma

1981

THE UTILIZATION OF SCIENTIFIC KNOWLEDGE:

A CASE STUDY OF ENERGY FROM THE WEST

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THE UTILIZATION OF SCIENTIFIC KNOWLEDGE:
A CASE STUDY OF ENERGY FROM THE WEST

BY: LARRY B. PARKER

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ABSTRACT

This research examines researchers' abilities and roles in promoting use of their research. To generate information to aid in better understanding the utilization process, the research specifically evaluates the participatory research strategy of the Science and Public Policy Program (S&PP) in conducting a technology assessment of western energy development--Energy From the West. To focus on the entire research process, the research develops three "perspectives" of that process based on the diverse types of questions social researchers are asked to address. The first perspective is the engineering view of utilization as the direct use of research. While most of the utilization literature is based on such a definition, this research shows this view to be somewhat inapprorpiate in the case of Energy From the West. Two other perspectives, enlightenment and intelligence use of research, which reflect the uncertainty and lack of consensus involved in social research, provide more insight on the potential

utilization of Energy From the West and the factors which influence that potential.

During the Energy From the West project, S&PP attempted to foster awareness, interest, trust, and credibility within users for its research. This strategy was implemented through four mechanisms: (1) advisory committee, (2) stakeholder review, (3) personal interaction, and, (4) presentation and packaging of research products. To determine the effectiveness of this strategy, the research surveyed the literature on barriers to utilization. Using multiple indicators, six aspects of these barriers were shown to have a significant impact on the potential utilization of Energy From the West: (1) awareness and interest, (2) trust and credibility, (3) presentation, (4) organizational interests, (5) new information provided users, and, (6) timing of the report.

From this result, the research examines the fostering of these six concepts within potential users by S&PP's utilization strategy. Awareness and interest, trust and credibility, and new information provided users were fostered by the S&PP utilization strategy. The strategy also influenced two other utilization concepts--organizational interests and timing.

The three results outlined above suggest an active role for researchers in the utilization process. This research

synthesizes four guideposts to such a research strategy as conducted during the Energy From the West project: (1) early involvement, (2) continuing relationships, (3) responsiveness to users needs, and (4) facilitating communications with users. These roles raise several ethical questions for the social researcher which this research identifies and discusses. Also, the research gives specific recommendations for improving the utilization strategy used by S&PP.

Finally, in emphasizing a model of research which discusses truth with power, the research notes the need for researchers to be humble. Efforts to build consensus within the policy community through intelligence and enlightenment utilization of research may fail, despite the best efforts of researchers.

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Finally, to my mother, whose confidence in me never wavered, I quote from the book of Habakkuk: "Behold, their souls which are lifted up are not upright in them, but the just shall live by their faith." No truer words were ever spoken. It is to my mother's watchtower of faith that this dissertation is dedicated.

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THE UTILIZATION OF SCIENTIFIC KNOWLEDGE: A CASE STUDY OF ENERGY FROM THE WEST

CHAPTER I

INTRODUCTION

> Political naivete can no longer be an excuse for social scientists who find their research ignored or abused. The political nature of applied social science research has been well-documented. The challenge is to apply this understanding to the research utilization process. Patton (1978)

I. Overview of Research

A. The Issue of Underutilization

Despite the tremendous attention given to the desirability of policy analysis, social diagnosis, social information systems, and other products of applied social research,[1] most assessments conclude social research is underused or misused. Both the research community and the government-user agencies appear to agree on this characterization. User perspectives on the underuse of social research is illustrated by the testimony of Assistant Secretary Aaron at the 1977 Senate Committee on Human Resources hearings on the cost, management, and utilization of human resources program evaluation. Secretary Aaron, whose agency, the Department of Health, Education, and Welfare, funds a substantial amount of social research

stated that he felt the majority of evaluation studies funded by the federal government probably do not directly affect decisions on future planning.[2]

This observation by the Secretary is supported by several government studies on the use of social research. For example, the 1967 study by the House Committee on Government Operations on the impact of social research on federal domestic programs concludes "the extent to which existing knowledge is utilized shaping...welfare programs leaves a good deal to be desired;" "existing economic, social and psychological data is rarely utilized in shaping national and local health programs."[3] This assessment is echoed by the conclusions of the National Science Foundation's Brim Commission in 1968:

> Too small a fraction of the national research effort is being devoted to social science; and it is the opinion of this Commission that the nation is missing crucial opportunities to utilize the best of social science in the formation and evaluation of policies for achieving desired social goals.[4]

The research community has also assessed this situation. According to the research community,[5] the applied research process often results in the following:

> The evaluator, having survived the recurrent crises of the study, finally collects and analyzes his data and produces a report. He turns it into the administrators of the study and the sponsors of the study and waits for the facts to speak for themselves. But often nothing happens.[6]

Illustrative of this result is the impact program evaluation had on War on Poverty programs.[7] Required by legislation, program evaluation was to be the instrument that agencies, such as the Office of Employment Opportunities (OEO), would determine the effectiveness of new programs; terminating the ineffective programs and retaining the effective ones. The long-term result of the effective programs would be the elimination of poverty in the United States, and therefore, the termination of the war.

This was not the case. As shown by Aaron, there were four primary causes for the failure of program evaluation. First, the constant political criticism that many War on Poverty programs were subjected (such as Community Action Programs) made objective analysis impossible; any hint of negativism in an evaluation would have had serious implications for the future of the specific program. Secondly, measurement of the success of the poverty programs proved to be very difficult. The goals of the programs were vague and not amendable to quantitative analysis, resulting in ambiguous results. Thirdly, the poverty program was a broad-front assault on the foundation of poverty. This approach caused difficulties for program evaluation which is typically most suited to evaluating a singular agency; it was virtually impossible to separate the effects of the various programs and the environment.[8] Finally, it became

clear during the War on Poverty that program evaluation was only one input into the political decision-making process and usually not the decisive one. Examples include Head Start,[9] which remained politically viable despite unfavorable evaluations, and Community Action Programs, which became the symbol of the failure of the War on Poverty despite favorable evaluations.

Utilization problems are not restricted to evaluation research. Systems analysis in general, and the various offshoots of systems analysis have had similar histories. Hoos's analysis of the use and abuse of systems analysis in California concludes that "if it demonstrated nothing else, the California experience proved that regardless of their intrinsic worth, systems studies are an extremely handy political tool, in the application of which reside, both advantage and protection."[10] Inappropriate uses include delaying action; by funding research, agencies can give the illusion of activity while delaying decision-making. Also, analysis can be used as a "strategic weapon" by the decision-maker; legitimating the program if the results are positive, and ignoring the results if they are negative. Hoos doesn't restrict this criticism to systems analysis -- social indicators, social forecasting, and other social research products are included in this regard.

Such misuses of social research have been recorded in several contexts. Brewer's critique of urban problem

solving lists four potential reasons, other than scientific, for why a decision-maker may desire an operational model or simulation project. They are:

1. Use models to rationalize a choice already made.

2. Use model building to delay making a decision.

3. Use models on routine problems to occupy the time and talent of one's staff.

4. Use models to demonstrate one's progressiveness, and give the appearance of using the most advanced management techniques available.[11]

It is clear that these reasons, along with those of Hoos and others, cannot be restricted to any particular technique or method of social research. Any technique can be underused or misused for these reasons.

The underutilization and sometimes misutilization of social research is not dependent on the decision-making level. As illustrated by Aaron, Hoos, Brewer, and others,[12] underuse or misuse of social research can occur at any level of government. Also, the discussion above indicates the problem of underutilization is not restricted to one technique or method. Modeling, evaluation research, systems analysis can all be underused.[13] Thus, the question is not whether social research is underuse or misused, the question is what can be done about it?

B. Science and Public Policy's Energy From the West Study

> Although a number of social scientists have in recent years become sensitive to various ethical and political aspects of the research process, they have not incorporated the issues involved into their methodology,... Sjoberg (1975)

The Science and Public Policy Program is an interdisciplinary research team at the University of Oklahoma. Recently, it completed a three-year technology assessment of western energy resource development for the Office of Energy, Minerals, and Industry (OEMI), Office of Research and Development, U.S. Environmental Protection Agency (EPA) entitled Energy From the West. The development of six energy resources (coal, geothermal, natural gas, oil, oil shale, and uranium) in an eight-state area (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming) is assessed. The time frame for the assessment is the present to the year 2000. The overall purposes of the technology assessment (TA) are to identify and analyze a broad range of consequences of energy resources development in the western U.S., and to identify, evaluate, and compare alternative courses of action for enhancing desirable consequences of western energy development and mitigating or eliminating undesirable ones.[14]

From the beginning, the study has tried to increase the potential utility of its research products by paying explicit attention to utilization in the research design stage of the research and by developing multiple dissemination strategies.[15]

This effort was guided by two themes. First, the team recognizes the need to establish relationships with sponsors, government agencies, and parties-at-interest at the earliest possible stage of the project. The team considers early involvement critical for fostering the awareness and interest of potential users in the product. By building this foundation early, the research team enhances the ability of the potential users to participate effectively in the research process. Secondly, the team recognizes the need to maintain a continuing relationship between themselves and their potential users. The team considers a continuing relationship necessary to the development of a collaborative relationship of trust and credibility between potential users and themselves. By keeping communications open between themselves and the potential users, the team keeps its technology assessment centered on users' needs and enhances its potential usefulness to them.

S&PP's participation and utilization efforts can be summarized under four headings or mechanisms.[16] They are:

> Advisory Committee. Formed within a few months of the project's beginning, the advisory committee reviewed the products of the team's research throughout the three year period, and provided useful feedback to the team on the purpose and scope of the project.
>
> Stakeholder Review. Periodically, the team sent out drafts of its reports to a diverse group of parties-at-interest, even before the team was completely satisfied with them. While perhaps contrary to accepted scientific norms, the procedure facilitated participation because stakeholders had input into the research before the issues became "set in concrete."

Personal Interaction. By visiting impacted areas, attending conferences and workshops, and establishing verbal and written contacts with participants in the system, the team interacted with the system, and learned about the people, activities, and institutions which influenced the functioning of the system.

Packaging/Presentation. Using non-technical language and short, well-illustrated summaries, the team attempted to make its research findings as understandable as possible. Also, the team made many slide presentations of their findings to interested parties to raise the level of understanding, and to receive useful feedback.

C. Purpose of Research

A wealth of literature exist about the various causal factors that influence the utilization process,[17] but field examinations of these concepts in social research settings are few.[18] Perhaps more importantly to social researhers is the dearth of information in the literature regarding strategies they may employ to increase the likelihood their research will be used.[19] The purpose of this research is to evaluate the effectiveness of S&PP's utilization strategy in fostering factors which influence the utilization process, and discuss the implications of such a strategy for researchers in conducting research. The Energy from the West study, during which particular attention was paid to utilization throughout the research process, provides an opportunity to contribute both substantive and conceptual knowledge to the field.

Thus, the specific purposes of this research are to:

1. Determine whether awareness, interest, trust, and credibility are a viable framework for developing utilization strategies.

2. Determine the influence of technical, individual, organizational and time barriers on utilization.

3. Evaluate the effectiveness of the S&PP strategy in fostering awareness, interest, trust and credibility in the Energy from the West study.

4. Recommend ways in which the effectiveness of the strategy may be improved.

5. Make overall recommendations as to how social researchers can increase the utilization of their work.

6. Discuss the implications for researchers in choosing to actively promote utilization during the research process, and assess the risk of such a strategy against the benefits.

D. Statement of the Research Problem

Three questions are critical to this investigation of the utilization of social research. The first is how to define "utilization." While utilization was once defined simply as the direct application of research results to decision-making, research in recent years has made it clear that such a characterization may be oversimplified in at least two ways: (1) too narrow a definition of what constitutes utilization; and, (2) lack of appreciation of the difficulties in determining when research is used.

In operationalizing utilization in this research, utilization will be defined through three "perspectives" or "lenses."[20] The first, the engineering perspective, views utilization as the direct application of research

results. The second, the intelligence perspective, views utilization as providing a knowledge base for decision-making. The third, the enlightenment perspective, views utilization as providing insight and understanding of the problem area to the user.

The second question to be addressed is what are the barriers to utilization (besides awareness, interest, trust, and credibility) which research must overcome. From the literature,[21] five general categories of barriers to utilization can be identified. The first category, individual barriers, identifies individual characteristics such as values, competence, and experience, which may hinder the utilization process. The second category, interpersonal barriers, consists of problems which occur during the communication process between individuals. Such barriers would include language, status, and value differences, and are addressed directly by S&PP's utilization strategy.

The third category, organizational barriers, refers to the added complexity to the communication process that organizational norms and procedures add. The fourth category, technical barriers, are communication problems which occur out of the preparation and transmission of the research product per se. Science and Public Policy paid particular attention to this barrier in the development

of its reports and summaries. The final category, time, refers to problems arising out of the time needed to do the research. Turnover of administrators and researchers over time hinders the establishment of linkages between them.

The final question to be addressed is what theory forms the basis of the examination of the independent variables. However, as noted by Berg in his study of factors affecting utilization of technology assessments,[22] theories and related research on knowledge utilization and the public policymaking process:

> While providing a useful base, ...[do] not provide a single overall conceptual scheme sufficient for encompassing the complexities and contingencies involved in the production and use of TAs nor was such derivable from the findings of this study. This situation is not peculiar to this study, but rather is indicative of the limitations of the social sciences especially when dealing with a changing and turbulent social environment.[23]

Although no comprehensive theory of utilization exists to guide this research, important theoretical concepts from the theory of innovations literature do exist. This study will use the concepts of awareness, interest, trust, and credibility, whose importance are firmly based in the theory of innovation literature, as a conceptual framework for the examination of enhanced likelihood for utilization. These concepts will constitute the criteria for determining the level of effectiveness achieved by each of the S&PP's utilization mechanisms: They are:

Awareness. Awareness refers to general knowledge about the research product. Researchers need to promote awareness of their research products as a first step toward utilization.

Interest. Interest refers to purposive activity on the part of the user in seeking additional information about the research.

Trust. Trust refers to positive feeling users have towards the producers. Such a feeling is generally built up over a period of time.

Credibility. Credibility refers to the feelings users have towards the accuracy and reliability of the producer's work.

Having defined utilization, identified major barriers to utilization, and described the conceptual framework, the research problem can be stated as follows:

> Given the individual, interpersonal, organizational, technical, and time factors which impede the engineering, intelligence, or enlightenment utilization of social research, what can the social researcher do to promote awareness, interest, trust and credibility in his research; and will promotion of these causal factors enhance the potential for utilization by individual decision-makers?

II. Outline of the Study

This study of Science and Public Policy Program's attempt to promote these concepts during its recent technology assessment is divided into seven chapters. Chapter II provides the substantive and theoretical foundation of the definition of utilization employed in this research, the conceptual framework, and utilization

barriers to be examined by this research. Chapter III describes the philosophy of S&PP concerning applied research and the mechanisms employed to enhance use of their work. Chapter IV describes the research design, the operational definitions, and the methods employed in the study. Chapter V analyzes the importance of awareness, interest, trust, and credibility to users opinions towards the utilization of Energy from the West, and the identification of other significant factors involved in that opinion. Chapter VI analyzes the effectiveness of S&PP's interaction in fostering awareness, interest, trust, and credibility in potential uses, and the identification of barriers to that process. Finally, Chapter VII states the conclusion of the study, and makes recommendations to social researchers for addressing the issue of underutilization.

FOOTNOTES

[1]For an elaboration on the necessity for planning and policy-relevent research to assist in the effort, see Galbraith, John Kenneth. The New Industrial State. New York: New American Library, 1967; Ellul, Jacques. The Technological Society. New York: Random House, 1964; Kochen, Manfred, ed. Information for Action: From Knowledge to Wisdom. New York: Academic Press, 1975; Brewer, Garry D. Politicians, Bureaucrats, and the Consultant: A Critique of Urban Problem Solving. New York: Basic Books, 1973; and, Bell, Daniel. The Coming of Post-Industrial Society: A Venture in Social Forecasting. New York: Basic Books, 1973.

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[6]Weiss, Carol H. Evaluation Research: Methods of Assessing Program Effectiveness. Englewood Cliffs, N.J.: Prentice-Hall, 1972. p. 110.

[7]See Aaron, Henry. Politics and the Professors: The Great Society in Perspective. Washington, D.C.: Brookings Institute, 1978.

[8]This circumstance was partially the result of the dominate position of summative evaluation during the 1960's. As an alternative to this "goal trap" problem, some have argued for "goal-free" or formulative evaluation and process evaluation. See Scriven, M. "The Methodology of Evaluation," in C.H. Weiss, ed., Evaluating Action Programs. Boston: Allyn and Bacon, 1972: 123-136; Waller, J.D., et al., Monitoring for Government Agencies. Washington, D.C.: The Urban Institute, 1976; Williams, W. "Implementation Analysis and Assessment," Policy Analysis 1:531-566, 1975; and, Weiss, R.S. and M. Rein. "The Evaluation of Broad-Aim Programs: Difficulties in Experimental Design and an Alternative," in F.A. Caro, ed., Readings in Evaluation Research, 253-262.

[9]See Rein, M. and S. White. "Can Policy Research Help Policy?" The Public Interest, 49, fall: 119-36, 1977.

[10]Hoos, Ida R. Systems Analysis in Public Policy. Berkeley: University of California Press, 1972. p. 94.

[11]Brewer, Garry D. Politicians, Bureaucrats, and the Consultant: A Critique of Urban Problem Solving. New York: Basic Books, 1973.

[12]For a representative sample of the scope of the underutilization problem, see footnote 5.

[13]There is some controversy as to the extent to which underutilization varies by technique. Rich (1979) contends that the use of knowledge "aries significantly, depending on the type of information produced (e.g., social indicators, consultant reports, surveys, program evaluation)..." (328) Hoos (1972), to the contrary, believes that all social research is abused. This author believes that while there is probably some variation between techniques, significant amounts of all variations of social research are underutilized.

[14]White, Irvin L., Steven C. Ballard, and Timothy A. Hall. "Technology Assessment as an Energy Tool." Policy Studies Journal. Autumn 1978.

[15]Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, the New York Hilton Hotel, New York, August 31-September 3, 1978.

[16]Ibid., p. 5.

[17]See Chapter II: "Theoretical Perspectives on Utilization."

[18]The most comprehensive attempt to assess the various concepts within the literature is Berg, Mark, et al. Factors Affecting Utilization of Technology Assessment Studies in Policy Making. Ann Arbor: Institute for Social Research, 1978.

[19]The only example this author has found is: Benson, Jonathon Lee. "The Development of Knowledge Dissemination and Utilization Strategies: The Benchmark Program." Ohio State University Dissertation, 1976.

[20]These perspective are more fully developed in Chapter II "Defining Utilization." In particular, see footnotes, 8, 9, and 10.

[21]See Chapter II: "Identifying Barriers to Utilization: The Structure of the Utilization Process."

[22]See Berg, Mark et al. Factors Affecting Utilization of Technology Assessment Studies in Policy Making. Ann Arbor: Institute for Social Research, 1978.

[23]Ibid., p. 5.

CHAPTER II

REVIEW OF THE LITERATURE

As shown in Chapter I, it is generally accepted by both the research community and government-user agencies that social research is underutilized. In recognition of this situation, a growing body of literature is evolving on utilization process. The creation of a new professional journal, Knowledge: Creation, Diffusion, Utilization, devoted to this area is illustrative of the increasing recognition of the need for information in this area.

This chapter provides elaboration and refinement for the research design's substantive and theoretical foundation. In particular, this review will concentrate on the three areas of the literature briefly stated in the "Statement of the Research Problem" which are of particular importance to this research. The first area deals with the controversy in the literature as to the definition of utilization; a definition which has serious implications for any research on utilization. From this review, three perspectives on utilization (engineering, intelligence, enlightenment) are developed. The second area concentrates on the perspectives which have been developed on the utilization process, and

identifies theoretically important factors which have to be fostered for utilization to occur. The final area identifies barriers to utilization and theories which have addressed the relative importance of the barriers to utilization. This discussion provides the basis for the hypotheses examined in the data analysis chapters.

I. Defining Utilization

A. Problems in Defining Utilization

Despite general acceptance that social research is underutilized, this consensus can be misrepresentative in at least two ways. The first is the tendency of social researchers to take a narrow view of what constitutes utilization. Research by Caplan (1975), Weiss (1977), and others[1] has documented that although research is typically underused, actual utilization is often underestimated due to overly restrictive definitions of what constitutes utilization. Specifically, utilization is usually limited to the direct application of research results to a policy decision. These researchers have found that policymakers may use social research for a much broader range of purposes, particularly conceptual purposes.

The contrast between direct and conceptual use of social research is illustrated by Caplan's study of 204 federal decisionmakers. Done in 1974, this study examined

reported incidences of direct use of research results. Using this restrictive definition of utilization the study found little use of studies by federal decisionmakers and concluded that "officials often lack the skills and proper orientation to put scientific knowledge to good use."[2]

However, in 1975, Caplan redefined his concept of "use" and re-analyzed the data. By broadening his definition to include concepts, perspectives, and generalizations arising from the research results as opposed to only specific data or conclusions, Caplan found much different results; 575 self-reported cases of utilization, or an average of about three per person. Moreover, the data suggested "that there is widespread use of soft information (i.e., non-empirical), and that its impact on policy, although often indirect, may be as great or even greater than the impact of hard information."[3]

In tandem with this definition problem is a measurement problem. The political process into which social research is introduced is a continuous process of bargaining and compromise. To expect any one or a series of documents to have an immediate and direct impact on the output of such a process is a mistake. Many factors affect utilization, including political considerations, interpersonal relationships, organizational interests, and researchers' efforts to increase utilization.[4] Carol Weiss[5] has suggested that

it may take ten years or more for decision-makers to respond to the accumulation of consistent evidence. To measure the impact of social research under such circumstances is very difficult, and subject to considerable uncertainty.

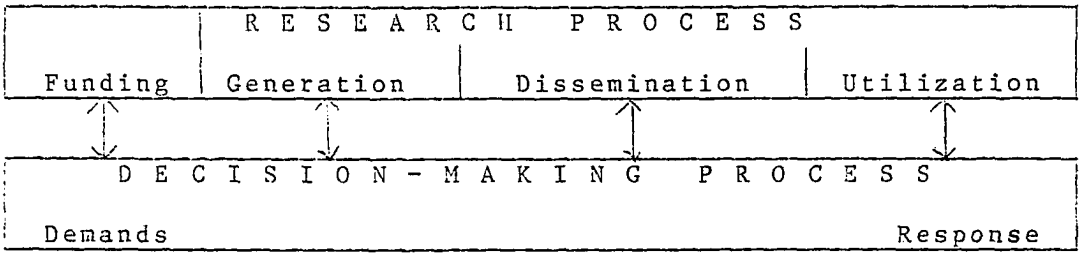
B. An Holistic Approach to Utilization

As noted by Rich,[6] researchers involved in knowledge development have generally concentrated on knowledge creation (generation), knowledge diffusion, or knowledge utilization. As a result, these areas have developed independently. However, as stated by Rich:

> ...in reality, each of these subprocesses influence the others. Knowledge development includes all three processes. If one conceives of utilization (impact) as being the product of the interactions in an overall knowledge inquiry system, then it is critical to examine the attitudes and behaviors of sponsors, producers, and users of research. Each link in this system...possess the potential of influencing the degree to which scientific knowledge can have an impact on decision-making.[7]

As illustrated by Figure II-1, one can conceptualize utilization as the overall impact of the various user-researcher interactions during the entire research process. "It is not sufficient to study utilization separately from the creation and diffusion of knowledge..."; "an analysis is incomplete without an understanding of the channels employed to disseminate information and an understanding of the assumptions made in creating the knowledge."[8] To focus on the entire research process rather than just impacts requires the development of "models" or "perspectives" of that process

FIGURE II-1: CONCEPTUALIZATION OF UTILIZATION PROCESS



based on the diverse types of questions social researchers are asked to address. These questions range from operational research questions, which are generally narrow and specific, to long-range planning questions which are broad and nebulous.

From the work of Byrd,[9] Kraemer,[10] and Crawford and Biderman,[11] perspectives on the research process can be divided into three categories. This division provides a basis for comparison. Using the terminology of Crawford and Biderman, these divisions are: engineering perspectives, intelligence perspectives, and enlightenment perspectives. Table II-1 compares and contrasts the three types of perspectives according to ten research questions researchers encounter during the research process. From this three "models of research" have been synthesized to show the influence perspectives can have on utilization.

TABLE II-1: COMPARISON OF RESEARCH PERSPECTIVES

Research Questions	Perspective on Research Process		
	Engineering	Intelligence	Enlightenment
Degree of difficulty and complexity in defining objectives	single objectives easily defined	multiple objectives difficult to define	defining objectives part of problem
Degree of explicitness of criteria for evaluating alternatives	single criteria mutually agreed upon	multiple criteria with a lack of general consensus	formulating criteria part of problem
Degree of difficulty in defining alternatives to the problem	several alternatives available	alternatives few and similar to each other	formulating alternatives part of the problem
Time frame of the problem	short-range	middle-range	long-range
Amount of uncertainty, real or stocastic, involved	uncertainty stocastic in nature	ranges of uncertainty describable	areas of uncertainty identifiable
Ability to arrive at an optimal solution to problem	single, optimal solution possible	comparison of alternatives possible	better understanding of problem possible
Number of different stakeholders whose interests are considered relevant	few stakeholders, interests similar to each other	groups of stakeholders, dissimilar interests	number of stakeholders unclear, interest not well defined
Degree of ability to restrict the system being studied	problem can be isolated from the rest of the system	some parameters can be put on the system	the system is an integral part of the problem
Extent to which dynamic features of the system and environment are considered	consideration of dynamic features unnecessary	selected dynamic features are considered	dynamic features are integral part of problem
Degree to which uncontrollable variables are considered	few uncontrollable variables to be considered	selected uncontrollable variables are considered	uncontrollable variables integral part of problem

1. Engineering Model of Research

Most of the literature which cites gross underutilization of social research is based an engineering perspective of what constitutes utilization. Illustrative of this tendency is the following by Carol Weiss:

> Evaluation research is meant for immediate and direct use in improving the quality of social programming. Yet a review of evaluation experience suggests that evaluation results have not exerted significant influence on program decisions.[12]

However, to have such a direct impact on decision-making, one must analyze the kind of research question which lends itself to a definitive kind of answer. Using characteristics listed in Table II-1, such a question would tend towards the narrow, specific research question. Such questions would tend to have: (1) single objectives; (2) clear and explicit criteria for evaluation; (3) clearly identifiable alternatives; (4) short time frames; (5) mostly stocastic uncertainty; (6) optimal solutions; (7) few relevent stakeholders; (8) narrow, restricted systems; (9) static systems; and (10) few uncontrollable variables.

Few questions presented to social scientists can be restricted to the point necessary for the engineering model of research (including evaluation research). Social problems tend toward the more complex, nebulous end of these characteristics: multivariate problems, dynamic systems, uncontrollable phenomena, no optimal solutions,

and other characteristics. Therefore, the engineering perspective of utilization should not be the only criteria by which social research utility is measured and evaluated.

2. Enlightenment Model of Research

As opposed to engineering questions which are narrow and well-defined, enlightenment questions are nebulous, with great uncertainty. Setting objectives, inventing alternatives, indicating areas of uncertainty, attempting to offer insight and understanding of the problem rather than an optimal solution, and dealing with a dynamic system are among the tasks an enlightenment perspective presents.

Given the uncertainty in defining an enlightenment question, it is not surprising that there would be a lack of consensus by researcher and user on how the research should proceed, and what the product would be. This lack of consensus is the basis of one theory's explanation for underutilization of social research, and has been cited by some as the primary reason for underutilization.[13]

That policy researchers must reach a consensus with decision-makers on the basic goals of their research to have their work utilized is challenged by the enlightenment model. Carol Weiss's study of the utilization of fifty mental health evaluations has indicated that decisionmakers react positively to research which challenges the status quo; that they want different perspectives on a problem, a different

insight. Therefore, the impact and use of information generated from an enlightenment research perspective will be different from that of engineering perspective. Rather than direct application, an enlightenment model of research will produce perspectives, orientations, and empirical generalizations about policy areas and priorities. As summarized by Weiss, the enlightenment model of research:

> ...does not consider value consensus a prerequisite for useful research. It sees a role for research as social criticism. It finds a place for research based on variant theoretical premises. It implies that research need not necessarily be geared to the operating feasibilities of today, but that research provides the intellectual background of concepts, orientations, and empirical generalizations that inform policy. As new concepts and data emerge, their gradual cumulative effect can be to change the conventions policymakers abide by and to reorder the goals and priorities of the practical policy world.[14]

3. Intelligence Model of Research

A third, middle-range model exist which characterizes much social research. As stated by Crawford and Biderman, the intelligence model "envisages more pragmatic specificity -- that is, more specific identifiability of users and uses -- than would be consistent with the general enlightenment mechanism."[15] Yet, the researcher is faced with multiple objectives, multiple criteria, limited alternatives, many uncontrollable variables, and only a limited ability to compare alternatives as opposed to arriving at an optimal solution. As summarized by Lasswell,[16] the potential

contribution of intelligence research is that it can help: (1) clarify goals, (2) clarify alternatives, and, (3) provide needed information.

Such characteristics do not lend themselves to the engineering perspective of utilization. They do not provide the decisionmaker with a clear-cut choice of an optimal solution. Also, the research is aimed at more specific users and uses than the enlightenment of decision-makers. Therefore, intelligence results tend to be introduced into the decision-making process as one of many inputs, and provide one basis for decisions to be made on. However, as noted earlier, measurement of the utilization of social research under such circumstance is very difficult, if not impossible. Evaluation research and technology assessment are examples of such research; addressed to specific problems, but for which optimal solutions are not forthcoming.

C. Summary of Defining Utilization

To determine the utilization of a research product, the research process, not just the results, must be the focus. It is not sufficient to study utilization separately from the creation and diffusion of the product. Thus, three models of the research process have been developed to account for the diverse questions that social researchers are asked to address. Each model has different implications for research design, the conduct of the research, and communication and

dissemination strategies. More importantly, most social problems overlap one or more of these models. Therefore, to look at the process of utilization, one must look at the research process through each of these "lenses" to gain a understanding of the utilization process. Each perspective increases our understanding of utilization.

II. Theoretical Perspectives on Utilization[17]

This section discusses three theoretical perspectives on the utilization process from the theory of innovation literature. From this discussion the importance of awareness, interest, trust and credibility will be synthesized.

A. Social Interaction Perspective

The Social Interaction perspective stresses the importance of the mechanism, or media, used to diffuse a new innovation. Personal communication between user and producer is viewed as the most effective means to diffuse information. While several authors have written on the Social Interaction perspective, the best known is Everett Rogers. In his book, Diffusion of Innovations,[18] Rogers proposes a five-stage process which an individual goes through to adopt an innovation.

At the first stage, awareness, the individual is exposed to the innovation, but lacks complete information about it. "The primary function of the awareness stage is to initiate the sequence of later stages that lead

to eventual adoption or rejection of the innovation."[19] At the second stage, interest, individuals become interested in the innovation, but have not judged the utility of it for their particular situation. At this point, the individual's actions becomes purposive; "his personality and values, as well as the norms of his social system may affect where he seeks information, as well as how he interprets this information about the innovation."[20] Awareness and interest are crucial stages in this process. As stated by Havelock, the user responds:

> ...to the new information, and the nature of his reaction determines whether or not subsequent stages will occur. If his awareness is followed by an expression of interest, he is launched on a series of stages which terminate with the acceptance or rejection of the innovation. 21

At the third stage, evaluation, individuals make mental decisions on the utility of the innovation in their particular situations. If the "mental trial" is positive, the process moves to the fourth stage, trial. At this stage, the individual uses the innovation on a small scale to determine the utility of it. If the demonstration proves successful, the process moves to the final stage, adoption, where the innovation is adopted.

B. Research, Development, and Diffusion Perspective

While the Social Interaction perspective presupposes an innovation to be diffused, the Research, Development,

and Diffusion perspective begins at an earlier point in the utilization process. Emphasizing the development of the innovation rather than fostering potential users, the Research, Development, and Diffusion perspective sees the process of utilization as a chain of events from the conception of the innovation to its adoption.

Illustrative of this perspective is the work of Guba and Clark.[22] From their work four links to the research development, and diffusion chain of events emerge. The first activity is research, where knowledge is advanced or extended. "It may provide a basis for innovation if anyone else chooses to capitalize on the research and is clever enough to develop an application from it."[23] The second activity, development, is subdivided into two categories: invention and design. The object of invention is "to formulate a new solution to an operating problem or to a class of operating problems, i.e., to innovate."[24] Such inspiration can be based on research, experience, or intuition. The objective of design is "to order and to systematize the components of the invented solution into an innovation package suitable for institutional use, i.e. to engineer."[25]

The third activity, diffusion, is also subdivided into two parts: dissemination and demonstration. The objective of dissemination is to "create widespread awareness of the

invention among practitioners, e.g. to inform."[26] The purpose of demonstration is to "afford an opportunity to examine and assess operating qualities of the invention, i.e. to build conviction."[27] In addition to the above, Guba has suggested additional diffusion activities for the producer to assist the user. As summarized by Havelock,[28] they are:

> Helping the practitioner by acting in capacities such as consultant or trouble-shooter,
>
> Involving the practitioner in the processes of problem identification, development, testing, and packaging of the innovation and diffusing it to others,
>
> Training the practicioner in the use of the innovation, and,
>
> Intervening in the client system, to the extent of mandating certain actions.

The final activity of this chain is adoption, the incorporation of the innovation into the functional system. This activity is subdivided into three other activities. These are:

> Trial. The objective of the trial stage is "to build familiarity with the invention and provide a basis for assessing the quality, value, fit, and utility of the invention in a particular institution, i.e. to test."[29]
>
> Installation. The objective of installation is "to fit the characteristics of the invention to the characteristics of the adopting institution, i.e. to operationalize."[30]
>
> Institutionalized. The purpose of institutionalized is to assimilated the innovation into the functioning structure of the system.

C. Problem-Solver Perspective

The Problem-Solver perspective views the utilization process as one directed towards solving the problems of a specific user; a process in which users themself are involved throughout. Whereas in the Social Interaction perspective, the users are referred to as the "target system," in the Problem-Solver perspective, they are the "client system," the relationship being one of collaboration.

A typical model of this is Lippitt, Watson, and Westley, The Phases of Planned Change.[31] Their seven phase process begins with the development of a need for change. Essentially, this process includes awareness of a stress in the system, and recognition of the need for change. Recognizing this need, the second phase is the establishment of a change relationship between the client (user) and the change agent (producer). At this point, Lippitt et al., stress the importance of building trust and understanding between the change agent and the client system for the relationship to be successful. As they state the issue:

> The success or failure of almost any change project depends heavily upon the quality and the workability of the relationship between the change agent and the client system.[32]

At the third stage, the change agent begins to clarify and diagnosis the client's problems. This process is continued in the next stage when alternative routes and goals

are examined and intentions of actions are established. At the fifth stage, these intentions are transformed into actual changes efforts. It is at this stage that the success or failure of the innovation may be determined. With a successful change effort, the next phase is to stabilize the new system. Finally, the change relationship is terminated.

D. Factors Affecting the Utilization Process

From these theoretical perspectives, some prescriptions for promoting utilization are given. The Research, Development, and Diffusion perspective is not very useful since it only categorizes the knowledge creation process and does not prescribe what can be done to promote utilization. However, both the Social Interaction and the Problem-Solver perspectives offer suggestions on promoting the utilization process.

The Social Interaction perspective is useful because it identifies the stages of decisionmaking an individual goes through in deciding on an innovation. In particular, this perspective points out the need to promote awareness and interest in the user to create a desire or need for the innovation, and as necessary precursors to getting the innovation evaluated, tried, and adopted. Secondly, it emphasizes the importance of the techniques used to disseminate and promote understanding of the innovation.

The Problem-Solver perspective is useful because it points out the need for building a collaborative

relationship of trust and credibility through user involvement in the research process. By building trust and credibility through a collaborative relationship during the awareness and interest stages of the research, the evaluation, trial, and adoption stages of the utilization process becomes a collaborative effort. As stated by Havelock:

> This type of collaborative interaction will not only make solutions more relevant and effective, but it also builds relationships of trust and mutual perspectives by user and resource persons that the other is truly concerned, will listen and will be able to provide useful information. These trust relationships can over time become channels for the rapid and effective transfer of information.[33]

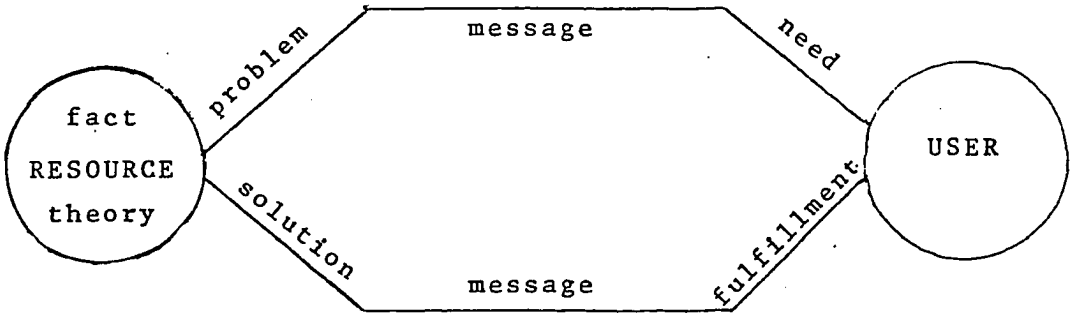
These concepts provide the framework for this research on utilization.

III. Identifying Barriers to Utilization: The Structure of the Utilization Process[34]

A. The System Model of Utilization

As discussed by Havelock, the systems approach to utilization is composed of two components. The first is the "flow structure;" the information-carrying system by which information is transmitted between the user and the producer. The second is the administrative backup to the flow structure which supports, supplies, and at least partially controls the flow structure. A simple utilization system might appear as the following:

FIGURE II-2: A SIMPLE UTILIZATION SYSTEM



Source: Havelock and Benne, 1967

1. Flow Structure

As this illustrates, the utilization system is a need-fulfillment cycle between the user and the producer (resource). From this perspective, two concepts important to the utilization process emerge. The first is the concept of a "message" or "unit of information;" the substance of the information being transmitted between user and producer. Such messages may be problems, solutions, requests, demands, or distress signals. The second concept is that of a "barrier"; a difference between the frame of reference of the user and that of the producer.

While the above illustration is a simple one involving two persons and a single message cycle, four points exists where a message enters or leaves a participant; posing at

least four potential barriers to the successful conclusion of the need-fulfillment cycle. The addition of other users or resources to the flow structure would increase the number of potential barriers; taken to the level of organizations, the proliferation of barriers becomes a serious problem. In addition, informal channels of communications may add or detract from the system. Attempts by users to "bypass" some elements of the system may undermine it. However, such channels may also provide feedback that the system's formal channels cannot.

2. Administrative Backup

Administrative support for the described flow structure is evident in the following five areas:

> Education. The educational system provides a continuous source of professionals for input into the system. Also, the educational structure provides for the "maintenance of standards, and, above all, the preparation of consumers for the use of knowledge."[35]
>
> Financial Support. While the amount of money a project has is a factor in the success of an utilization effort, it is not the only one. Reliability, stability, and flexibility of the support is just as important.
>
> Control. A third necessary administrative function is the specification of goals and coordination of activities of the flow structure. Participants in the process may be too involved to do it effectively.
>
> Protection. A fourth administrative function is the protection of each group in the system as well as the system as a whole.

> Change. The last administrative function is providing the system with mechanism to ensure adaptability and flexibility to changing circumstances and new knowledge.

While the above activities are necessary for the maintenance of the system, they are not information-carrying mechanisms, and therefore not a part of the flow structure. However, such activities may hinder an utilization effort. Over time, changes in the administrative support of an organization can influence the success of an utilization effort. Changes in personnel, funding, and organization can all have serious effects on the research process.

B. The Process Model of Utilization

While the systems model provides background to the basic concepts of utilization, the model becomes very cumbersome as more details are added to it. The need-fulfillment cycle involves numerous communications, exchanges, and contacts which can be viewed as separate instances of one overall process.

The need-fulfilling value of the message is of primary importance to the participants of the system; it is the payoff. In this sense, utilization is similar to economic exchange. The potential payoff to both the producer and the user is the primary reason why the process was begun. In discussing the utilization process, Havelock has divided the process into three categories: (1) the motivational aspect of the process; (2) the interpersonal and group

membership issues; and, (3) technical issues dealing with the content of the message itself.[36] By addressing these issues, the complexities of the utilization process is revealed.

1. Motivational Aspects

Urgency of the need, both real and psychological, is important when addressing motivation. The circumstances of the situation may be that the issue is "too hot to handle," or users may need to "put out the fire," or users may be in the position of "don't stand there, do something." Clearly, these situations affect the motivation of the user. In addition, psychological urgency, such as the present urgency to find a cure for cancer, may effect the urgency in which a user views a problem.

Moreover, individual characteristics relating to the dissemination-utilization process may assist or hinder that process. Examples include the following:

> Competence. Incompetent individuals will have more of a tendency to reject the new and the strange as a threat to them.
>
> Open- and closed-mindedness. An individual with a closed mind is going to be more dogmatic when dealing with new knowledge than an individual with a more open one.
>
> Values. Deep-seated values of individuals can be a significant barrier to new knowledge if the individuals perceive that knowledge as being contrary to their values.
>
> Past Experience. People act in accordance with their past experience. New knowledge which runs contrary to such experience is faced with a difficult barrier.

> Feeling of Threat. When new information either questions the self-image, status, position, or presents strange knowledge to an individual, that individual attempts to resist that threat.
>
> Distortion of New Information. People have a tendency to assimilate information in close proximity to one's own views and either reject or distort deviant information.

The importance of such factors to the utilization of knowledge is partially dependent on the flexibility permitted individuals by their organizational environment. In the case of a university or research institute setting, the individual may have great freedom in the alternatives available and the choices possible. However, an individual in a bureaucratic structure would tend to make decisions based on the directives of supervisors and dictated requirements of the organization.

2. Interpersonal and Group Membership Issues

While the individual aspects of the utilization process, addresses the motivation of decision-makers, interpersonal and group membership issues addresses the process of communication between individuals. As stated by Havelock:

> The process of communication is a matter of language, transmission, and having something to say, but this is only part of it. Communication is also contact and non-verbal exchange between persons and between groups. To be heard, a message must be received with suspicion, the sender must be trusted and believed. The receiver must be interested and receptive. There must be rapport, a feeling of commonness of purpose or of spirit, or at the very least, an implicit contract that what is said will be listened to.[37]

This added complexity to the utilization process presents another set of potential barriers to utilization. Among them are the following:

> Role Perception and Definition. Individuals may refuse to perceive themself as "producers" or "users." Such people are refusing to admit that they need outside help, or are able to give it.
>
> Status Discrepancy and Ambiguity. Individuals may see the role of sender or receiver as endangering their status.
>
> Language. The producer and user may not speak the same technical language.
>
> Values. The values of the user and producer may conflict.
>
> Being Out of Phase. The user may ask for an answer before the producer can provide one, or the producer may provide an answer before the user is sure what the question is.

Generally, individual users and producers operate and make decisions within the larger context of an organization. As such, many of their decisions are either dictated or constrained by the norms and procedures of their organization. This added complexity to the interpersonal barriers presents another set of barriers to the transfer of knowledge. Among the characteristics of organizations which cause these new barriers are the following:

> Survival. The first rule of organizations is survival. To this end, information which is considered threatening to the organization will be intercepted, and screened out.
>
> Purpose. Most organizations have a defined purpose in being. Hence, information which they feel is not "relevent" to their purpose may be screened out.

Stability. Organizations function and work in a state of equilibrium. New information which threatens this equilibrium may be screened out.

Membership. People within an organization generally take on the norms of the organization. These norms may tend to separate them from the outside world and constitute a barrier.

3. Technical Issues

The third issue in the process model of utilization is the preparation and transmission of the message itself. As stated by Havelock, the preparation stage is a four-part process. First, there is the research process where relevant facts become the body of the message to be transmitted. Second, the message is translated into language which is understandable to the potential users. Third, the message is reviewed for error and validity. Finally, the message is packaged and labelled.

Ready for transmission, the question for the researcher becomes how to transmit it. The most common method is by written text. While writing provides a rather precise and accurate means of transmission, it is a one-dimensional media and cannot provide rapid feedback. Mass media such as television or large lectures provide speed and dimension to a presentation, but tend towards oversimplication of the issues, and not facilitate rapid feedback.

C. Summary of Barriers to Utilization

Utilization should be conceptualized as the overall impact of the various user-producer interactions along

the entire research process. In this way, one discovers that several potential barriers to successful interaction between users and producers exist. Utilization strategies must overcome these barriers.

Five general categories of barriers can be identified. Individual barriers are those characteristics of producers and users such as values, competence, experience, and urgency of need, which may hinder the utilization process. Interpersonal barriers are problems which occur during the process of communication and interaction between individuals. These barriers include language, status and value differences.

Organizational barriers refer to the added complexity to the communication-interaction process resulting from organizational norms and procedures. Technical barriers are communication problems which occur from the preparation and transmission of the research product per se. The time barriers are problems arising from the time needed to do research. These problems include turnover of administrators and researchers over time which hinders the establishment of linkages between them.

IV. Responsibility for Underutilization

While a variety of theories have been advanced as to the relative importance of these barriers, most can be classified under three headings: Knowledge-Specific Theories, Policy

Maker-Constraint Theories, and Two-Communities Theories.[38] Each of these theories place the responsibility for the underutilization differently.

Policy Maker-Constraint Theories tend to place the responsibility for underutilization on the policy-making process; the time constraints and political process of bargaining and compromise runs counter to the rational-comprehensive nature of social research, and will inevitably "filter out" the research, whether good or bad. White and Rein's account of the political manipulation of the Westinghouse evaluation of Head Start is an example where millions were spent on research and few of the results were used.[39]

Such theories on underutilization place the responsibility for improving the situation on the policymaking process. David Cohen summarized the view of many in the academic community on the status of social research vis-a-vis government decisionmaking by laying the blame on policy makers: "...there is little evidence to indicate that government planning offices have succeeded in linking social research and decisionmaking."[40] Not surprisingly, suggestions for improving the effectiveness of social research tend to be institutional in nature: suggestions include Campbell's call for the formulation of programs in a fashion that facilitates the evaluation of them,[41] and Wholey's suggestion that the evaluator assist program managers "in 'program design' efforts to define measurable

objectives and testable assumptions linking intended program activities to program objectives."[42]

Knowledge-Specific Theories tend to place the responsibility for underutilization on the knowledge producers, rather than the users. Factors such as inadequate theory, data, methodology, along with disciplinary narrowness, and a lack of policy orientation contribute to the underutilization of social research. As stated by Dye: "social scientists simply do not know enough about individual and group behavior to be able to give reliable advice to policy makers."[43] Social problems are seen as being too complex for social scientists to make accurate analyses of potential policy impacts at the present time.

Two-Communities Theories tend not to place the responsibility for underutilization on either the user or producer, but rather to stress the mismatches between the research community and government-user agencies, and the importance of developing linkages between them. Such mismatches between producer and user may include differing values, goals, languages, reward systems, and standards. By developing lines of communications between the two communities, it is possible that such barriers to utilization may be mitigated.

This third perspective on utilization rejects the "inevitability" argument of the Policy-Constraint Theories, and the social science "impotence" argument of the Knowledge-Specific Theories. It sees researchers as building

linkages between themselves and the potential users of their research to bridge the gap between them. To this extent, the Science and Public Policy Program has followed a two-communities approach to utilization by promoting interaction between itself and the users. It is through such interaction that Science and Public Policy hoped to build the awareness, interest, trust, and credibility necessary to enhance the potential for utilization. The next chapter will discuss Science and Public Policy's strategy for fostering utilization.

FOOTNOTES

[1]See Weiss, Carol H. "Research for Policy Sake: The Enlightenment Function of Social Science Research." Policy Analysis 3,4:531-545, 1977 for a summary.

[2]Caplan, Nathan. "Science is Seldom Put to Good Use by U.S. Officials." ISR Newsletter, 2 (Spring): 2, 1974.

[3]Caplan, Nathan, A. Morrison, and R.J. Stambaugh. The Use of Social Science Knowledge in Policy Decisions at the National Level. Ann Arbor: Institute for Social Research, University of Michigan, 1975. p. 47.

[4]On these other inputs into the policy process, see Arron, H. Politics and the Professors: The Great Society in Perspective, Washington, D.C.: Brookings Institution, 1978: House, P.W. and D.W. Jones. Getting It Off the Shelf: A Methodology for Implementing Federal Research. Boulder: Westview Press, 1977: Lindblom, C.E. and D.K. Cohen. Useable Knowledge: Social Science and Social Problem-Solving New Haven: Yale University Press, 1979; and, Patton, M.Q. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978.

[5]See Weiss, Carol H. "Research for Policy Sake: The Enlightenment Function of Social Science Research." Policy Analysis 3,4:531-545, 1977.

[6]See Rich, Robert F. "Editor's Introduction," American Behavioral Scientist 22, 3:327-337, 1979.

[7]Ibid, 331.

[8]Ibid, 333.

[9]Byrd, Jack, Jr. Operations Research Models for Public Administration. Lexington, MA: Lexington Books, 1975.

[10] Kraemer, Kenneth L. Policy Analysis in Local Government. Washington, D.C.: International City Management Association, 1973.

[11]Crawford Elisbeth T., and Albert D. Biderman, eds. Social Scientists and International Affairs: A Case for a Sociology of Social Science. New York: John Wiley & Sons, 1969.

[12]Weiss, Carol H. Evaluation Research: Methods of Assessing Program Effectiveness. Englewood Cliffs, N.J.: Prentice-Hall, 1972. p. 10-11.

[13]The reference here is to the Two-Communities Theory of Non-Utilization. Among the authors citing this lack of consensus, see in particular Patton, Michael Q. Utilization Focused Evaluation. Beverly Hills: Sage Publications, 1978.

[14]Weiss, Carol H. "Research for Policy Sake: The Enlightenment Function of Social Science Research." Policy Analysis 3,4:531-545 (1977) p. 545.

[15]Crawford, Elisbeth T., and Albert D. Biderman, eds. Social Scientists and International Affairs: A Case for a Sociology of Social Science. New York: John Wiley & Sons, 1969. p. 240.

[16]Lasswell, Harold O. "Constraints on the Use of Knowledge in DecisionMaking," in Manfred Kochen (ed.) Information for Action. New York: Academic Press, 1975.

[17]This analysis rests primarily on work done by Ronald Havelock. In particular, Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969.

[18]Rogers, Everett M. Diffusion of Innovations. New York: Free Press, 1962.

[19]Ibid., 82.

[20]Ibid., 83.

[21]Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969. p. 14.

[22]Guba, Egon G. and David Clark. "Development, Diffusion and Evaluation" in T.L. Eidell and Joanne Kitchel, eds., Knowledge Production and Utilization in Educational Adminstration. Eugene: University of Oregon, 1968.

[23]Ibid., 7.

[24]Ibid., 8.

[25]Ibid., 9.

[26]Ibid., 8.

[27]Ibid., 8.

[28]Havelock, Ronald G. Planning for Innovation Through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969.

[29]Guba, Egon G. and David Clark. "Development, Diffusion and Evaluation," in T.L. Eidell and Joanne Kitchel, eds., Knowledge Production and Utilization in Education Administration. Eugene: University of Oregon, 1968. p. 8.

[30]Ibid., 8.

[31]Lippitt, Ronald, Jeanne Watson, and Bruce Westley. The Dynamics of Planned Change. New York: Harcourt, Brace, and Company, 1958.

[32]Ibid., 135-136.

[33]Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969. p. 11-14.

[34]This analysis rests primarily on work done by Ronald Havelock. In particular, Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969, and _____ and Kenneth Benne. "An Exploratory Study of Knowledge Utilization" in G. Watson, ed., Concepts for Social Change. Washington, D.C.: NTL Institute for Applied Behaviorial Science, 1967.

[35]Havelock, Ronald G., and Kenneth Benne. "An Exploratory Study of Knowledge Utilization." in G. Watson, ed., Concepts for Social Change. Washington, D.C.: NTL Institute for Applied Behaviorial Science, 1967.

[36]Ibid.

[37]Ibid.

[38]See Caplan, Nathan, A. Morrison, and R.J. Stambaugh. The Use of Social Science Knowledge in Policy Decisions at the National Level. Ann Arbor: Institute for Sociall Research, University of Michigan, 1975.

[39]Rein, N. and S. White. "Can Policy Research Help Policy? The Public Interest, 49, fall: 119-36, 1977.

[40]Cohen, David K., and Michael S. Garet. "Reforming Educational Policy with Applied Social Research." Harvard Educational Review 45, 1: 17-41 (February 1975).

[41]Campbell, D.T. "Reforms as Experiments," American Psychologist 24:409-29, 1969.

[42]Wholey, J.S., et al. "Evaluation: When is it Really Needed?" Evaluation 2, 2:89-93, 1975.

[43]Dye, Thomas R. Understanding Public Policy. Englewood Cliffs, N.J.: Prentice-Hall, 1978.

CHAPTER III

RESEARCH CONTEXT

> ...we can't find any of those methodologies that work and about all one can do in interdisciplinary studies aimed at informing public policy is to organize groups of people from different disciplines or project groups or task force groups. The organizing mode really is the problem definition. And you can define it -- in our case we usually try to structure the investigation around some particular technology, trying to examine the impacts of that technology on society. But, the only thing that holds our study together usually is the hardware around which we are building the study. Subconsciously we've taken the view that what you have to do is substitute organization and procedures for what would be better done with an adequate methodology or body of theory. (Kash, 1977)

The Science and Public Policy Program was established at the University of Oklahoma in September, 1970. Under the direction of Don E. Kash and Irvin L. (Jack) White,[1] the program has conducted a number of "technology assessments." Such research projects are undertaken to assist policymakers in anticipating the broad range of social, economic, environmental, institutional, and other consequences likely to occur through the introduction, extension, or modification of a technology.[2] In particular, the program has focused on energy technologies.

I. S&PP'S Approach to Applied Policy Analysis

A. View of Technological Society

In recent years, some have suggested that American society has evolved into a "post-industrial" or "technological" society;[3] one that is fundamentally different from societies of the past. Such a society is the product of a historically complex dialectic between science and technology.[4] The industrial society of the 19th and early 20th centuries concerned itself with maximizing production and consumption of goods -- a materialistic definition of "the good life." To the extent that science and technology was useful in achieving this goal, they were linked to society. Beyond first-order consequences of these activities, the impacts of innovations and activities were given little consideration.

However, with the coming of the technological age, society has become more dependent on scientific knowledge. As the demands of society have caused the development of more sophisticated technologies, technology has "depended more and more upon basic scientific knowledge and today the two activities are virtually inseparable."[5] Such a situation has seen the development of linkages between government, industry, and science to facilitate the process of innovation. Thus, as stated by Kash and White:

> ...while the Technological Society is truly brain-based, its distinctive genius is organizational and managerial. This genius makes it possible to create technology on demand, an ability that in turn allows social goals to be established which require for their achievement the development of wholly new technologies. Likewise, the development of new technologies now at times makes it possible to establish new social goals. In the case of synthetic products, the capability to produce has been contingent upon successfully linking basic knowledge and innovative technologies. But in this instance, the central focus still has been upon tangible products; thus synthetic products represent only an incremental change from the characteristic mode of operation within the Industrial Society.[6]

Thus, the fundamental change wrought by the technological age is the organizational and managerial innovations developed to handle the increasing complexity of technology and specialization of expertise. Examples include the Manhattan, Polaris, and Apollo projects; projects which required organizations "that could link together, manage, even orchestrate complex organizational components from a variety of sources."[7] In industry, this organizational form has surfaced in the development of conglomerates. One advantage of such organizations is the flexibility they provide in developing new product organizations and eliminating old ones.[8] "But more importantly, these organizational forms allow for maintaining some degree of balance stability and flexibility; the desire for stability appears to be pervasive

in all societies while one of the immediate specific demands of the technological society appears to be flexibility."

An example of one ad hoc and transient project organization is the C-5A transport project. As noted by Toffler:

> When Lockheed Aircraft Corp. won a controversial contract to build fifty-eight giant C-5A military air transports, it created a whole new 11,000-man organization specifically for that purpose. To complete the multi billion-dollar job, Lockheed had to coordinate the work not only of its own people, but hundreds of subcontracting firms. In all 6,000 companies are involved in producing the more than 120,000 parts needed for each of these enormous airplanes. The Lockheed project organization created for this purpose has its own management and its own complex internal structure.[9]

"The planned impermanence or transient character of the project organization is emphasized by building into it a self-destruct mechanism which is supposed to be activated upon project completion."[10]

B. The Need for Technology Assessments

Despite the development of science and technology and the organizational and managerial capacity to link diverse components, society, until recently, continued to concern itself with only the first-order consequences of technological innovations. While such a narrow view of impact may have been reasonable in pre-technological societies where change was gradual and incremental, with the rate of change occurring in the technological age, social control appears to be lacking. Some have suggested that

such control may be beyond our capacity unless society retreats from the complexity of the technological age.[11]

However, many of the ills of today's society are the results of the industrial society's preoccupation with first-order consequences of development. The various forms of pollution and cancer-causing food additives are examples of impacts that previous societies failed to foresee. Other ills, such as the byproducts of synthetic products, are directly the result of the technological age.

Other impacts of the technological society are more subtle. In particular, the ad hoc nature of many project organizations conflicts with the bureaucratic tendency for survival; the interests which brought the organization together for the project remain after the project organization has been dismantled. Using Toffler's example of the C-5A, while the project organization was dismantled after completion of the "mission," the aerospace industry remained. Given the reality that success or failure, the project organization will be dissolved at some point, members of the technological communities "consequently often concern themselves with searching for a justification for the continued existence of their particular technological community if not their particular project organization." As summarized by Kash and White:[12]

> In short, technological communities continuously are involved either in attempting: (1) to modify their capabilities so that they can develop technologies that will contribute to new goals; (2) to develop new technologies that will contribute to unachieved goals; or (3) to convince government that it should adopt new goals to which the technologies they are developing can contribute.[13]

Such a development of technologies may lead to two problems: (1) the pursuance of goals which are undesirable to the society; and (2) increase potential for unacceptable second and third order consequences to be borne by the society. In either case, the atmosphere for the development of science and technology will be adversely affected; a development on which the fulfillment of many social goals hinge. As summarized by Kash and White:

> Our dilemma then, is: how do we deal with new problems which often are a consequence of the rapid development of science and technology while at the same time satisfying the conventional aspirations of those who have yet to enjoy the abundance made possible by scientific and technological innovation.[14]

One alternative for "keeping tabs" on the costs and benefits of new technologies is the development of a mechanism for assessing the impacts caused by the introduction, expansion, or modification of a technology. "Technology Assessments"[15] -- are one such choice.[16]

C. Structure of a Technology Assessment and the Importance of User Interaction

"Applied policy is inherently interdisciplinary because societal problems seldom, if ever, fall within the boundaries

of any single discipline. As a consequence, a variety of disciplinary perspectives, expertise, and analytical skills are almost always needed to acquire the requisite substantive knowledge and perform the required analyses."[17] Yet, applied research is always incomplete; there is always uncertainty, data and methodological limitations which prevent the researcher from arriving at the definitive answer. What an interdisciplinary approach does is to broaden the perspectives considered, and assists in preventing disciplinary or personal bias.

The interdisciplinary approach developed in the Science and Public Policy Program has four main components: (1) a general conceptual framework; (2) an interdisciplinary research team; (3) the active involvement of numerous outside experts and stakeholders; and, (4) an issue-systems policy analysis framework.[18] It is the third component -- active involvement of stakeholders -- which is of particular importance to this study. There are three reasons why Science and Public Policy involves large numbers of users in the ongoing research process.[19] First, given the inherent uncertainty, and data and methodological limitations of doing applied research mentioned earlier, "extensive external advice and reviews help to guard against disciplinary myopia, ideological bias, factual errors, and unwarranted omissions."[20] Secondly, S&PP feels that potential users who actively participate in on-going research are more likely to use

the results when the research is completed. Finally, interaction with potential users can be a useful communications vehicle both for the research team and potential users of the reports. It is the requirements of this component of the S&PP approach to doing applied policy analysis which led to the development of the utilization mechanisms being evaluated here.

II. Individual Mechanisms for Enhancing Prospects for Utilization

The individual mechanisms used by S&PP to enhance utilization can be traced to the program's successful utilization experience[21] with its first technology assessment, Energy Under the Oceans,[22] a study of outer continental shelf oil and gas operations. According to RANN's evaluation of the study's utilization success, many factors affected the utility of the study, some manipulable, some not.[23]

Among the manipulable factors mentioned by RANN were the markedly interactive techniques used by the research team. "From the outset, the study team made significant efforts to obtain the participation of the most important vested interests that would be affected by the study's conclusions. These included representatives from environmental interest groups, energy-producing industry groups, and government agencies."[24] Such techniques included an oversight committee consisting of representatives

from each of the above groups, the distribution of drafts to "just about anyone who would read them,[25] and the willingness to respond to criticism, and make alterations in the reports when necessary.

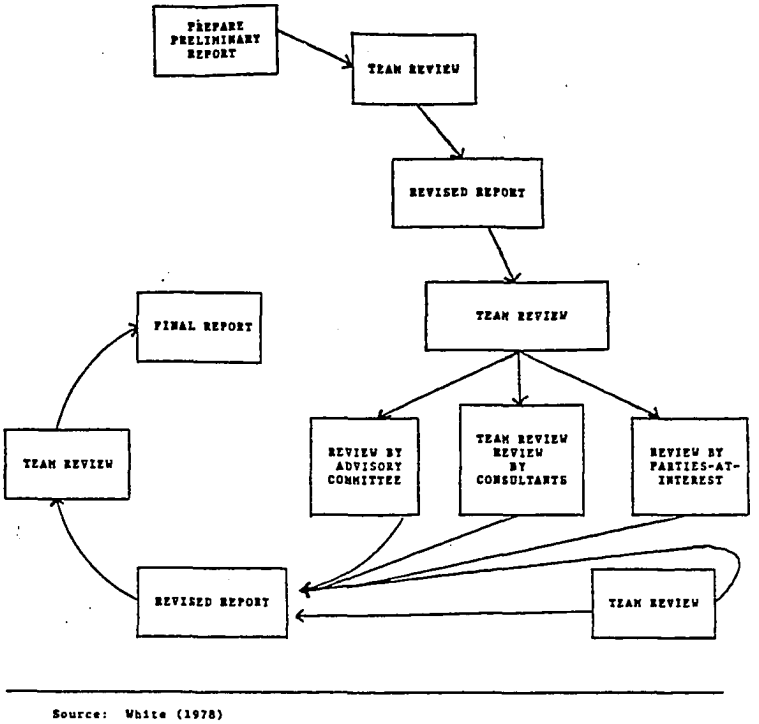
Other factors involved in the success of the study included the extensive exposure of the study to government agencies and other potential users. Such exposure was accomplished both through extensive distribution of the written report, and the presentation of the study's findings at several conferences and symposia.

Such emphasis on interaction with potential users, and exposure of the study's findings carried over to the team's technology assessment of western energy resource development. As the figure on the next page shows, the research process has integrated within it both internal and external review points. In the case of the western energy study, this process was repeated a number of times, as the discussion below will show. Also, besides these "formal" review points in the process, S&PP informally sent out drafts of reports to particular users when circumstances call for it. The following sections will discuss in more detail the workings of each of the utilization mechanisms.

A. Advisory Committee

With eight months of the beginning of the four-year western energy study, letters including a general description of the project, and advance copies of the first-year work

FIGURE III-1: INTERNAL AND EXTERNAL REVIEW PROCESS



Source: White (1978)

plan were sent to potential advisory committee members. These letters included a statement explaining why they were being asked to serve on the committee, and indicated that they would be contacted in a short time after they had an opportunity to review the work plan.

From these inquiries, a committee of seventeen was formed. The number of members was a compromise between the large number of areas of interests which could have been chosen, and the need for a committee to be of a manageable size to provide useful feedback to the research team. While the need for balance was recognized by the team, it should be noted that the selection process was judgmental in nature,

and did not involve comprehensive, systematic procedures for ensuring balance. As the table on the next page illustrates, a mixture of interests and values were represented on the committee. At the national level, representatives included current and former members of the Departments of Commerce and Interior, the Federal Energy Administration, the Office of Technology Assessment, the U.S. Water Resources Council, and the Center for Law and Social Policy (an environmental interest group). Regional interests included representatives of Mobil Oil, Kaiser Industries, Western Energy Company, Sierra Club, Native American rights Fund, and the Western Governors' Policy Office. State and local concerns were represented by a western governor, a local mayor, a state level water resource agence, a labor union representative, and an environmental scientist.[26]

The advisory committee met a total of four times to review the progress of the team's technology assessment. These meetings had two purposes: (1) to inform the members of the committee on the team's progress; (2) to receive feedback from the committee on the team's research products and future plans. The overall purpose was to set up a two-way communications format. As the table on the next page illustrates, these meetings fell basically into two general catagories: those intended to discuss the general thrust of the project (the first and third meetings), and those intended to comprehensively review draft research products (the second and fourth meetings). The formats of the meetings reflected

TABLE III-1: ADVISORY COMMITTEE

Member	Organization	Interest Represented
John Bermingham	Department of Commerce	Federal Government
Jack Campbell	Federation of Rocky Mountain States	State Government
Sharon Eads	Native American Rights Fund	Indians
Lionel S. Johns	Office of Technology Assessment	U. S. Congress
S. P. Mathur	U.S. Water Resources Council	Federal Government
Richard Meyer	Western Governors' Regional Energy Policy Office	Regional Governments
Thadis W. Box	College of Environmental Studies, Utah State University	Environment
Bill Conine	Mobil Oil Corporation	Industry
Michael B. Enzi	Mayor of Gillette, Wyoming	Local Government
Kenneth Kauffman	Department of Interior	Federal Government
Leonard Meeker	Center for Law and Social Policies	Environment
Raphael Moure	Oil, Chemical, and Atomic Workers Union	Labor
Bruce Pasternack	Federal Energy Administration	Federal Government
Robert Richards	Kaiser Industries	Industry
H. Anthony Ruckel	Sierra Club	Environment
Warren Schmechel	Western Energy Company	Industry
Vernon Valantine	Colorado River Board of California	State Government

TABLE III-2: SUMMARY OF ADVISORY COMMITTEE MEETINGS

DATE	STAGE IN RESEARCH	LOCATION	FORMAT	PURPOSE
May 11, 12, 1976	The first year work plan was completed. The team was working on the first year TA progress report.	Denver, Colorado	1. Get together session on the 11th. 2. Plenary work session.	1. Comment on first year work plan and outline of first-year TA progress report. 2. Comment on emphasis during first year, and suggest modifications/additions for second and third years.
August 20, 1976	The team had completed a preliminary draft of the first year TA progress report.	Norman, Oklahoma	1. Brief plenary session. 2. Division of committee into four groups.	1. Comprehensive review of preliminary draft of first yea TA progress report, and suggest general and specific comments regarding it.
February 14, 1977	The first year TA progress report was completed, along with a draft of work plan to complete the TA.	Norman, Oklahoma	1. Plenary work session. 2. Comments from those not attending.	1. Comment on draft work plan for completing TA. 2. Comment on summary of findings of first year TA.
April 1978	The team had completed a preliminary draft of a draft policy analysis report.	Norman, Oklahoma	1. Division of committee and team into topical groups.	1. Comment on the preliminary draft of the draft policy analysis report.

these differing emphasis. The meetings concerning the first-year work plan and the work plan for completing the technology assessment were held in plenary session, whereas the two draft review sessions, reflecting the need to divide up the massive reports for comprehensive review, broke up into topical groups.

The importance of the advisory committee can be illustrated by its first two meetings with the research team. Because of the early formation of the committee, the advisory committee members were able to comment on and influence the scope, emphasis, and assumptions of the first-year work plan and planning for the second and third years of the project at their first meeting. The range of concerns mentioned by the members at the first meeting included matters ranging from the boundaries of the study and bias in reporting potential negative impacts to assuring that the views of all participants were represented and aiming the report at providing assistance in terms of knowledge and tools, not recommendations.

This use of parties-at-interest to help define and organize research activities which S&PP has used with all its technology assessments, is influenced by the work of Don K. Price; Dr. Price is a proponent of the view that not only is most policy organized around substantive activities, but that parties-at-interest in these substantive activities, generally define most policy options.[27] As stated by Don E. Kash:

> Participation in policy-making requires either knowledge of or a stake in the outcome of the substantive activity. The possibility of playing a role as a policy analyst and advisor depends on having knowledge of the substance of the activity for which policy is being made, and having policy-makers aware that you have that knowledge.[28]

Hence, the participation of parties-at-interest in the research was not merely useful, but necessary.

The advisory committee did not only deal with the general direction of the study, but also with specifics. The second meeting of the committee was held in August 1976 to review a preliminary draft of the first-year progress report. Dividing up into four groups: physical impacts, socio-economic-political impacts, ecological impacts, and policy, the members made a comprehensive, sometimes page-by-page review of the drafts making general and specific comments on the contents. Such comments range from questions concerning wording and emphasis to the identification of overlooked impacts.

There were four major factors involved in S&PP's attempt to integrate the advisory committee into the design of the project. The first was the formation of the committee as early as possible at the beginning of the project. As mentioned above, the view of the problem by parties-at-interest is critical to a technology assessment research design, and by forming it early, it enhanced the ability of the members to influence the direction of the study.

Second, as Table III-3 illustrates, there were many values and interests involved in the substantive problem area. Given this multitude of concerns, the team attempted to make the committee as balanced as possible, including representatives of a variety of interests and concerns, to help protect the project from possible bias. Third, the team actively sought and responded to comments and criticisms made by the committee. Finally, the team made the relationship with the advisory committee an on-going one, meeting four times formally and having countless individual, informal contacts. The committee was not merely a one-shot affair. In this manner the advisory committee was made an integral part of the design of the project, not just an afterthought.

B. Stakeholder Review

Like the advisory committee, stakeholder review of S&PP's research products began early in the research process. In November, 1975, copies of a Draft First-Year Work Plan was sent to 300 parties-at-interest for comments and suggestions. The distribution list included members of industry, environmental groups, government, and research groups (private and university-based). From the response (over 60), the team made revisions in the draft for final publication, March 1976. Upon publication, the First-Year Work Plan was disseminated to over 400 stakeholders, including those who had been sent the draft report.

TABLE III-3: INTEREST AND VALUE CHECKLIST

SOCIAL

Quality of Life
- --Educational Opportunities
- --Health Care
- --Housing
- --Utilities
- --Recreational Opportunities
- --Public Safety
- --Aesthetics
- --Comfort
- --Lifestyle
- --Leisure

Stability/Certainty

Equity

Health
- --Occupational
- --Public

Conservation

Safety
- --Occupational
- --Traffic

Security/Crime
- --Personal
- --Community

Autonomy
- --Independence/Freedom

Cultural

Moral/Ethical

Religion

Ethnicity

Personal Efficacy

Heritage
- --Artifacts and Sites
- --Lifestyle
- --Mores
- --Resources

Status

ECONOMIC

Economic Opportunities
- --Employment
- --Small Business
- --Corporate

Personal Income

Public Revenues
- --Taxes
- --Fees/Transfers

Property Values

Cost-of-Living

Inflation

Economic Well-Being
- --Lifestyle
- --Security
- --Status

Economic Sectoral Changes
- --Manufacturing
- --Agriculture
- --Other Extractive
- --Service
- --Government

Economic Growth
- --Local
- --Regional
- --National

Competition for
- --Labor
- --Resources

ENVIRONMENTAL

Aesthetics
- --Air Quality
- --Water Quality
- --Land Forms
- --Rivers and Streams
- --Visual Intrusions
- --Noise
- --Odors
- --Wildlife/Plants

Physical Alterations
- --Air Quality
- --Water Quality and Availability
- --Land-Use Changes
- --Rivers and Streams
- --Weather Modification
- --Visibility

Archeological Sites and Artifacts

Parks and Recreational Areas

Unique or Rare Species and Habitat

Toxics and Hazardous Substances

Population Density

Stability

Diversity

Production

Open Space

POLITICAL/INSTITUTIONAL

Public Participation
- --Leadership
- --Access
- --Personal Power and Efficacy

Ethnic Identity
- --Self-Determination
- --Control Over Communal Property and Resources
- --Intergovernmental Relations

Autonomy
- --Community
- --State
- --Regional
- --Organizational

Stability
- --Leadership
- --Rules of the Game
- --Planning Capability
- --Organizational Inertia

Interdependence

Regulation and Control

Public/Private Ownership

Complexity/Simplicity

Good Government

Partisanship

Source: Energy From the West: Policy Analysis Report.

As illustrated above, stakeholder review consisted of two parts: (1) dissemination of drafts for comments and suggestions, and, (2) dissemination of final reports to inform stakeholders of the research team's progress, and to show stakeholders that the team took their comments seriously.[29] As with the advisory committee, the purpose was to set up a two-way communications format between the research team and stakeholders. Materials sent to stakeholders eight times over a three-and-one-half year period included four draft and six completed reports. Table III-4 summarizes these reviews.

As summarized by Jack White, project director of the Energy From the West study, the stakeholder review accomplish four essential things:

> "First, it does help to eliminate disciplinary myopia, ideological bias, factual errors and unwarranted omissions. Second, it can help to build credibility if people are shown that their comments and suggestions are taken seriously. Third, it can provide for effective communication with potential users of research results. And, fourth, it establishes utilization as an ongoing activity while the project is still underway."[30]

C. Personal Interaction

One requirement for doing applied policy analysis is the need to understand the "issue-system" being studied. This requirement extends itself not only to the substantive area under investigation, but also to the parties-at-interest which, as mentioned earlier, generally define most policy

TABLE III-4: SUMMARY OF STAKEHOLDER REVIEWS

DATE	STAGE IN RESEARCH	NUMBER INVOLVED	PURPOSE
November 1975	Preliminary draft of the first-year work plan had been completed.	Over 300 copies were sent out.	1. Allow comment by stakeholders on the propose scope and emphasis of the three-year study.
March 1976	Completion and publication of *First-year work plan*.	Over 400 copies were sent out.	1. Inform stakeholders of the progress of the research team. 2. Inform stakeholders of the scope and emphasis of the three-year study. 3. Allow stakeholders to assess changes made in the draft report.
September 1976	Preliminary draft of the first-year progress report had been completed.	Over 500 copies were sent out.	1. Allow comment by stakeholders on the preliminary results of the research team's work on the impacts of western energy development.
February 1977	Preliminary draft of the work plan for completing the technology assessment was completed.	Copies sent to about 60 paid consultants.	1. Allow comment by stakeholders on the proposed procedures for completing the technology assessment.
July 1977	Completion and publication of Energy From the West: Progress Report.	Over 500 copies were sent out.	1. Inform stakeholders of the progress of research team. 2. Inform stakeholders of the results of the research team's preliminary impact analysis. 3. Allow stakeholders to assess changes made in the draft report.
February 1978	Completion and publication of Energy From the West: A Work Plan for Completion of a Technology Assessment of Western Energy Development.	Over 600 copies were sent out.	1. Inform stakeholders of the procedures to be followed for completing the technology assessment. 2. Allow stakeholders to assess changes made in the draft report.
April 1978	Completion and publication of Energy From the West: Draft Policy Analysis Report.	Over 800 copies were sent out.	1. Allow comment by stakeholders on the preliminary results of research team's policy analysis.
March 1979	Completion and publication of: (1) Energy Resource Systems Development Report, (2) Impact Analysis Report (final), (3) Policy Analysis Report (final).	For the ERDS report, 100 copies were sent out. For the Impact Analysis Report, 500 copies were sent out. For the Policy Analysis Report, 800 copies were sent out.	1. Information stakeholders of the final results of technology assessment.

options. Therefore, personal interaction is a natural byproduct of the research team's effort to learn about the system; that is, "the people, activities, and institutions which influence the variety of problem areas affected by resource development."[31]

One way in which the research team interacted with the system was by visiting the development sites as hypothesized in our site-specific scenarios. Visits to the study area began in August, 1975, the second month of the project, and continued throughout the project. Such visits were not restricted to only the six sites examined in the study,[32] but included other western towns affected by energy development, state capitals, regional organizations, and universities within the area. Hence, a variety of interests-local, state, federal, regional, and others--were contacted.

A second way in which the team personally interacted with potential users was by attending various workshops and conferences addressing issues surrounding western energy development and related questions. Such meetings were at all levels of government--local, state, regional, and federal--and placed the research team in contact with other persons actively involved in both studying the problems involved in western energy development, and those who are having to deal with them.

Besides the personal interaction, the team gain valuable sources of information through the papers presented and citations given at these conferences. Also, members of the research team gave reports and papers at some of these conferences on important issues and questions they had uncovered during its research. So, besides building personal relationships with important people within the policy system, such conferences helped the research process substantively, and hence, the credibility of the research reports.

A final way in which the team interacted with potential users was through presentations of its preliminary results to people within the study area (the operations of which are given in the next section). Coupled with the presentation was a question and answer period which allowed participants to discuss the project with the researchers on a personal basis. Also, informal meetings before and after presentations were common.

Much of the personal interaction with potential users occurred on an informal basis provided by the forums above. Such conversations proved invaluable in forming linkages with participants, and providing the research team with a perspective of how various stakeholders view western energy development. Finally, the activity was an important source of substantive information on the issues surrounding western energy development.

D. Packaging/Presentation

Perhaps the area in the dissemination-utilization process which is most ignored by researchers is the need to disseminate and present their research in a manner easily understandable to potential users. As stated by Ballard and Hall: "although it seems obvious that reports written in an easily readible and understandable form will greatly increase the interest and awareness of potential users, this point appears often to be overlooked, even for those engaged in applied research."[33] This is not to suggest that necessary scientific rigor be sacrificed, but that summary documents based on such information be presented in a useable manner to users.

During the Energy From the West study, Science and Public Policy paid particular attention to this problem by developing short, concise summaries of their work using graphs, charts, and other visual techniques, written in non-technical language. The executive summary of the 1100 page First-Year Progress Report is 12 pages in length. For the final Policy Analysis Report, two forms of executive summaries are employed. First, in the front of each chapter of the report which discusses an issue-area, there is a short 5-7 page summary of the problems involved in that particular area, the alternatives evaluated, and the results of the evaluation. Secondly, there is a project summary which puts together the essence of the study into a 36-page report. As such, it can be used as a guide

to users in determining the relevant portions of the study for their particular area of concern.

Science and Public Policy's presentation concerns were not limited to the written media. Around the time of the publication of the Progress Report (summer, 1977), the research team gave slide show presentations to local officials, industry groups, and federal agencies (both research and policy oriented) on the preliminary results of the study. These slide presentations covered "the context of western energy development, the identification and description of impacts, and policy alternatives and implementation strategies for dealing with them."[34] The emphasis of the presentation depended on the location of the audience, and their particular interests in western energy development. For example, local audiences tended to be more interested in growth management impacts since that issues most directly affected them whereas state officials tended to be more interested in water questions.

III. Summary

Based on their philosophy of how to do policy analysis, Science and Public Policy has developed an interactive perspective on research. One of the cornerstones of this approach is developing communication strategies to interact with users. This chapter has detailed how four communication strategies--advisory committee, stakeholder review, personal

interaction, and packaging/presentation--worked during the Energy From the West project. Chapter VI will evaluate the effectiveness of these strategies for fostering utilization concepts.

FOOTNOTES

[1]For elaboration on how S&PP does applied research, see Kash, Don E., and White, Irvin L. "Technology Assessment: Harnessing Genius." Chemical and Engineering News, November 29, 1971, 36-41; Kash, Don E. "Observations on Interdisciplinary Studies and Government Roles." in Scribner and Chalk (eds.) Adapting Science to Social Needs: Knowledge, Institutions, People into Action. Washington D.C.: American Association for the Advancement of Science, 1977, 147-67; White, Irvin L. "Policy Analysis and International Studies Association, New York City, New York, March 14-17, 1973; White, Irvin L. "Managing Interdisciplinary Research: A Technology Assessment OCS Oil and Gas Operations." Presented at the Manned Spacecraft Center, Houston Texas, April 26, 1973; White, Irvin L. "An Interdisciplinary Approach to Applied Policy Analysis." Presented at the Annual Meeting of the American Political Science Association, New York City, New York, August 31-September 3, 1978; Ballard, Steven C., and Hall, Timothy A. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Presented at the Annual Meeting of the American Political Science Association, New York City, New York, August 31-September 3, 1978; White, Irvin L., Ballard, Steven C., and Timothy A. Hall. "Technology Assessment as a Energy Tool." Policy Studies Journal, Autumn 1978, 76-84; Kash, Don E. et al., Energy Under the Oceans. Norman OK; University of Oklahoma Press, 1973; White Irvin L., et al. First-Year Work Plan for Western Energy Resource Development. Washington D.C.: Environmental Protection Agency, 1976; and, White, Irvin L., et al. Work Plan for Completing Technology Assessment of Western Energy Resource Development. Washington, D.C.: Environmental Protection Agency, 1977.

[2]Studies include Kash, Don E., et al. Energy Under the Oceans: A Technology Assessment of Outer Continental Shelf Oil and Gas Operations. Norman: University of Oklahoma, 1973: White, Irvin L., et al. North Sea Oil and Gas: Implications for Future United States Development. Norman: University of Oklahoma, 1973; Kash, Don E., et al. Energy Alternatives: A Comparative Analysis. Washington, D.C. Government Printing Office, 1975, Kash, Don E., et al. Our Energy Future: The Role of Research, Development, and Demonstration in Reaching a National Consensus on Energy Supply. Norman: University of Oklahoma, 1976; White, Irvin L., et al. Energy From the West: Energy Resource Development Systems Report. Washington D.C.: Environmental Protection Agency, 1979; White, Irvin L., et al. Energy From the West: Impact Analysis Report. Washington D.C.; Environmental Protection Agency, 1979; and White, Irvin L., et al. Energy From the West: Policy Analysis Report. Washington, D.C.: Environmental Protection Agency, 1979.

[3]See Galbraith, John Kenneth. The New Industrial State. New York: New American Library, 1967; Ellul, Jacques. The Technological Society. New York: Random House, 1964; Toffler, Alvin. Future Shock. New York: Random House, 1970; Kochen, Manfred, ed. Information for Action: From Knowledge to Wisdom. New York Academic Press, 1975; Brewer, Garry D. Politicians, Bureaucrats, and the Consultant: A Critique of Urban Problem Solving. New York: Basic Books, 1973; and, Bell, Daniel. The Coming of Post-Industrial Society: A Venture in Social Forecasting. New York: Basic Books, 1973.

[4]Kash, Don E., and White, Irvin L. "Technology Assessment: Harnessing Genius." Chemical and Engineering News. November 29, 1971, p. 36.

[5]idem.

[6]Kash, Don E., and White, Irvin L. "Technology Assessment: A Prescription for the Technological Society." Norman OK: Science and Public Policy, February 1971. p. 10-11.

[7]Kash, Don E., and White, Irvin L. "Technology Assessment: Harnessing Genius." Chemical and Engineering News. November 29, 1971, p. 36.

[8]Idem.

[9]Toffler, Alvin. Future Shock. New York: Random House, 1970.

[10]Kash, Don E., and White, Irvin L. "Technology Assessment: Harnessing Genius." Chemical and Engineering News. November 29, 1971, p. 37.

[11]See, for example, Dubos, Rene. So Human an Animal. New York: Scribner's Sons, 1968.

Kash, Don E., and Irvin L. White, "Technology Assessment: Harnessing Genius: Chemical and Engineering News. November 29, 1971, p. 38.

[13]Kash, Don E., and White, Irvin L. "Technology Assessment: Harnessing Genius.: Chemical and Engineering News. November 29, 1971, p. 38.

[14]Idem.

[15]See idem., for history of term.

[16]White, Irvin L., Ballard, Steven C., and Timothy A. Hall. "Technology Assessment as a Energy Tool." Policy Studies Journal Autumn 1978, p. 76.

[17]White, Irvin L. "An Interdisciplinary Approach to Applied Policy Analysis." Presented at the Annual Meeting of the American Political Science Association, New York, August 31-September 3, 1978.

[18]White, Irvin L. "An Interdisciplinary Approach to Applies Policy Analysis." Presented at the Annual Meeting of the American Political Science Association, New York, City, New York, August 31-September 2, 1978. page 5.

[19]Ibid. page 8.

[20]Idem.

[21]See Miedema, A. "Rann Utilization Experience: Outer Continental Shelf Oil and Gas." Research Triangle Park NC: Research Triangle Institute, 1974.

[22]Kash, Don E. et al. Energy Under the Oceans: A Technology Assessment of Outer Continental Shelf Oil and Gas Operations. Norman OK: University of Oklahoma Press, 1973.

[23]Miedema, A. "Rann Utilization Experience: Outer Continental Shelf Oil and Gas." Research Triangle Park NC: Research Triangle Institute, 1974. p. 12-26.

[24]Ibid., page 12-27.

[25]Kash, Don E. "Observations on Interdisciplinary Studies and Government Roles." in Scribner and Chalk (eds.) Adapting Science to Social Needs: Knowledge, Institutions, People into Action. Washington D.C: American Association for the Advancement of Science, 1977, page 153.

[26]See Ballard, Steven C. and Hall, Timothy A. "Intergrating Applied Policy Analysis and Political Science: A Report of A Technology Assessment of Western Energy Resource Development." Presented at the Annual Meeting of the American Political Science Association, New York City, New York, August 31, September 3, 1978.

[27]See Price, Don K. Government and Science. New York: Oxford Press, 1962.

[28]Kash, Don E. "Observations on Interdisciplinary Studies and Government Roles." in Scribner and Chalk (eds.) Adapting Science to Social Needs: Knowledge, Institutions, People into Action. Washington D.C.: American Association for the Advancement of Science, 1977, page 149.

[29]As noted by White (1978), this does not mean that the draft is changed in response to every comment and suggestion. It does mean that factual errors are corrected and other interpretations and points of view are acknowledged. This balance will be discussed in more detail in Chapter VI.

[30]White, Irvin L. "An Interdisciplinary Approach to Applied Policy Analysis." Presented at the Annual Meeting of the American Political Science Association, New York City, New York, August 31-September 3, 1978. page 9.

[31]Ballard, Steven C. and Hall, Timothy A. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Presented at the Annual Meeting of the American Political Science Association, New York City, New York, August 31-September 3, 1978. page 17.

[32]The six sites were Beulah, North Dakota; Colstrip, Montana; Rifle, Colorado; Navajo/Farmington, New Mexico; Kaiparowits/Escalante, Utah; and, Gillette, Wyoming.

[33]Ballard, Steven C. and Hall, Timothy A. "Intergrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Presented at the Annual Meeting of the American Political Science Association, New York City, New York, August 31-September 3, 1978, pages 17-18.

[34]Ibid., page 18.

CHAPTER IV

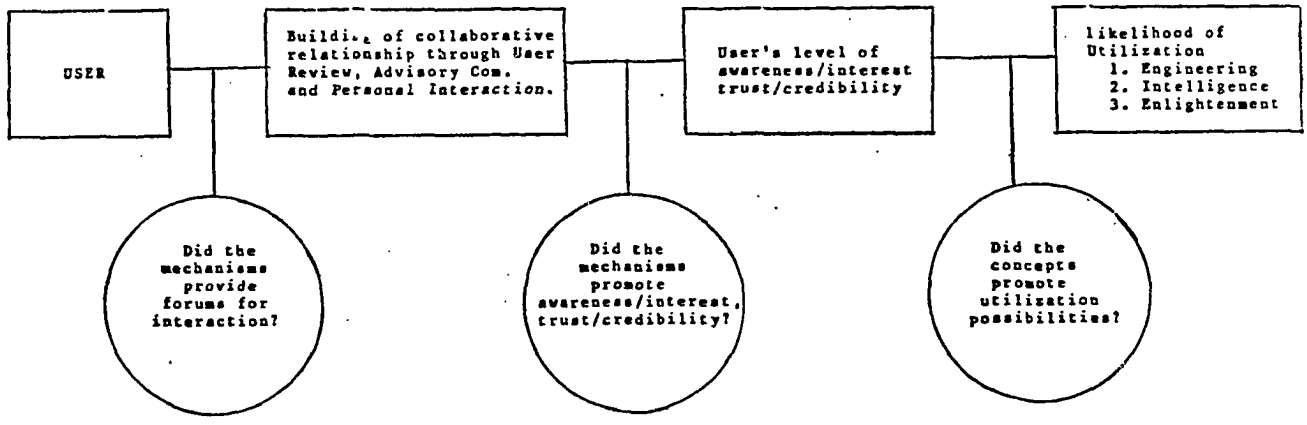
RESEARCH DESIGN

I. Conduct of the Research

A. Conceptual Approach

The previous chapter provides an overview of Science and Public Policy's utilization strategy. As illustrated in Figure IV-1, three questions must be answered in the affirmative for the utilization strategy to be successful. These questions place three conditions on the utilization strategy for success. They are as follows:

FIGURE IV-1: CONCEPTUAL APPROACH



1. Mechanisms to implement the strategy must provide effective forums for interaction. A tone of receptivity and attentiveness to the input of users must be set in order to establish linkages for a successful collaborative relationship between researchers and users.

2. The mechanisms must foster awareness, interest, trust and credibility with users. If this is not done, then mechanisms are likely to be ineffectual.

3. The fostering of awareness, interest, trust, and credibility by the mechanisms must be a valid foundation for increasing the likelihood of utilization by individual users. To determine the validity of these concepts, an examination of important barriers affecting utilization is required. This context allows one to determine the relative importance of interpersonal barriers (the barriers S&PP concentrated on) vis-a-vis other barriers (individual, organizational, technical, and time). This should help the researcher in testing and reformulating theories of non-utilization, and in determining their ability to influence the utilization of their work.

This dissertation also intends to be prescriptive. Recommendations will be made for improving utilization strategies, including specific methods to employ. These recommendations will include discussion of barriers which the researcher cannot redress, and limitations on the capacity of researchers to influence the utilization of their research.

3. Methodological Requirements

A research methodology should reflect the needs and characteristics of the problem being analyzed. The objectives of this study require measurement of attitudes and

perceptions of both users and researchers. Both qualitative as well as quantitative methods are used to accomplish this task.[1] Quantitative methods are used to determine the relative levels of of collaborative relationship, awareness, interest, trust, credibility, and the importance of the various utilization barriers. Qualitative techniques, such as open-ended interviews and questionnaires, are used to increase understanding of why these relationships developed and to make recommendations for improvement.

The importance of qualitative methods in dealing with the issue of use is discussed by Patton.[2] Using an open-ended interviewing technique, Patton reported the importance of individual decisionmakers in determining the use of evaluation research. As stated by Patton:

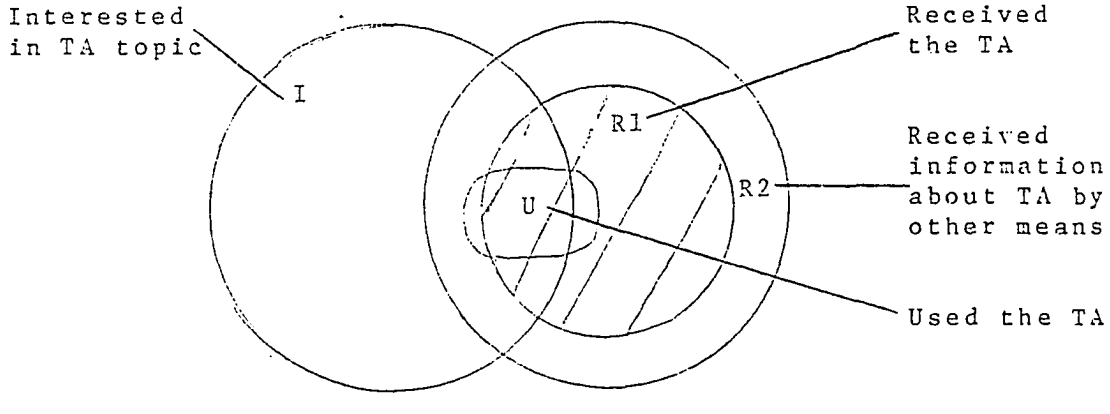
> The specifics vary from study to study but the pattern is markedly clear: where the personal factor emerges, where some person takes direct, personal responsibility for getting the information to the right people, evaluations have an impact. Where the personal factor is absent, there is a marked absence of impact. Utilization is not simply determined by some configuration of abstract factors; it is determined in large part by real, live, caring human beings.[3]

Through open-ended interviews and questionnaires, this research attempts to understand the motives and thoughts behind the actions of these "real, live, caring human beings": to see things from their point of view.

C. Methodological Limitations on Research

A serious methodological problem with research on utilization is the inability of the researcher to obtain a representative sample of the entire universe of users. As noted by the Venn diagram below, many users who might benefit from a technology assessment will either never see it or will receive secondhand knowledge of it.[4]

FIGURE IV-2: VENN DIAGRAM OF THE UNIVERSE OF USERS



Source: Modified from Berg., et al., 1978: 37.

For the specific purposes of this research, this is not a serious problem. Records kept by S&PP will, at best, identify only those potential users designated by R1. Yet, since the purpose of this research is to evaluate the effectiveness of S&PP's utilization strategy on this group, the other part is beyond the scope of the research. This research will only consider that portion of the population indicated by the sashed area.

A second difficulty in studying utilization is the nature of the underutilization problem. The three different theories explaining underutilization are not contending theories, but complimentary. Each of them discusses a different aspect of the utilization process. The aspect dominating any one decisionmaker's response to a research endeavor is partially depended on circumstances beyond the control of either the user or the researcher (such as the political demands of the day or the ability of social science to respond to a certain policy area effectively). Therefore, despite the attempts of researchers to improve the climate for utilization, utilization efforts influence only one factor in the overall utilization process. It is necessary for researchers to recognize the potential for failure. Social research is only one input into the decisionmaking process, and, in given circumstances, not the critical one. In the final analysis, researchers

must recognize that although researcher involvement in utilization may be a necessary condition for utilization, it may not be a sufficient one.

A third difficulty with utilization research is defining utilization. Utilization is not a decrete phenomenon which can be identified and quantified. Rather, its form is more nebulous because its effects are uncertain, and may be unrecognized by the researcher or the user. This research has addressed this situation by defining utilization through "lenses" which recognize the varying forms utilization may take. Yet, these lenses are useful only if the user or producer are aware of the research's effects on their frames of reference. The effect of the research on the user may be so subtle that the user is unaware of it, and therefore, it is likely that any study short of a psychological profile of users before and after exposure to a research project will underestimate the impact of research. Certainly this is an area in need of future research.

A final limitation on this research is the time chosen to review the impact of Energy From the West. The data for this dissertation were collected within three months of the distribution of the final report. This was done primarily to prevent the passage of time to interject

extraneous variables into the utilization process being evaluated. Also, it was hoped that by evaluating the study immediately after publishing the final report, the report would still be fresh on the minds of the users.

However, it is obvious that picking one discrete point has disadvantages. Although one can determine whether the strategy enhanced the likelihood for utilization at one particular point in time, the effects of that enhancement may not be evident for years, and, as mentioned above, not measureable. Only a study over time could determine with any certainty the actual impact of any report. Such concerns are important but beyond the scope of this research. This research is limited to examining enhanced attitudes towards use of Energy From the West, not proving utilization. Actual utilization may be impossible to determine.

II. Methodology

A. Data Collection Methods

As summarized by Henerson, Morris, and Fitz-Gibbon,[5] four general approaches may be employed in measuring attitudes (See Table IV-1). Although each of these approaches have their particular strengths and weaknesses, this research employs the self-report approach (approach 1). This choice is made for several reasons based on the following assumptions about the groups being examined:

TABLE IV-1: FOUR APPROACHES FOR EVALUATING THE ATTITUDES OF MEMBERS OF A GROUP OR GROUPS

	When is this approach most appropriate?	What kinds of questions can be answered by the measure?	Examples of the kinds of conclusions the measures can yield
Approach 1: SELF-REPORT MEASURES (Members of Group X report directly about their own attitudes) • interviews, surveys, polls, • questionnaires and attitude rating scales • logs, journals, diaries	When the people whose attitudes you are investigating • are able to understand the questions asked of them • have sufficient self-awareness to provide the necessary information • are likely to answer honestly and not deliberately falsify their responses	(as a member of Group X) How do you feel about it? How strongly do you feel about? ("it" may be any aspect of a program, focus of interest, or element of concern.) What do you believe about it? What are your reasons for believing as you do? What should you do? What have you done in the past? Which do you prefer to do?	Students in Program A have a greater tendency to attribute their school successes to their own efforts than do students in the control group. Teachers in Program A are highly satisfied with the materials. Parents of children in Program A report greater satisfaction with the school and the progress of *their children than do* parents of children in Program B. *Seventy-five percent of the students* in Program A have asked to continue in the program next year.
Approach 2: REPORTS OF OTHERS. (Others report about the attitudes of members of Group X) • interviews • questionnaires • logs, journals, reports • observation procedures	When the people whose attitudes you are investigating are unable or unlikely to provide accurate information. When you want information about how people behave under certain circumstances. When you can assume that the reporter will be unbiased and will present objective information. When you can assume that the reporter has sufficient opportunity to observe *a representative sample of behavior.*	(from your observations of *Group X) what do they believe* about it? How do they feel about it? What do they do when *confronted with it?*	Parents of children in Program A report *significant improvement* in their children's work habits since the beginning of school. *Teachers in Program A report* that classroom friendship patterns indicate successful integration and acceptance of the bussed students. Observers report a significant difference in the number of helping behaviors exhibited in Program A classrooms as compared with control group classrooms.
Approach 3: SOCIOMETRIC PROCEDURES (Members of Group X report about *their attitudes toward one another)* • peer ratings • social choice techniques	When you want a picture of the social patterns within a group.	(as a member of Group X) Who in your group fits this description? Whom would you choose in this situation? Who associates with whom?	The sociometric choices of students in Program A indicate that handicapped students are establishing friendships with students in the larger group.
Approach 4: RECORDS • counselor files • attendance records	When you have access to records that provide information relevant to the attitudes in questions and when these records are complete.	What do past records indicate they (Group X) know about it? What inferences can be made from past records concerning their feelings about it? What do past records indicate they do when confronted with it?	Students in Program A tend to be absent less than students in Program B. There have been significantly fewer disciplinary referrals in Group X.

Source: Henerson, Morris and Fitz-Gibbon, 1978: 22-23.

1. As stated by Henerson, Morris and Fitz-Gibbon: "Self reports procedures represent the most direct type of attitude assessment and should probably be employed unless you have reason to believe that the people whose attitudes you are investigating are unable or unwilling to provide the necessary information."[6] The people being questioned in this research should have sufficient self-awareness to provide the necessary information. If not, then that in and of itself is a significant response.

2. The people being questioned in this research are generally a knowledgeable and well-educated group; they are quite capable of understanding the questions that will be asked and providing intelligent answers.

3. There is no reason to believe that the people being interviewed would make a systematic attempt to deceive or lie about their attitude.

4. The S&PP utilization mechanisms are based on personal interaction and communication; to evaluate such mechanisms one needs to know how each individual personally feels about the process. Only self-report measures can provide this kind of information.

The methods used to collect data from the research team included a mixture of interviews, questionnaires, and informal discussions.[7] Because the primary purpose of the researcher data was to gain perspective and prescription, more formal means of collecting data was considered unnecessary. Interviews and questionnaires were generally flexible to allow the respondents to fully express their views, and to bring up issues and perspectives of which the interviewer was unaware.

The primary method used to collect data from the user sample was a questionnaire (See Appendix A). Because of the two-fold purpose of user data to test the utilization factors and to gain insight on user's reasoning towards utilization, a combination of closed- and open-ended questions was employed. Regarding the closed-ended questions, a five point rank order scale was used in categorizing user responses. Initial development of the questionnaire began in January, 1979 with completion of the literature review. Three professors with survey experience reviewed the questionnaire along with the dissertation committee. It was pretested internally and externally, and then prepared for distribution.

The final report of the Energy From the West project was ready for distribution in early June, 1979. Information regarding the survey being conducted for this research was included in the mailing of the final report. Users were given the choice of responding to the questionnaire either by phone or mail. Because this research is interested in energy policymaking, only users with direct responsibility for energy policy were included in the sample pool. Eliminating users from universities, private research groups and Congressmen who did not specify particular energy staff memebers, reduced the total sample pool to 350.[8] From this pool, a sample of 145 was randomly

chosen. Sixth four users responded: twenty users chose telephone interviews, 44 chose mail questionnaires. This sample size gives the data collected a sampling error of plus or minus 5.6 percent at the 95 percent confidence level.

The response rate differed according to exposure of the user to the S&PP utilization strategy. This was expected. As noted by Erdos (1970), awareness and interest are important criteria for users in responding to questionnaires. Seventy percent of the Advisory Committee, 50 percent of other participants in the S&PP utilization strategy, and 35 percent of non-participant returned questionnaires or phone interview cards. Overall response rate was 45 percent (30 participants, 34 non-participants). Because awareness and interest influence response rate, those non-participants who responded to the questionnaire were probably exhibiting more awareness and interest in the research than the average nonparticipant. The resulting impact of this on the research is a probable reduction in the differences between participants and non-participants. Hence, the sample probably underestimates the impact of S&PP's utilization.

To build the contextual base of the analysis (Chapter III), various secondary sources are used. Such

sources include the following: (1) the monthly progress reports to EPA submitted by the research team; (2) trip reports by team members on utilization activities; (3) reports on advisory committee meetings; and (4) publications of team members arising out the research. Although these sources are secondary in nature, they are necessary to help the contextual basis of the analysis.

B. Data Analysis Strategy

To apply statistical methods to the rank ordered data collected from the closed-ended questions contained in the questionnaire, responses were collapsed into dichotomous categories. This was done due to the sample size being analyzed. As noted by Thomas,[9] collapsing categories because of sample size is the only legitimate reason for such a procedure. This left the research with nominal data.

The sample was divided according to user response to whether they had participated in one or more of S&PP's mechanisms (advisory committee, stakeholder review, personal interaction) or not. This provided a comparison between those who have been heavily exposed to S&PP's utilization strategy, and therefore should have enhanced tendencies towards use, and those who only received the final policy analysis report and therefore had little exposure to the strategy.

For the purpose of testing the utilization factors' effectiveness in promoting utilization, the three-perspective definition of utilization developed by this research was the dependent variable with the utilization factors being the independent variables (Chapter V). To test the effectiveness of S&PP's interaction in promoting the utilization factors, the utilization factors were the dependent variables and interaction is the independent variable (Chapter VI). To test whether these nominal measures were related, Chi-square with the Yates Correction (for use with small samples) was chosen. Because of the small sample size and exploratory nature of the research, a confidence level of .1 was chosen.[10]

The correlation coefficient chosen for this research was phi/phimax. The phi coefficient is an extension of the point biserial (and the Pearson) coefficient to situations where both variables are dichotomized. For example, consider the data in Table IV-2.

TABLE IV-2. Correlation of Two Dichotomized Variables

X	X	Y	Y	XY
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
1	1	0	0	0
0	0	1	1	0
0	0	1	1	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Using this data, the calculation of the Pearson coefficient is as follows:

$$r = \frac{SP}{\sqrt{SS_x\ SS_y}} = \frac{1.0}{\sqrt{(2.5)(2.4)}} = \frac{1.0}{2.45} = .41$$

where

$$SP = \Sigma xy = \Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{N}$$
$$SS_x = \Sigma x^2 = \Sigma X - \frac{(\Sigma X)^2}{N}$$
$$SS_y = \Sigma y^2 = \Sigma Y - \frac{(\Sigma Y)^2}{N}$$

Data of this sort are generally organized into a two-by-two bivariate frequency table, with the letters a, b, c, and d representing the frequencies of the four cells. This is illustrated in Table IV-3.

TABLE IV-3. Bivariate Frequency Table for Phi Coefficient

	X = 0	X = 1
Y = 0	a = 2	b = 4
Y = 0	c = 3	d = 1

With this information, phi (ϕ) is calculated as follows:

$$\phi = \frac{10}{\sqrt{(6)(4)(5)(5)}} = \frac{10}{24.5} = .41$$

Unity correlation can only be achieved when the responses are evenly divided between the two categories of both dichotomies, i.e., a+b=c+d and a+c=b+d. In order to index the phi coefficient on a 0 to 1 scale in all cases, phi/phimax divides the phi coefficient calculated by the maximum phi possible under the distribution of responses presented.

By synthesizing information provided by this analysis with the perspectives and prescriptions gain through the open-ended questions and discussions, recommendations on improving the strategy, and conclusions on the social researcher's role in the utilization process are made.

C. Operational Definitions

The following discussion identifies the measures used in this research to assess: (1) the collaborative relationship achieved by S&PP; (2) the concepts of awareness, interest, trust, and credibility; (3) the three perspectives of utilization; and, (4) the intervening factors or barriers to utilization.

1. Operational Definition of Collaborative Relationship

"Collaborative relationship" refers to the attitude of the user towards the research team's interaction efforts, and the attitude of the team members towards the interaction with the user. A collaborative relationship involves users perceiving themselves as a part of the research; that their

voices are being heard. Indicators of such a relationship include user perceptions of the receptivity of the producers to their comments, satisfaction with producers' responses to their comments, and the feeling that their comments influenced the research; i.e., had an impact. Such perceptions are a critical foundation to an effective interaction.

Collaborative relationships are a two-way street. researchers must also feel that the interaction with users is a useful and important part of the research process. Indicators of such a relationship include producer perceptions of the mechanism's usefulness, their receptivity to user input, and satisfaction with their responses. These perceptions, along with those of the users determine whether or not the mechanisms are effective forums for interaction between the users and producers. (See Appendix B for indicators of a collaborative relationship for both users and producers employed in this research.)

2. Operational Definition of Utilization Concepts

Awareness is important in initiating the sequence of later utilization stages that lead to eventual use. Awareness has two primary variables: degree of exposure and type of exposure. Indicators of the former would include the amount of information requested and received, and the length of time a person has been associated with the study. Indicators of the second variable--type of exposure--include attendance at presentations, receipt of written

products, or other contacts by users. People who are exposed to a combination of media processes will have a reinforced awareness of the study. During the Energy From the West study, S&PP emphasized early involvement of users and used a variety of presentation techniques in disseminating its results. Such activities should have had a positive effect on awareness.

A general overall indicator of awareness is the person's familiarity with the purpose, scope, and results of the study. Such an indicator summarizes a person's overall knowledge about the existence and purpose of the research product.

Interest is closely related to awareness. Interest implies the active seeking of information by the individual and purposive activity. Because of the close relationship between awareness and interest, the same two variables that affect awareness affect interest. Yet, interest is more than awareness because it involves activity. Indicators of this activity include reading reports, commenting on draft reports, questioning and commenting at presentations, and requesting materials.

Because of the similarity between awareness and interest, this research has combined them into one concept. (See Appendix C for indicators of awareness/interest employed in this research.)

Trust refers to positive feelings and confidence between users and producers. Closely related to credibility, trust is built up over time. Indicators of trust include expressions of confidence in the technical quality of the report that the report is objective and unbias. Credibility refers to the accuracy and reliability of the study. The concept involves the user's assessment of the research results. Indicators of credibility include user perceptions of accuracy, reliability, willingness to refer results to others, and general assessment of the research product.

Because of similiarity between trust and credibility, this research has combined them into one concept. (See Appendix D for indicators of trust/credibility employed in this research.)

3. Operational Definition of Utilization

Engineering utilization refers to the direct application of research results. Indicators of this type of utilization include instances where users say that a particular part or conclusion of the report indicates a particular course of action. For example, during the research, the research team discussed several uncertainties involved with the effect of waste disposal on water quality. A decision by EPA to increase research on these uncertainties would be engineering utilization.

Intelligence utilization refers to using research as a knowledge base for decision-making. Indicators of this type of utilization include instances where users felt that particular decisions could be made at least partially on the information and comparisons of alternatives provided by the report. For example, Energy from the West spends considerable time discussing socio-economic impacts of energy development and possible alternatives for alleviating them. The report may be used by the federal government in assessing proposals to provided federal energy impact assistance to states with high energy-related growth rates.

Enlightenment utilization refers to using research to provide insight and understanding of the problem rather than an optimal solution. Indicators of this type of utilization include instances where users feel they received additional insight into the problems and issues of western energy development, and the likely benefits that may occur from development. Over time, a continuous stream of research may mold the climate of opinion of federal agencies or state government on whether to promote western energy development. Some states may decide that development is not worth the costs and risks. The federal government may decide not to provide assistance or relax certain regulations. (See Appendix E for indicators of utilization employed in this research.)

4. Operational Definitions of Utilization Barriers

Individual barriers refer to the motivations and characteristics of individual users. Variables affecting these characteristics include urgency of need, competence, education, and position in organization. Indicators of these characteristics include user perceptions of their need for information and the extent to which the study satisfied that need, the effect of the timing of the report's release, educational background, and current position in the organization. For example, a knowledgeable user with little need for information may be less likely to use a study than one who is less knowledgable and is required to take action in the area. (See Appendix F for indicators of individual barriers employed in this research.)

Organizational barriers refer to the effects organizations have on an individual's norms and actions. In particular, information that threatens the organization may be screened out by an organization member as unacceptable. Indicators of these organizational barriers include perceptions on the importance of the subject matter to the organization, the helpfulness of the information to the organization's interests, and the user's tenure with the organization. For example, a user who feels a report discusses issues critical to his organization in a manner detrimental to that organization is less likely to respond positively to that report than one who finds the report

helpful to his organization. (See Appendix G for indicators of organizational barriers employed in this research.)

Technical barriers refer to the packaging and presentation of the research. Variables include the report's scope, length, ease of reading, and understandability of contents. Indicators of technical barriers include user perceptions of the effect of the report's scope, length, and general effectiveness of S&PP's presentation. For example, it is quite possible that many users will read the reports' executive summaries first to determine the usefulness of the report for their own purposes. It is unlikely that many users will read the complete report cover to cover. (See Appendix H for indicators of technical barriers employed in this research.)

Time refers to barriers arising out of the time neccessary to do applied research. Variables affecting these barriers include the length of the study's duration, amount of time between communications between users and producers, and research team/user turnover during the project. Indicators of this barrier include research team turnover, user turnover, and user perception of the effect that the passage of time has on the research. For example, some users may feel that the time it took to produce the report has dated the information generated and therefore reduced its utility to them. (See Appendix I for indicators of time barriers employed in this research.) research team. The major thrust of this effort was to gather

FOOTNOTES

[1]Patton, Michael Q., et al. "In Search of Impact: An Analysis of the Utilization of Federal Health Evaluation Research." in Carol Weiss, ed., Using Social Research in Public Policy Making. Lexington, MA: Lexington Book, 1977. p. 158.

[2]Ibid.

[3]See Bogdan, Robert, and Seven J. Taylor. Introduction to Qualitative Research Methods: A Phenomenological Approach to the Social Sciences." New York: Wiley & Sons, 1975.

[4]See Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor, MI: University of Michigan, Institute of Social Research, Center for Research on Utilization of Scientific Knowledge, June 1978.

[5]See Henerson, Marlene E., Morris, Lynn Lyons, and Carol Taylor Fitz-Gibbon. How to Measure Attitudes. Beverly Hills: Sage Publications, 1978.

[6]Ibid., 21.

[7]Comments were received from all but one of the faculty members of the research team.

[8]The original sample was 170, but 17 percent of the sample could not be contacted. Reason for included retirement, change of address (no forwarding address), and death. This percentage was applied to the original pool of 425 to arrive at the number of 350.

[9]Thomas, David Hurst. Figuring Anthropology. New York: Holt, Rhinehart, and Winston, 1976.

[10]Berg (1978) has suggested that confidence levels of up to .2 may be acceptable for exploratory research.

CHAPTER V

ENHANCING UTILIZATION: THE IMPORTANCE OF AWARENESS, INTEREST, TRUST, AND CREDIBILITY

This chapter analyzes the importance of awareness, interest, and a collaborative relationship of trust and credibility to utilization. In addition, technical, individual, organizational, and time barriers to utilization are examined. Thus, the chapter has three purposes: (1) to determine whether awareness, interest, trust and credibility are a viable framework for developing utilization strategies, (2) to identify other perhaps more uncontrollable variables which may influence the process, and (3) to discuss the implications of the data for social researchers and their role in the utilization process.

I. Users' Attitudes Towards Utilization

This research has defined utilization from three perspectives (see Chapter II). The engineering perspective views utilization as the direct application of research results. The intelligence perspective views utilization as providing a knowledge base for decision-making. The enlightenment perspective views utilization as providing insight and understanding of the problem area to the user.

The literature[1] suggests that users will use research more for enlightenment purposes than engineering purposes. Decision-making is typically influenced by many factors--primarily organizational values and political considerations.

User attitudes towards potential use of Energy From the West (EFW), as tabulated from responses to the questionnaire, are presented in Table V-1. The results indicate distinct differences between the utilization types. "Intelligence" was the most common use of EFW; 57 percent of the users reported some or a great deal of this type of utilization. The result was evident with both indicators of intelligence utilization. As expected, users reported less engineering use than the other form of utilization. Approximately half of the users were unable to determine potential engineering utilization of Energy From the West. This reflects the difficulty of assessing the impact of one document on the policymaking process.

For the social researcher, the most significant part of these data is the percentage of users favorably inclined towards utilization. The percentages presented are hopeful signs to the social researcher. As noted in Chapter I, the conventional view of both users and researchers is that social research is underused. Within the constraints of the

TABLE V-I. UTILIZATION OF ENERGY FROM THE WEST

Type of Utilization	Utilization Level: Great Deal or Some	Slight or None	Uncertain	N
Engineering	20%	31%	49%	61
Enlightenment	37%	42%	21%	57
Intelligence	57%	22%	19%	58

data discussed in Chapter IV and the given situation, these data indicate that this characterization is not a fait accompli. Social research can be used in several ways, including direct applications. Applied researchers should recognize these differing uses as worthwhile contributions to the policy process and work to achieve these different kinds of results. To achieve this goal, understanding of user attitudes towards use of Energy From the West is essential.

User attitudes about these results reveals some interesting paradoxes. As shown in Table V-2, when users were asked to explain their attitude towards intelligence utilization many users responded that the focus of the reports on the "big issue" was its strong point. By "big issue," the users were commenting on the broad scope of the reports:

TABLE V-2: USER REASONING ON UTILIZATION

Type of Utilization	Users' Reasons for Favorable Response to Utilization					Users' Reasons for Unfavorable Responses to Utilization						
	Broaden Perspective/ Focus on Overall Issue	Good Discussion of Alternatives/ Tradeoffs	Good Information Sources	Tool for Policymakers	Confirmed Intuition	Lack of Details	Politics	Other Studies Dilute	Policymakers Will Not Listen	Lack of Distribution	Information Out of Date	Narrow Range of Alternatives
Engineering	--	--	2	5	--	6	24	--	5	3	--	--
Intelligence	9	7	4	--	--	8	--	4	--	--	3	2
Enlightenment	11	5	4		3	Not surveyed*						

Note: Multiple responses to survey question were accepted. Categories with only one response were deleted.

as noted in Chapter III, nine issue areas related to western energy development were covered.[2] Users thought this comprehensiveness gave them an broader perspective on the tradeoffs involved in western energy development. Other favorable comments included positive reactions to the discussion of alternatives, to the report's value as a future reference, and to the report's use as a policy tool.

Negative comments about EFW included criticisms of the lack of details; an unavoidable result of the project's broad scope. The broad scope of the project also made it more difficult to assess a full range of alternatives in any one issue-area. Only one of the negative responses was not related to the project's scope--those noting the proliferation of energy studies and the possibility EFW would be diluted by these studies.

Scoping a research project is a fundamental decision that influences the focus of the utilization effort. The contrasting user comments concerning scope indicate the difficulty in making such a decision. Energy From the West is a broad-scoped report. Opinions from users indicate that this aspect of the report was a mixed-bag from an intelligence utilization perspective.

For engineering utilization, the popular response was that politics would have the dominate voice in energy decision-making. As indicated in Table V-2,

politics was the overwhelming response of users in discussing engineering utilization. However, as indicated by Table V-1, twenty percent of the users had positive attitudes towards engineering use. These users tended to question the dominance of politics in their evaluation of Energy From the West. To get some feeling for this influence, the responses to the engineering utilization question presented in Table V-2[3] was dichotomized according to whether the user felt that the political process would dominant the decision-making process, or whether the report could have an influence on the process. As indicated in Table V-3, users who believed in the dominance of politics

TABLE V-3: IMPORTANCE OF POLITICS TO UTILIZATION

	Importance of Politics		
Attitude Towards Use	Politics Will be Major voice in Decision-making	Other Factors Important in Decision-making	N
Favorably inclined towards engineering utilization	36%	64%	11
Not favorably inclined towards engineering utilization	63%	37%	27
N	21	17	38

generally had a more pessimistic attitude towards Energy From the West, however, this relationship was not statistically significant. Although these data are insufficient to make any firm conclusions, it does indicate that the situation is not hopeless, even for users who believe in the dominance of politics.

Recognizing the uncertainty in defining "enlightenment utilization," the open-ended follow-up question on this issue asked how the user was enlightened by EFW. As indicated by Table V-2, the trait mentioned most frequently by users was the widening of perspective; the adding of heretofore unrecognized viewpoints to their perspective on the western energy situation. Other aspects mentioned were the identification of various values and interests involved in western energy development, and the usefulness of the reports as an information source. Finally, some users found the confirmation of their intuition on the issues very useful.

As indicated in Table V-2, user reacting unfavorably to enlightenment use were not formally questioned regarding their reasoning. However, through the phone interviews and follow-up conversations described in Chapter IV, some negative responses to enlightenment use were obtained. The primary reason given by these users for finding Energy From the West not particularly enlightening was its lack of new information. Basically, these users felt that they were well-informed on the impacts

of western energy development, and did not feel EFW added any new information.

Fortunately, a question directed towards this attitude was included in the questionnaire. As discussed in Chapter IV, one indicator of individual factors influencing utilization is new information provided the user. Correlating this indicator with the indicator of enlightenment utilization showed a strong correlation (.799). This relationship indicates that the amount of new information provided is one influence on enlightenment utilization.

There are several reasons why users might not respond positively to the information provided by EFW. One possible reason is that users reject the perspective presented in EFW; it is in opposition to their perspective. Essentially, a user with this attitude is taking the opposite position to users who responded above that the report confirmed their intuition. Because the report did not confirm the users' intuition, they did not find the information useful.

A second possible reason is that the information provided by EFW is already understood by the user. Before the Arab oil embargo of 1973, few people outside of industry had extensive knowledge of energy related problems. However, since the oil embargo, a slow education process has occurred within government. This process has become vital with the increased responsibilities of government in energy policies.

With the requirements of the National Energy Act and various environmental laws, both state and federal officials have had to raise their energy consciousness.

The third possible reason is an offshoot of the second reason. The increased need for information on energy has encouraged specialization by participants in the energy policy system. This specialization would work against a broadly scoped project if users were only interested in their own area of expertise. Certainly the criticism that the report lacked detail would indicate this possibility.

In summary, the pivotal influence in user attitudes toward Energy From the West is scope. Favorable opinion towards the scope of EFW and the discussion of alternatives resulted in positive attitudes towards intelligence utilization. Also, scope seemed to be the major criterion in determining user attitudes towards enlightenment utilization. Finally, although politics tended to have some effect on user reasoning on engineering utilization, the data indicate that the situation is not hopeless. The overview presented here indicates social research has the potential to influence users, although direct use (engineering utilization) is not very likely. It also indicates users are more receptive to conceptual uses of research, than to direct use. This receptivity represents an avenue for social researchers to aid policymaking.

Recognizing this potential, factors which may have fostered this situation will be examined.

II. Importance of Awareness and Interest to Utilization

The concepts of awareness and interest are the foundation of any successful utilization strategy. The literature[4] suggests several expectations regarding the relationship between these concepts and the three definitions of utilization used in this research. These expectations are as follows:

1. Positive attitudes towards all types of utilization requires awareness and interest of the user in the final report.

2. For enlightenment utilization, the need for awareness and interest extends throughout the research process.

3. Users reporting potential usefulness of the report will be interested and aware of the study.

It is expected that awareness and interest are important to all types of utilization. However, the importance of the concept across the research process may vary according to utilization type. Enlightenment utilization is expected to reflect the various contacts the user has made throughout the research process. Whereas intelligence and engineering utilization is likely to reflect the users' interest in the final report of the study and its conclusions.

As discussed in Chapter IV, three user awareness and interest indicators are employed in this study. The first two, familiarity with the study's purpose and familiarity with the study's results, are general awareness and interest indicators. Table V-4 summarizes the correlation of these two indicators with indicators of the three utilization perspectives. The relative and actual scores of the indicators are generally as expected. Although familiarity with the study is very important for enlightenment purposes, it becomes less important as the definition of use takes on a more direct application. As noted by Rogers,[5] awareness and interest are the building blocks for the later decisions. However, being aware and interested in the study does not translate into direct use as strongly as conceptual use. This result may be due to the surfacing of intervening factors that constrain user actions. During the decision-making process, such factors, particularly individual and organizational, may intervene against use. This intervention is more likely to occur with engineering use, since such use attempts to influence directly the decisionmaking process.

This discussion of awareness and interest must be qualified and refined by the third indicator--familiarity with individual reports. As shown in Table V-4, for enlightenment use, the correlations for awareness and interest remained significant across the various reports. Such a

TABLE V-4 UTILIZATION TYPES AND INDICATORS OF AWARENESS/INTEREST

Utilization Type	Indicators of Awareness and Interest: Familiarity With Study's Purpose	Familiarity With Study's Results	Familiarity With First-Year Work Plan	Familiarity With Progress Report	Familiarity With Executive Summary of Progress Report	Familiarity With Plan for Completing T.A.	Familiarity With Draft Analysis Report	Familiarity With ERDS Report	Familiarty With Impact Analysis Report	Familiarty With Policy Analysis Report
Engineering	NS[a]	.773[b]	NS	NS	NS	.576	.609	.500	.697	.800
Enlightenment	1.000	.720	.497	.793	.569	.457	.783	.451	.473	.533
Intelligence										
Promote Discussion	.621	.424	.376	.367	.310	.580	NS	NS	NS	.352
Identify Alternatives	.570	.532	.266	.368	.272	.483	NS	.465	.374	.528

[a] NS = Not significant.
[b] All coefficients (phi/phimax) are significant at the .1 level.
Total N-size ranges from 57 to 61.

trend tends to support expectations that awareness and interest are important to enlightenment utilization throughout the research process.

This concept of awareness and interest as a process occurring throughout the research process is also important for intelligence utilization although to a lesser degree. Although the early reports were slightly correlated with utilization, the mid-term report--Draft Policy Analysis Report--was not. Also, correlation of two final reports, the Impact Analysis Report and the ERDS report, was not statistically significant for one intelligence utilization indicator. This later result is partially due to the limited dissemination of these reports and the policy orientation of the users. That is, since the users were primarily interested in the policy alternatives and the implications of the report, their interest in the technical information of these reports is questionable.

The Draft Policy Analysis Report reflects the difference between enlightenment and intelligence utilization. Enlightenment utilization showed a high correlation between use and the Draft report; reflecting the users first opportunity to learn about the policy options being examined by S&PP. However, this new information was incomplete as it was only a draft report, and not very useful for fully assessing policy alternatives. This is not to say it was not useful for other purposes; draft reports are a critical

component in maintaining communications with users. However, they are not intended for direct use.

For engineering utilization, the results generally support expectations that awareness and interest in the final reports are important to engineering utilization. The earlier reports were not statistically correlated with engineering utilization. However, the mid-term reports, the Work Plan and the Draft Policy Analysis Report, along with the technical report--the ERDS--were moderately correlated with engineering utilization. These relationships may reflect the need of direct application for specific information concerning methodology and technical detail to assess the appropriateness of the information for particular situations. As expected, awareness and interest in the Impact Analysis Report and the Policy Analysis Report were strongly correlated with engineering utilization.

In summary, the above discussion indicates two important features of awareness and interest. First, the results show what is intuitively obvious--awareness and interest are necessary building blocks for utilization efforts. Second, and more importantly, the results presented here indicate the importance of building awareness and interest during the various phases of research process--particularly for enlightenment and intelligence utilization, but also for engineering utilization. This aspect of utilization confirms the need for researchers to include users at

the beginning of the research process, and to continue open dialogue throughout the process. Whether S&PP's participation strategy was successful in promoting this dialogue is evaluated in Chapter VI. The data here suggest such a dialogue is a potentially fruitful course for social researchers to follow.

III. Importance of Trust and Credibility to Utilization

Building users' trust and credibility in one's research is critical in assisting their evaluation of that research. The literature[6] suggests several expectations regarding the relationship between trust and credibility and the three definitions of utilization used in this research. These expectations are as follows:

> Positive attitudes towards utilization require user trust and credibility in the research.
>
> The influence of user trust and credibility in affecting use is strongest for enlightenment utilization, less so for intelligence utilization and least for engineering utilization.

It is expected that trust and credibility are necessary conditions for utilization. However, the influence of trust and credibiliy in users' decisions about use is expected to vary according to utilization type. For more direct applications, it is expected that other factors will exert a stronger influence on a user's decision, lessening the importance of trust and credibility. For more conceptual uses, such intervening factors should be less important.

As discussed in Chapter IV, three user trust and credibility indicators are employed in this study. Table V-5 summarizes the correlation of these indicators with the three utilization perspectives. The first indicator, technical quality, measures the attitudes of the user towards the scientific credibility of the research. As shown below, technical quality was statistically correlated with enlightenment and intelligence but not engineering utilization.

TABLE V-5: UTILIZATION AND INDICATORS OF TRUST AND CREDIBILITY

	Indicators of Trust and Credibility		
Utilization Type	Technical Quality of Reports	Balance of Reports	Willingness to Refer Others to the Report
Engineering	NS	.661	NS
Enlightenment	.764	.698	.764
Intelligence			
Promote Discussion	.407	.597	.481
Identify Alternatives	.613	.533	.613

NS = not significant.

All coefficients (phi/phimax) are significant at the .1 level.

Total N-size ranges from 57 to 61.

The third indicator, willingness to refer others to the report, had results similar to the first indicator. Only the second indicator, balance presentation of issues, was statistically related with engineering utilization. These results reaffirm themes which surfaced under the previous discussion on awareness and interest. First, it indicates the difficulty in influencing engineering utilization. Despite generally favorable attitudes towards trust and credibility, the attitudes did not completely transfer to engineering utilization. However, the result of the second indicator indicates some influence may be possible.

The impact of the awareness, interest, trust, and credibility--concepts which can be influenced by researchers--indicates that influencing engineering utilization is difficult; researchers have little power to directly influence policy decisions. However, despite significant barriers, some factors, like writing balanced reports and promoting awareness and interest, can impact engineering utilization. Use is possible, even for direct purposes.

In summary, these results should motivate researchers to accept intelligence and enlightment utilization as worthy goals of applied research. Awareness, interest, trust, and credibility have all been shown to be important considerations in user attitude towards intelligence and

enlightenment utilization. If methods of building trust and credibility can be defined, researchers will have some guide to achieving enhanced attitudes towards enlightenment and intelligence utilization.

IV. Importance of Technical Factors to Utilization

The scoping and packaging of research products have not received much attention in the literature.[7] However, with discussion of user attitudes presented earlier in this chapter supplementing the literature, the following expectations for the relationship between technical factors and utilization are suggested:

1. Well packaged and presented research will assist utilization.
2. For enlightenment and intelligence utilization, a broadly scoped report will assist utilization.
3. A broadly scoped report is detrimental to engineering utilization.

It is expected that effective packaging of research will increase the number of users who read and use the report. A broad scoped report is expected to provide users with a wider perspective on issues, increasing enlightenment and intelligence utilization. However, a broad scoped report may fail to satisfy the needs of engineering utilization for detail.

A. Packaging and Presentation

As discussed in Chapter IV, two indicators of presentation and packaging are employed in this study. The first indicator concerns the general importance of presentation to reading reports. Users found presentation very important to them in deciding to read reports; over 93 percent of the sample (N=60) felt presentation was important.

This importance assigned to presentation is reflected by user responses to the second indicator--effectiveness of EFW's presentation. As indicated by Table V-6, the relationship between user attitude towards EFW's presentation and all forms of utilization was statistically significant. This overall strength of packaging and presentation may surprise some researchers who feel such concerns are trivial. However, discussions with users during the phone interviews indicated that size and ease of reference can be the impetus to whether a report is studied or used as a doorstop. As noted earlier, awareness and interest are the building blocks of utiliztion. The results here indicate that these are fragile concepts--easily torn down by bad execution of the final product. This is particularly true in the energy area where recent interest in the area has produced numerous studies--each with a different scope, level of detail, and usefulness for individual users. Under these circumstances, a user needs the ability to separate the wheat from the chaff. If a report

is organized in such a way that this process is difficult, the user may lose interest in the report and put it on the shelf.

B. Scope

For the second component, scope, this study employed one indicator. As noted in section I of this chapter, user reasoning on scope resulted in a paradox between those users who appreciated the broad scope of EFW, and those users who wanted more detail. However, the importance users placed on scope is not reflected by the results presented in Table V-6. Only one utilization indicator--promoting discussion--was statistically related to scope.

This contradiction can be resolved by looking at the responses to the indicators. Seventy percent of the sample (N=56) felt that EFW's scope would have little or no affect on potential use of the report. The indicator, however, does not distinguish between utilization type. If one accepts the user reasoning presented earlier, these results indicate that users tended to look at EFW from an intelligence utilization perspective.

C. Summary

Users of social research are people beseiged by a barage of information with uneven usefulness. Given this

TABLE V-6. UTILIZATION AND INDICATORS OF TECHNICAL BARRIERS

Utilization Type	Indicators of Technical Factors	
	Effectiveness of EFW Presentation	Adverse Impact from Scope of EFW
Engineering	.750	NS
Enlightenment	.714	NS
Intelligence		
Promote Discussion	.461	-.322
Identify Alternatives	.429	NS

All coefficients (phi/phimax) are significant at the .1 level.

Total N-size ranges from 56 to 60.

NS = Not significant.

situation, it is not surprising that effective organization of research results enhances the potential for use of the product. The implication of this for the S&PP's utilization strategy which emphasizes presentation is that this is a correct emphasis, and will enhance use. As shown earlier, building awareness, interest, trust, and credibility is a

continuous process between user and researcher. Given this, it is not surprising that developing effective strategies for presenting the purpose and results of research are important in facilitating use. Presentation, like awareness, interest, trust, and credibility, is controllable by researchers. That many researchers choose to ignore presentation concerns in packaging research products indicates a fundamental misunderstanding of the policy process. This misunderstanding will be discussed in Chapter VII.

The indicator for scope shows the problems involved in trying to discuss utilization in a generic sense. The opening discussion of this chapter delineated the differing effects scope had on users' attitudes according to utilization type. Without understanding the utilization type being used, it is impossible to interpret the meaning of this indicator for scope. However, given the user reasoning presented earlier, the positive response of users to EFW's broad scope implies that users tended to view EFW in terms of enlightenment and intelligence use and not engineering use.

V. Importance of Individual Factors to Utilization

Individual factors can influence user receptivity to information. The literature[8] suggests several expectations

for the relationship between individual factors and utilization. These included the following:

1. Users respond positively to new information provided them.
2. Need for information is a prerequisite for use.
3. Higher levels of user education lead to more use of research.
4. Users with engineering or physical science backgrounds will respond to research more than users whose disciplines emphasize other factors in the policy process.
5. Timing is a prerequisite for use, especially engineering use.

To expect a relationship between need and action is not surprising. Neither is an expectation that receipt of new information will increase the potential for all forms of utilization. For education level, it is expected that users with advanced degrees will be more open to information than less educated users. Also, it is expected that users educated in disciplines emphasizing practical application of research (engineering, physical science) will be more favorable to all forms of use than disciplines which emphasize other influences on the policy process (social sciences). Finally, it is expected that individual users will act positively to timely information.

As discussed in Chapter IV, six indicators are used in this study to measure the impact of a variety of individual characteristics on utilization. The three primary

aspects being measured are: (1) information needs, (2) education, (3) urgency of need (timing). The following discussion is divided by these three traits and followed by a summary.

A. Need for Information

As indicated in Table V-7, need for information on energy development is not statistically related to utilization. Need does not relate directly to use. One possible response to this indicator is that Energy From the West did not provide the information either needed or wanted by users. Certainly, Knowledge Specific Theories of Non-utilization would suggest this to be the case. More likely, however, it suggests that need per se is insufficient to promote use. Users are discriminating in what they will use. More than just need is necessary to prompt action.

The second indicator measured whether EFW provided users with new information about western energy development. Receipt of new information appears to be a strong influence on the use of EFW. As indicated by Table V-7, new information is statistically related to all forms of utilization. This result confirms the strong result achieved by new information by Berg,[9] and the expectation of this research. However, the apparent strength of this relationship needs

TABLE V-7 UTILIZATION AND INDICATORS OF INDIVIDUAL BARRIERS

Utilization Type	Indicators of Individual Factors					
	User Need for Information	New Information Provided by Reports	Level of Education	Field of Study	Importance of Timing to EFW	Effect of EFW's Timing
Engineering	NS [a]	.828 [b]	NS	NS	NS	NS
Enlightenment	NS	.799	NS	NS	.646	NS
Intelligence						
Promote Discussion	NS	.597	NS	NS	.502	.483
Identify Alternatives	NS	.456	NS	NS	.356	.415

[a] NS = not significant

[b] All coefficients (phi/phimax) are significant at the .1 level.

Total N-size ranges from 50 to 60.

to be tempered by the discussion of this variable presented earlier in this chapter.

B. Education

The idea that educating users will improve utilization is the basis of many suggestions in the literature to improve the use of social research. Taken as a whole, the sample studied here is a well-educated group. Only one did not have a college degree. Given that college degrees are virtual prerequisites for many government jobs, such a result is not surprising. Unfortunately, this research could not break down the sample according to specific training received by users in using social research. This omission tempers any results presented here.

To determine whether education has an influence on utilization, the sample was broken into two classes: those with a bachelor's degree, and those who had achieved higher degrees. As shown by Table V-7, there was no statistical relationship between the two groups and the three types of utilization. This may be due to the high dividing line chosen for this analysis. The results do suggest that more education is not necessarily better in regards to utilization; however, the results do not indicate whether specialized training assists utilization.

The second indicator of educational characteristics is the disciplinary training of the user. Dividing the sample

into those users with a "hard science" background and those with a "soft science" background, Table V-7 shows no statistical relationship between field of study and any form of utilization. This result is not in harmony with the expectations expressed earlier which could be due to the applied background of virtually all users in the sample. Such a background would negate part of the disciplinary differences on research application.

C. Urgency of Need

Two indicators of timing are employed by this study. The first indicator, importance of timing for EFW, measures the effect of fortuitous timing of the final report's release. As summarized by Table V-7, not only did a majority of users feel timing would have an influence on the report's potential use (60 percent), but such opinions were statistically related with enlightenment and intelligence utilization. Engineering utilization was not significantly related with timing.

To refine this finding, a second indicator, whether the effect of timing was positive or negative, was employed. Asked of users who felt timing would influence use of the report, 70 percent felt such an influence would be positive. However, when this result was correlated with use, only intelligence utilization showed a significant relationship. Given the few users who responded positively to engineering utilization, this result suggest that while timing may be a necessary condition for engineering use, it is not

sufficient. Other factors, particularly the inability of half the sample to assess the engineering use, intervene in the relationship.

D. Summary

Of the three aspects of individual users examined here, amount of new information provided is the most powerful. While the discussion of user reasoning presented earlier should temper this result, the overall thrust of the indicator is clear: for information to be useful and used by policy-makers, researchers must understand and respond to users' needs for information. The literature suggests this can be done by interacting with users during the research process. Since S&PP attempted to do this during the EFW project, this research provides an opportunity to test this idea empirically. (See Chapter VI). Also, results indicate the timing of reports is important to utilization, a situation largely beyond the control of researchers. Despite the somewhat haphazard nature of timing, Science and Public Policy attempted to exploit such opportunities when they arose. Chapter VI will discuss these efforts in more detail.

VI. Importance of Organizational Factors to Utilization

Organizational interests are strong factors in users attitudes toward utilization. The literature[10] suggests several expectations for the relationship between organizational factors and utilization. These include the following:

1. In the case of EFW, federal users will react more positively to the reports than non-federal users.

2. Positive attitudes towards utilization require a favorable user perception of a report's impact on the user's organization.

3. Long tenure in an organization is detrimental to utilization.

Although EFW addresses issues at all levels of government, it is focused more at the federal level than any other. It was also funded by a federal agency--EPA. Thus, it is expected that federal users will be more receptive to the report than other users. It is also expected that organizational interests and the amount of time a user has been exposed to those interests will have a significant effect on user's perception of the report's usefulness.

Four indicators of organizational influences are employed by this study. The first indicator, agency of employment, divides the sample between federal users (N=20) and other users (N=37). As shown in Table V-8, comparing this indicator with the utilization indicators finds one intelligence use indicator with a statistical relationship. The other utilization indicators showed no relationship. This result reflects the central thrust of the Energy From the West project as outlined in Chapter III: intelligence utilization by federal users, particularly EPA.

The second indicator of organizational influence is organizational interest. Eighty-three percent of the sample (N=58) found the substance of EFW important to their particular organization. This finding should temper the lack of

TABLE V-8: UTILIZATION AND INDICATORS OF ORGANIZATIONAL BARRIERS

Utilization Type	Indicators of Organizational Factors			
	Agency of Employment	Importance of Issues to Organization	Helpful to Organization	Tenure With Organization
Engineering	NS[a]	NS	NS	NS
Enlightenment	NS	NS	.887	NS
Intelligence				
Promote Discussion	NS	NS	.561	NS
Identify Alternatives	.409[b]	NS	.613	NS

[a]NS = not significant.

[b]All coefficients (phi/phimax) are significant at the .1 level.

Total N-size ranges from 57 to 61.

a statistical relationship between importance of issues to organization and the utilization indicators as presented in Table V-8. An examination of the correlation between these indicators shows negative responses to use from those users with no organizational interests, particularly for enlightenment utilization. This result indicates that while importance of issues to organization may not directly foster use, it may be a necessary condition for enlightenment or intelligence use to occur.

It is interesting to note that user response to engineering utilization reverses the trend identified above: users in organizations where the issues raised by EFW are not important tended to favor engineering utilization over those users who organization had an interest in the subject matter. This reversal may indicate that users without an organization interests in the policy questions addressed by EFW may lack understanding of the complexities of that particular policy area, and conclude that Energy From the West may have a direct impact on the area. Users with organizational interests in the area generally did not feel the report would have such an impact.

The third indicator of organizational influences is helpfulness to organizational interest. The helpfulness of a report to a user's organization is a very important influence on the potential use of EFW. As shown in Table V-8, organizational interest shows a significant relationship

with enlightenment and intelligence utilization. Although the relationship with engineering utilization was not statistically significant at the .1 level, it came very close. These strong influence of organizational interests are not surprising; as noted in Chapter II, people tend to take on the values of the organizations they serve.

The final indicator measures the effect of organization tenure towards user receptivity of EFW. As shown by Table V-8, tenure apparently has little effect on user attitude towards EFW. Possible reasons for this include the tenure chosen to divide the sample--five years and the generally favorable reaction of users to the potential impact of EFW on their organization (60 percent).

In summary, a user's organization is a strong influence on all forms of use. This is not surprising. Perhaps the most surprising result of this section is the clear majority of users (60 percent) who felt EFW would be helpful to their respective organizational interests. Given the diversity of interests represented in the sample, this consensus is unexpected, and suggest part of the reason why intelligence utilization of EFW scored so well among the users. It also suggest a role for social research for building linkages between different organizations by providing a common base of information. Such a role is discussed in more detail in section VIII of this chapter.

VII. Importance of Time to Utilization

The time required to do social research can affect the utility of it. The literature[11] suggest the following expectation for the relationship between time and utilization:

1. The longer a research project takes to complete, the less likely it is to be used.

EFW took over three years to complete. It is expected that over this time the changes in the policy system, the dating of information, and the turnover in researchers and potential users had an adverse effect on potential use.

The effect of time on research is difficult to assess. This research employed three indicators to explore this factor and its effect on EFW. The first indicator asked the sample whether they felt the three years plus it took to complete EFW had an adverse effect on use. Sixty percent of the sample felt the time taken to complete the project had little or no adverse effect on use. As recorded by Table V-9, there was one statistical relationship between this feeling and use.

Users interviewed gave two reasons for the lack of effect. One, many users felt energy was a long term problem that would not be solved in the near future. Therefore, any research done on the subject would probably have a long shelf life. The second reason given was the timing of the final report's release; shortly before the President announced a major new initiative to develop coal and oil shale in the West. As

TABLE V-9: UTILIZATION AND INDICATORS OF TIME

Utilization Type	Adverse Impact From Time Necessary to Complete Project
Engineering	NS
Enlightenment	NS
Intelligence	
Promote Discussions	NS
Identify Alternatives	-.456

NS = not significant

Coefficient (phi/phimax) is significant at the .1 level.

N = 59

a final note, many users felt the study could not have been done in less than three years.

However, this indicator of time tells only part of the story. For during the research there was considerable turnover of users and researchers. The second indicator of time is the amount of turnover in user agencies during the research process. From the random sample taken from the EFW mailing, approximately fifteen to twenty precent of the

sample had left their original agency with no forwarding address. Retirement was the principal reason given. How much this turnover affected potential use of EFW is unclear.

This turnover problem also affected the research team. Of the original seven members of the research team, only three were still at S&PP when the final policy report was published. This turnover included the project director and one of the co-investigators. Given the personal nature of the contracts made with potential users, the loss of project director was particularly unfortunate. However, the total effect of the turnover is difficult to assess.

In summary, because of the choice of a timely topic and the fortunate timing of the report's conclusions, many of the potential adverse effects of a three-year long project were adverted. However, the duration did take its toll on users and researchers; a toll difficult to assess.

VIII. Summary and Conclusions

> People say that social science research should be used. But many of the people doing the saying are social scientists who, like Rexford Tugwell on his way to Roosevelt's Washington, expect to "speak truth to power." Such a posture presupposes that (a) there is a clear and single truth, (b) they have it by the tail, (c) it is a whole truth whose revelation is irrelevant to the clash of interests and political stakes, (d) powerful decisionmakers will heed this truth, and (e) decisions embodying such "truth" will be better and wiser than decisions reached on other grounds.
>
> Few social scientists would make such extravagant claims. Yet, many of them talk as though using social research is a simple and straightforward business: Research is truth and they are the passers of the flame. (Weiss, 1977)

Social science research is a humble enterprise. As expressed by Weiss above, the direct application of social research, or engineering utilization, is a perspective based on premises few social scientists would consider reasonable. This research adds its weight to this observation.

But if researchers cannot expect the facts to "speak for themselves," the question becomes what can the applied researcher do? It is suggested here that researchers can help build a consensus within the policy community through both intelligence and enlightenment utilization of their research. Rather than trying to "speak truth to power," researchers can "discuss truth with power" by establishing credible information and sensitizing users to the various values involved in the issue area. This research indicates that users are receptive to such enlightenment and intelligence uses of research.

Such a role for applied researchers would place new demands on them; demands similar to that of the "change agent" in the Problem-Solver perspective of utilization (see Chapter II). The primary responsibility this role would put on the researcher is to develop strategies to communicate and disseminate information to users. As indicated by this research, early involvement with EFW was important to utilization by fostering awareness and interest in users for EFW. Thus, it would seem that early involvement is a prerequisite to any utilization strategy.

Other factors which can be influenced by researchers and affect user attitudes toward enlightenment and intelligence use of EFW are trust and credibility, and presentation. For trust and credibility, it has been suggested in the literature[12] that trust and credibility can be fostered by building continuing relationships between researchers and users. Given the importance of a balance report indicated by this research, such relationships should include a wide variety of interests; interests which will have to agree for a working policy consensus to form. Also, researchers need to be receptive and responsive to these interest groups' opinions and comments not only for balance, but also for technical accuracy.

The strength of presentation in influencing user attitudes toward use of EFW makes presentation an important communication strategy in any overall utilization strategy. A short, well-thought out summary cannot only provide a guide to the report, but also provide the user with a common base to interact with researchers. This research indicates that a little time spent condensing and formating information in a concise and easily understandable manner will pay off in enhanced user attitudes towards use.

However, this chapter also indicates a number of important utilization influences which are probably beyond the control of researchers. These are organizational interests, timing of the report, and the amount of new

information a user receives from a report. The extent to which a utilization strategy stressing early involvement and continuing relationships between users and researchers would influence these factors is problematical. It is expected that if users are included in the research process, the probability that new, useful information for users will be produced is increased. However, the differing levels of knowledge of the individual users makes the effectiveness of any strategy uncertain in this respect.

An important influence to be overcome if applied researchers hope to build linkages and consensus is organizational interests. As indicated by the literature, organizational values take on a personal character with users, making them very difficult to overcome. If continuing relationships are effective in building trust and credibility, then the bond created will help to alleviate the suspicion created by organizational influences. However, the extent to which such bonds can overcome organizational interests is uncertain.

A utilization strategy cannot affect timing per se to any great degree. However, by becoming active with the policy community, the researcher will be more aware of the topical areas of concern to users. Hence, the likelihood of picking a time area of research is increased. Certainly, the S&PP decision to do a study on western energy was guided

by a feeling engendered by the policy community that this was an area of continuing interest to them. As indicated by this research, the timing of the report was fortunate.

In conclusion, this research indicates that an utilization strategy based on fostering awareness, interest, trust, and credibilty, with concern for presentation is sound. In this regard, this chapter empirically reinforces the conceptual literature on utilization. Also, this research identifies three other factors--new information provided, organizational interests, and timing of the report which are important to user's attitudes towards use. Finally, this chapter suggests that engineering utilization is a somewhat inappropriate way to view use, both in terms of results, and in the nature of decision-making.

S&PP has attempted to favorably influence these factors through a strategy which stresses early involvement and continuing relationships between users and researchers. Chapter VI will analyze this strategy in terms of fostering the above six utilization concepts to determine the effectiveness of the strategy. Also, user and research comments on the effectiveness of the S&PP utilization strategy will be employed to analyze the strength and weaknesses of the strategy.

FOOTNOTES

[1]See Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor, MI: University of Michigan, Institute for Social Research, Center for Research on Utilization of Scientific Knowledge, June 1978; Caplan, Nathan, A. Morrison, and R.J. Stambaugh. The Use of Social Science Knowledge in Policy Decisions at the National Level. Ann Arbor: Institute for Social Research, University of Michigan, 1975; and, Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969.

[2]As discussed in Chapter III, the issue-areas covered by Energy From the West were broad, allowing for only a general discussion of alternatives.

[3]Because of multiple responses and deleted categories, the N sizes of Table V-2 and Table V-3 do not correspond.

[4]See Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science; A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978; Ballard, Steven C., Brosz, Allyn R., and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8: 951-957 (Summer 1980); Ballard, Steven C., and Larry B. Parker. "Discussing Truth with Power: The Importance of Participatory Research." Paper delivered at the annual meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980; Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969; Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor, MI: University of Michigan, Institute for Social Research, Center for Research on Utilization on Scientific Knowledge, June 1978; Kash, Don E. "Observations on interdisciplinary studies and government roles," in R.A. Scribner and R.A. Chalk (eds.) Adapting Science to Social Needs. Washington, D.C.: American Association for the Advancement of Science, pp. 147-178, 1977; and, Patton, M.Q. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978.

[5]Rogers, Everett. Diffusion of Innovations. New York: The Free Press, 1962.

[6] Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978; Ballard, Steven C., Brosz, Allyn R., and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8: 951-957 (Summer 1980); Ballard, Steven C., and Larry B. Parker. "Discussing Truth with Power: The Importance of Participatory Research." Paper delivered at the annual meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980: Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969; Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor, MI: Institute for Social Researc, June 1978; Kash, Don E. "Observations on interdisciplinary studies and government roles," in R.A. Scribner and R.A. Chalk (eds.), Adapting Science to Social Needs. Washington, D.C.: American Association for the Advancement of Science, pp. 147-178, 1977; and, Patton, M.Q. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978.

[7] See Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978; Ballard, Steven C., Brosz, Allyn R., and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8: 951-957 (Summer 1980); Ballard, Steven C., and Larry B. Parker. "Discussing Truth with Power: The Importance of Participatory Research." Paper delivered at the annual meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28,1980; Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969; and Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor: Institute for Social Research, June 1978.

[8]See Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policy. Ann Arbor: Institute for Social Research, June 1978; Caplan, Nathan, A. Morrison, and R.J. Stambaugh. The Use of Social Knowledge in Policy Decisions at the National Level. Ann Arbor: Institute for Social Research, 1975; Caplan, Nathan. "Science is Seldom Put to Good Use by U.S. Officials." ISR Newsletter, 2:2 (Spring, 1974); Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969; Havelock, Ronald and Kenneth Benne. "An Exploratory Study of Knowledge Utilization." in G. Watson (ed.) Concepts for Social Change. Washington,D.C.; NTL Institute for Applied Behavioral Science, 1967; Kash, Don E. "Observations on interdisciplinary stuides and government roles," in R.A. Scribner and R.A. Chalk (eds.) Adapting Science to Social Needs. Washington,D.C.; American Association for the Advancement of Science, pp. 147-178, 1977; and, Patton, M.Q. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978.

[9]Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor: Institute for Social Research, June, 1978.

[10]See Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor: Institute for Social Research, June 1978; Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969; and, Havelock, Ronald G., and Kenneth Benne. "An Exploratory Study of Knowledge Utilization," in G. Watson (ed.) Concepts for Social Change. Washington, D.C.: NTL Institute for Applied Behavioral Science, 1967.

[11]See Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969; and, Havelock, Ronald G. and Kenneth Benne. "An Exploratory Study of Knowledge Utilization," in G. Watson (ed.) Concepts for Social Change. Washington,D.C.: NTL Institute for Applied Behavioral Science, 1967.

[12] Patton, Michael Q. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978.

CHAPTER VI

DOING PARTICIPATORY RESEARCH: THE IMPACT OF INTERACTION ON UTILIZATION CONCEPTS

In Chapter V, individual, interpersonal, organizational, technical, and time barriers were observed to have an important impact on the utilization of Energy From the West by influencing: (1) awareness and interest, (2) trust and credibility, (3) presentation, (4) new information provided, (5) organizational interests, and, (6) timing of the report. Science and Public Policy, through a strategy of stressing early involvement and continuing relationships between users and themselves, attempted to enhance awareness, interest, trust, and credibility in its products. This chapter will analyze this strategy in terms of fostering these six utilization factors to determine the effectiveness of the strategy. From this evaluation and user and researcher comments on the strategy's effectiveness, guideposts for researchers interested in improving utilization will be identified.

I. Users' Attitudes Towards Interaction with S&PP

Based on the literature[1] and user comment received by S&PP during the research, it is expected that interaction had a positive impact on users' attitudes towards use of Energy From the West by promoting awareness, interest, trust,

and credibility, with users. Also, it is expected that interaction assisted the research team in providing new information to users and reducing potential organizational barriers to use. Interaction is not expected to have directly influenced timing; however, it is expected that interaction did assist S&PP in responding to timely situations when they arose.

Users gave several reasons for their positive attitude towards their interaction with S&PP. As indicated by Table VI-1, when questioned about their feeling towards

TABLE VI-1: USER REASONING ON INTERACTION

Favorable Responses	Number of Responses	Unfavorable Responses	Number of Responses
1. Increased ability to assess the contents of Energy From the West	12	1. Information only partially relevant to user's organization	4
2. Increased credibility of Energy From the West	9	2. Time constraints inhibited ability to interact	3
3. Increased awareness-interest in Energy From the West	4	3. Interaction had no effect on user	2

Note: Multiple responses to survey question were accepted. Categories with only one response were deleted.

their discussions with S&PP, three positive themes emerged. The first was that interaction improve users ability to assess EFW. By interacting with the research throughout the project, the project became important to the user, and the user found the time to examine the study's products. This improved users familiarity with the research and made assessing the products of the research easier. This finding corresponds with the third reason given by users--increased awareness and interest in Energy From the West.

The second response to their interaction with S&PP was that interaction increased the credibility of Energy From the West. Two reasons were given for this feeling. First, users pointed to the amount and range of input that was received by S&PP. As noted in Chapter III, the range of perspectives solicited by S&PP ranged from energy companies to environmental interest groups. Secondly, users mentioned specific instances where they personally had commented on the accuracy or tone of a report, and S&PP had modified the particular part or corrected the error. This, combined with the amount of input received by S&PP, made users more confident in the project and its products. Such responsiveness brings up a question about how far a researcher should go in accommodating users. This and other facets of responsiveness will be addressed together in Chapter VII.

Users who felt interaction was ineffectual generally blamed their own particular situation rather than S&PP. Time constraints and limited relevance of information to organizational interests were the primary reasons given. Only a couple of users felt that interaction with researchers was irrelevant in assessing Energy From the West.

This overview of user attitudes towards interaction with S&PP indicates that S&PP's utilization strategy was successful in fostering factors important to utilization. Users comments on the interaction indicate success by S&PP in fostering awareness, interest, trust, and credibility in users for their research products. Recognizing this, the means by which this result was achieved will be examined.

II. Impact of Interaction on Awareness and Interest

It is expected that S&PP's strategy of early involvement and continuing relationships between themselves and potential users will favorably influence those users towards awareness and interest in the research.[2] As noted earlier, multiple user awareness and interest indicators were employed by this study. Table VI-2 summarizes the correlation between interaction with S&PP and the various awareness and interest indicators. The results are as expected. Perhaps the surprising aspect of the data is the general strength of the relationship across the various reports. All were significantly related with interaction.

TABLE VI-2: INTERACTION AND INDICATORS OF AWARENESS/INTEREST

Indicators of Awareness and Interest	Interaction with S&PP
Familiarity with study's purpose	.523[a]
Familiarity with study's results	.516
Familiarity with First-Year Work Plan	.682
Familiarity with Progress Report	.733
Familiarity with Executive Summary of Progress Report	.585
Familiarity with Plan for Completing Technology Assessment	.832
Familiarity with Draft Analysis Report	.576
Familiarity with ERDS Report	.793
Familiarity with Impact Analysis Report	.694
Familiarity with Policy Analysis Report	.498

[a]All coefficients (phi/phimax) are significant at the .1 level. Total N-size ranges from 62 to 63.

This is surprising for the last report because the Policy Analysis Report was sent to most users, along with this researcher's questionnaire. Evidently, the mere dissemination of reports to users is insufficient motivation for some users to do more than skim the report. This situation reinforces the need for researchers to actively promote awareness and interest in their reports to prevent reports from becoming lost in the crowd. The problem of becoming lost in the crowd in the case of Energy From the West was exacerbated by the study's size and subject matter. The physical size of the final report (over 800 pages) intimidated some users to whom the Policy Analysis Report was their first contact with the project. To them the report was "that big green thing" that arrived in the mail and was put on the shelf.

Also, about the same time S&PP released its final report, other energy studies, particularly Harvard's Energy Future, RFF's Energy, the Next Twenty Years, and CONAE's Energy in Transition, were released along with various government sponsored studies on energy. This tended to obscure the individual aspects of each report to those users who had not built up any special relationship with the Energy From the West report.

This need to make a report "special" to users corresponds with users' comments on their interaction with S&PP. As noted earlier, users who interacted with S&PP found the

time to look at the study's products--the project was important to the users. This increased both their awareness and interest in the study, and their ability to assess the quality of the research.

In summary, awareness and interest in a research product is more than mailing out a final report and assuming the user will read it. The results presented here reinforce the discussion of the last section that S&PP's strategy of early involvement with users was effective in fostering awareness and interest in users. This effectiveness was evident throughout the research process. The discussion here suggests that awareness and interest are not factors to be taken lightly--active promotion by researchers is necessary.

III. Impact of Interaction on Trust and Credibility

It is expected that S&PP's strategy of early involvement and continuing relationships between themselves and potential users will foster trust and credibility in users for the research.[3]

Table VI-3 summarizes the results of the correlation of the three indicators of trust and credibility with interaction. The results are as expected. This relationship, as indicated earlier, is critical to the S&PP utilization strategy. It is interesting to note that willingness to refer others to S&PP showed the highest correlation with respect to interaction. Perhaps more than the other

TABLE VI-3: INTERACTION AND INDICATORS OF TRUST AND CREDIBILITY

Indicators of Trust and Credibility	Interaction With S&PP
Technical quality of reports	.335[a]
Balance of reports	.297
Willingness to refer others to the report	.482

[a]All coefficients (phi/phimax) are significant at the .1 level.

Total N-size is 61.

indicators, confidence is critical to utilization. As noted by Patton,[4] development of confidence by users in the research is decisive in many cases in determining whether a report is used or ignored. The data here indicate that S&PP was able to foster such confidence in users for its research effort.

The two other indicators--technical quality and balance of reports--suggest users felt their interaction improved

the research product. This feeling was shared by the S&PP research team. As noted by Kash[5] improving research products is a critical reason for interacting with users. In discussing the success of Energy Under the Oceans, Kash noted the following series of events:

> Our pattern of continuous contact had a major payoff we had not foreseen. To appreciate this point, I should note that noone on our research team knew anything about offshore oil operations in advance of the study. Some of our initial papers reflected a level of ignorance and shoddy quality that was embarrassing in the extreme. Most of us on the team were certain that airing such papers would ruin our reputation forever. As it turned out, showing our early work, warts and all, was a major factor in establishing our credibility. At one time or another we misunderstood nearly everything and were on every side of every issue.[6]

There is reason to believe the same happened with Energy From the West, although to a lesser degree. As mentioned earlier in this chapter, a major response by user to S&PP's interaction efforts was the feeling of increased credibility. Many users noted that S&PP started from a lowpoint on the western energy learning curve, but had learned through criticism and in the end had done a competent job. This is reflected in users responses to why they felt the way they did for the two indicators--technical quality and balance of report. Twenty of the 25 responses to this question felt that S&PP had done a competent job on a tough subject.

TABLE VI-4: USERS REASONING ON TECHNICAL QUALITY AND BALANCE OF REPORTS

Response	Number of responses for technical quality indicator	Number of responses for balance of report indicator
Important issues to the user overlooked or underevaluated	--	5
Trouble finding assumptions and conclusions	5	2
Bias towards development	--	3
Bias towards environment	--	3
Incorrectly focused	3	--

Note: Multiple responses to survey question were accepted. Categories with only one response were deleted.

Of course, not everyone agreed with this characterization. One participant from the study area questioned whether S&PP had talked to anyone. However, as noted by Table VI-4, three of the negative response categories involved specific difficulties: difficulties users felt work against them or their organization's interests. Essentially, Energy From the West was criticized for not taking the perspective certain users desired. However, the absolute number of users reporting any problem with the technical quality or balance of the reports was small,

particularly regarding bias. For technical quality, the negative responses reflect the issue of scope which was discussed in Chapter V.

In summary, the data presented here indicate that S&PP's strategy of building trust and credibility through continuing relationships between themselves and potential users is sound. By building links with the users, S&PP helped to foster the "personal factor" Patton[7] states is necessary for utilization. Interaction with users also improved the technical quality and balance of the reports in the eyes of participating users and the research team.

IV. Impact of Interaction on New Information Provided Users

It it expected that S&PP's strategy of early involvement and continuing relationships provided users with the opportunity to interact and learn more through two-way communications with the research team and fellow users than non-participants.[8] Of the multiple indicators of user needs employed by this study, only one--new information provided--measured user need in such a way to produce a significant relationship with utilization. The correlation of interaction with that indicator produced a significant relationship (.283) at the .1 level (N=60).

In discussing this indicator in Chapter V, it was noted that there were several reasons why users may have responded

to it in the manner they did. It is useful to review those those explanations in view of this finding. The first explanation is that the users agreed with the information and perspective provided by EFW. Assuming this response, the relationship between user needs and interaction becomes one of who influenced whom. With the building of awareness, interest, trust and credibility through continuing relationship with users, a mutual learning process occurred as suggested in the discussion discussion of trust and credibility.

This also suggest that interaction is one means of preventing the two other possible explanations from becoming barriers to use. By interacting with users, S&PP was better able to determine their needs. Of course, S&PP could not change the scope of the project or discuss every issue important to users. However, by listening to users, S&PP was able to determine the most important impacts and issues to study. Interaction was used as one filter to scope the study.

This interaction requires a theme of responsiveness by S&PP to users' needs. Such responsiveness is different from responding to specific comments about a sentence or paragraph. It suggests some flexibility in the issues which are emphasized and in the general scope of the discussion. Clearly, such responsiveness could present problems to the researcher in keeping control of their project. Some of these problems and their implications for the researcher are discussed in Chapter VII.

In summary, the data presented here indicates that the S&PP strategy of building continuing relationship between themselves and potential users assisted in meeting user needs for information. Also, the discussion indicates a level of responsiveness by S&PP in listening to potential users. This result, although not a formal part of the S&PP strategy, is a logical byproduct of it. It is reasonable to assume that researchers interacting with users would build linkages regarding issues the research should address. And, as noted in Chapter III, S&PP mechanisms--particularly the Advisory Committee--were structured to encourage input by users into the design of the study. The results here suggest this was effective.

V. Impact of Interaction on Organizational Interests

As indicated in Chapter II, organizational interests are strong influences on a user's perspective of a research's usefulness. This influence is constant and ongoing. Therefore, it is not expected that S&PP's strategy of developing linkages with users will be sufficient to overcome the basic organizational influence.[9] However, such interaction should alert S&PP to potential organizational barriers which can be addressed.

Of the multiple indicators of organizational barriers employed by this study, only one--helpfulness of information to organizational interests--measured organizational

influences in such a way to produce a significance relationship with utilization. However, neither that indicator nor any of the other organizational indicators were significantly correlated with interaction.

In discussing the impact of interaction on organizational interests, it should be noted that most users found Energy From the West either helpful to their organization's interests or neutral. As indicated by Table VI-5, two-thirds of the users found Energy From the West helpful to their organizational interests and 16 percent found Energy From the West neutral. This is somewhat surprising given the diverse groups of interests the study covers in its reports.

TABLE VI-5: HELPFULNESS OF ENERGY FROM THE WEST TO USER'S ORGANIZATION

Indicator	Somewhat or Very Helpful	Not very or not at all helpful	Neutral	N
Helpfulness of information to user's organizational interests	66%	18%	16%	50

This suggests that S&PP's interaction with various interest groups was very successful in alerting the research team to major "red flags" in the subject matter and S&PP responded adequately to them. Evidently, the response was also sufficient that non-participants who read the report noticed the result. However, this responsiveness to users' comments is not without risks. Some researchers expressed concern that S&PP was too willing to weaken language to avoid offending potential users. Difficulties in striking a balance on this issue is discussed in the section on the collaborative relationship in this chapter and in Chapter VII.

In summary, S&PP utilization strategy was insufficient to directly overcome the continuing influence of user's organizations. To expect this may be unrealistic. However, the discussion here suggests that interaction can sensitize researchers to the organizational concerns of various potential users. Assuming a wide range of input, such input does not necessarily introduce bias into the research. Rather than removing organizational barriers, interaction provides a means of addressing them. As noted in Table VI-5, few users accused S&PP of bias in the conduct of the research. Doing this, of course brings up some ethical questions concerning how far one should go in achieving a "consensual" report. These questions are addressed in Chapter VII.

VI. Impact of Interaction on the Timing of Energy from the West

As indicated in Chapter II and Chapter V, timing of a report is important in determining the ultimate use of any research document. The conditions which create proper timing are considered to be beyond the control of researchers.[10] Hence, it is doubtful that interaction would have any direct influence on this factor.

Of the multiple indicators of timing employed by this study, only one--effect of timing on potential use--measured timing influences in such a way to produce a significant relationship with utilization. However, neither this indicator nor any of the other indicators were significantly correlated with interaction.

To see no significant correlation between interaction and timing is not surprising; it would have been rather odd if there had been one. However, one cannot dismiss the issue that simply. Utilization is a process. The timeliness of a research project may vary during the research process, depending on the subject matter and the political climate. The object of the social researcher is to pick important subject areas and be sufficiently "plugged in" to the policy community to provide information to that community on short notice. Interaction can provide this linkage--a linkage to assist researchers in picking topics of concern to the policy community, and to provide means of dissemination useful information to

that community when necessary. Researchers, however, have to be responsive to these situations when they arise.

An example of this kind of situation is a series of events which occurred at S&PP after President Carter's speech of July 11, 1979 regarding the development of a massive synthetic fuels industry. Within a few days of the announcement, the sponsors of Energy From the West, the Environmental Protection Agency (EPA) asked S&PP to prepare some presentations on synthetic fuels and the impact of their development on the western states. Although S&PP's study had not followed the President's proposed development schedule, S&PP seized the opportunity presented by the President's speech. Within a month, S&PP had developed a series of slide presentations covering the major issue-areas.

However, the dissemination and presentation efforts did not stop with EPA. Through contacts made during the Energy From the West project, S&PP gave these presentation to several other relevant agencies, both executive and congressional. Although S&PP did not create the timing involved here, it did maximize the opportunity when it did occur.

In summary, it is not surprising that interaction and timing are not correlated. Politics is the environment in which policymakers work. There is little researchers can do to change it. However, the discussion presented here suggests

that interaction with users may assist researchers in exploiting the opportunities timing presents them during the research process. By developing linkages with the policy community, the researcher has direct lines to that community when "timing" occurs.

VII. Summary of Interaction's Impact on Utilization Concepts

> The Specifics vary from study to study, but the pattern is markedly clear: Where the personal factor emerges, where some person takes direct, personal responsibility for getting the information to the right people, evaluations have an impact. Where the personal factor is absent, there is a marked absence of impact. (Patton, 1978)

It has been suggested in the literature that interaction with users is a technique which can foster the use of research. This research lends confirmation to this belief, both in terms of fostering the utilization concepts discussed in Chapter V, and in terms of users' opinion of the effectiveness of such an approach. As noted throughout this section, the two guiding themes to S&PP's interactive approach to research were early involvement and continuing relationships between potential users and themselves. The findings presented here suggest that this approach was effective in promoting the utilization factors shown effective in Chapter V.

However, throughout this section, a third guidepost to doing participatory research continually appeared. This theme was responsiveness by researchers to users needs. This responsiveness occurred at three levels. At one level, there is responsiveness to users at the formulation stage of the research design. By taking user input into account in designing a project, researchers increase user interest in the project, and start building relationships with them.

On other level, responsiveness involves being receptive to suggestions and comments by users on the various products of the research. Such responsiveness can improve the trust and credibility users put in the research. Also, by employing a wide range of interests in reviewing products, responsiveness can help prevent the introduction of bias into the research.

On a third level, responsiveness involves understanding when information is needed by users. Researchers have no direct control over political events which make their research more or less desirable by the policy community. However, by responding to user needs when situations present themselves can improve the likelihood their research will be used.

This building of a collaborative relationship between S&PP will be examined in the next section discussing

user and researcher opinions of the relationship. Also, user and researcher opinion of how the process could be improved will be examined.

VIII. Assessment of the Collaborative Relationship: Opinion of Users and Researchers

In discussing the impact of interaction on the potential use of Energy From the West, it is necessary to assess user and researcher attitudes towards the process and how improvement could be made. Chapter III outlined the process; this section will discuss user and researcher opinion of it.

A. Assessment of Collaborative Relationship

As discussed in Chapter IV, several indicators of collaborative relationship are employed by this study. Summarized in Table VI-6, the results indicate that users who interacted with S&PP were satisfied with the partnership. This was particularly true regarding S&PP's receptiveness and responsiveness to user comments. As noted earlier in this chapter, many users gave specific examples of when they had suggested changes in part of the report and then saw modification appear in a later draft.

The only indicator where the "somewhat" or "very" response did not receive an absolute majority was influence of user's comments on the research. This circumstance is

TABLE VI-6: RESULTS OF USER INDICATORS OF COLLABORATIVE RELATIONSHIP

Indicator	"Somewhat" or "very" satisfied	"Not at all" or "not very" satisfied	"Uncertain" or "don't know"	N
Receptiveness of S&PP to user comments	73%	3%	24%	33
Satisfaction of users to S&PP's response to their comments	67%	3%	30%	33
Influence of user's comments on the research	46%	27%	27%	33
Impact of interaction on user's attitude towards use	64%	27%	9%	33

due to the differing definitions users gave to "influence on the research." Those who defined influence as covering only the part of the report they commented on gave high marks for influence. However, other users defined "influence" as encompassing the entire report; hence, they naturally felt they had little influence on the report.

This need for responsiveness emerged in the last section, and is important to a successful collaborative relationship. However, as noted, responsiveness presents a problem to researchers; researchers must decide the merits of the comments, and how "responsive" they are going to be to them. As noted by White,[11] responsiveness:

> "...does not mean that the draft is changed in response to every comment and suggestion. It does mean that factual errors are corrected and other interpretations and points of view are acknowledged."

This "responsiveness" on the part of S&PP was questioned by some members of the research team when interviewed. They noted that most of the changes made in the drafts were minor, and not of major consequences. They felt that the process was not a very meaningful part of the research. It should be noted that this was a minority position among the research team.

The findings and discussion presented here and elsewhere in this chapter would indicate S&PP's response to users at this level of responsiveness was sufficient. There are two possible reasons for this perceived sufficiency on the part of users. One, S&PP's response to users could have been more extensive than was believed by some members of the research team. Secondly, users might not require extensive changes to be satisfied with the discussion of a topic; receptivity

and responsiveness of researchers to their comments may have been sufficient. From discussions with users, there is strong reason to believe it is the latter reason. Users during interviews stressed the importance of receptivity; the feeling that S&PP had at least listened to them which was more than they had received from other studies. They did not feel they could expect much more from the research team, given the uncertainty involved with the subject area.

B. Barriers and Improvements to S&PP's Utilization Strategy

In discussing barriers and improvements to S&PP's utilization strategy, both users and researchers tended to discuss general problems and improvements involving interaction, not specific suggestions about individual mechanisms. Both users and researchers felt the greatest barriers to interaction between them were time and logistics. Table VI-7 summarizes user opinions of barriers to utilization. Asked of users who felt interaction was important to utilization, the greatest number of responses concerned time constraints of users in actively pursuing a participatory role in the research process. This time constraint was exacerbated by S&PP's location in Oklahoma. Many of the potential users of the Energy From the West project worked either in Washington, D.C., including the sponsors of the project, or in various

TABLE VI-7: USER COMMENTS ON BARRIERS TO INTERACTION

Response	Number of Responses
1. Time constraints and logistics hinder ability to interact with S&PP	19
2. Researchers do not understand the real world and do not want to interact with users	14
3. Communication between users and researchers, between and within an organization prevent effective interaction	11
4. Size and presentation of reports was a barrier to interaction	9

Note: Multiple responses to survey question were accepted. Categories with only one response were deleted.

parts of the study area of which Oklahoma was not a part. Hence, much of the interaction was either by letter or phone.

This problem was illustrated when meetings of the advisory committee were called. Generally, it was difficult to set a date for a meeting acceptable to all members of

the committee to come to Oklahoma. In such cases, the missing members had to send their comments to the research team by letter or by phone. Also, it meant that they missed out on the discussion with other potential users. Depending on the people absent, the resulting interaction among users and researchers was sometimes not as balanced as desired.

The second comment on barriers to utilization reflects the view of the utilization process as presented by Knowledge-Specific Theories of Non-utilization. Of the fourteen responses in this category, twelve of them were from users who did not interact with S&PP, but thought interaction might have been useful to them. Such a result indicates two things. First, the idea that researchers do not understand users and their needs is a perception that may be widespread throughout the policy community--a perception researchers have to break in order to effectively interact with users. Second, the fact that only two users who had interacted with S&PP responded this way, along with the discussion of the previous section, indicates that this barrier can be overcome by active researchers.

The third comment regarding communication difficulties reflects the difficulties in identifying relevant policymakers within organizations. Identification of relevant policymakers was an ad hoc affair in the case of Energy From the West. Researchers did not always know who to

contact within an organization, and sometimes, organizations did not know who to contact within their own structure. The difficulties of this identification process was exacerbated by the geographic isolation of S&PP from users. Clearly, some important users were not contacted.

The last comment regarding size and presentation is two-fold. First, the shear size and scope of the project made many of its products very time-consuming to review. Second, as noted by some researchers, most of the potential users were narrowly focused specialists-not generalists. Given the breadth of Energy from the West, it was not surprising that users tended to concentrate on their own small area of expertise, and ignore the rest of the report. This made cross-interaction between users difficult. Also, as noted by some researchers, because of the broad range of interests represented, there was some jealousy between some of the users--particularly between state and federal participants.

Users suggestions for breaking down barriers to use revolved around three ideas: (1) early involvement; (2) broad range of input into the process; and, (3) concise writing by researchers to make the review process less burdensome. To these three ideas, researchers added two more: (1) better identification of potential users, and, (2) more frequent meetings or trips for users and researchers

to get together. Users who interacted with S&PP generally felt that S&PP made an honest attempt to involve users as early as possible in the research efforts. However, users felt there should be a more systematic means of identifying relevant users than previous personal contact with the research team. Specific suggestions in this regard included having the sponsor circulate an abstract of the project to relevant organizations, having professional organizations perform the task, and having the research team try harder. As noted above, researchers agreed with users in the need for a better method of identifying potential users.

Users who interacted with S&PP also felt that S&PP received a broad range of input from various interested users. Suggestions for improving the process were basically the same as for early involvement: better identification of potential users.

Users who interacted with S&PP felt more concise writing by S&PP would make the review process less burdensome, and improve communications between themselves and the research team. In particular, users called for shorter documents and better presentation of conclusions. Also, some users felt that there were too many different reports; it was difficult to keep them straight given the infrequent dissemination of the various drafts. Researchers generally

agreed that shorter documents would encourage users to read and comment on reports. As far as presenting conclusions was concerned, researchers pointed to the constraints the research was under in not making recommendations from its research.

Besides agreeing with these suggestions, researchers generally felt more meetings with users or trips would be useful in promoting interaction with the policy community. However, as mentioned above, such trips run against one of the major barriers to interaction--time and logistics. Besides the actual time the trips or meetings would require, the planning and preparation for such trips are also quite time consuming.

All of the suggestions given here call for improved communications between users and researchers. The need for this improved communication occurs at several levels. First, there is a need for communication links to better identify relevant users who might find interaction with S&PP useful to them. Second, there is a need to prepare research products in such a way to facilitate communications between users and researchers. Finally, there is a need for more frequent meetings between users and researchers. Generally, users felt that it was the researchers' or their sponsors' responsibility to make contact with them about a research

project. This feeling that researchers had to be the be the major force in creating a collaborative relationship was also the consensus of researchers. This calls for an activist role for researchers, and its implications are discussed in Chapter VII.

IX. Summary

> .... The impact of evaluation research is most often experienced as a reduction in the uncertainty faced by individual decision makers as they attempt to deal with the complexity of programming reality. Evaluation information is one piece of data available to decisionmakers. It must be assimilated and fitted into a contextual whole: "The results are never self-explanatory." The translation, the interpretation, the meaning, the relevance are established through the interactions over time of individual who care enough to take the time to make the contextual fit, and then are interested enough to act on the basis of that contextual fit. (Patton, 1978)

How actively a researcher should pursue the role of a change agent in doing applied research has been a source of disagreement with the research community for many years. The research presented here suggests that an active role by researchers in establishing early involvement and promoting continuing relationships with users, was a fruitful course of action in fostering utilization factors. These factors included awareness and interest, trust and credibility, and user needs. Factors not directly fostered by the S&PP

utilization strategy included organizational and timing considerations.

Active promotion of awareness and interest in Energy From the West by the S&PP research team was critical in presenting the study to potential users. The data indicate that merely sending reports to users is not sufficient to ensure awareness, much less interest. By interacting with users early and continually throughout the research process, the report became familiar to the users, and separated it for other studies that crossed users desk. It helped focus attention on the study and its products.

Continuing relationships between users and researchers provided benefits to both during the Energy From the West project. For users, the process built confidence in the research effort, both in terms of the technical quality of the reports and their presentation of the conflicting values and interests involved. This development of the "personal factor" is critical to potential use. For researchers, user interaction helped to identify potential sources of bias in the report's presentation and correct factual errors.

An indicator of the research team's responsiveness to users was the feeling of interacting users that they had received new information from the reports. As noted in

Chapter V, there are several motivations a user may have in responding positively to such a question. The data presented here suggest researchers can alleviate some of the less desirable motivations through interaction. This is particularly true of the users who are involved early in the research process.

Interaction with users did not have a direct impact on organizational barriers to use considered one of the most powerful barriers to use. However, the data do suggest S&PP's interaction did help to prevent unnecessary aggravation of organization barriers by alerting researchers to potential "red flags" in their research. This process was sufficiently effective that even users who did not interact with S&PP noted the neutrality or helpfulness of the research products to their respective organizations.

Lastly, interaction did not have any direct influence on timing. This is not surprising. However, development of continuing relationships between S&PP and the policy community did keep S&PP "plugged in" to the political situation, and allowed the research team to exploit favorable situations when they did arise. With continuing relationships with the policy community, S&PP was able to exploit the right situations as they arose.

The above summary of S&PP's participatory research strategy illustrates strongly the need for an active role for researchers in promoting the use of their research. This need for an active role for researchers couples perfectly with the theme of Chapter V that direct use is an unlikely result of research. Utilization is a process, not just the use of the end product. Researchers must be involved in that process. Applied research is only one input into the policy process; an input which is not currently being well assimilated into the dynamics of that process. If research to be so assimilated, it is the interactions between policy-makers and researchers that will do it.

But, what are the guideposts to such a research strategy? The two themes identified by Ballard and Hall[12] -- early involvement and continuing relationshps--are two of them. As demonstrated here, early involvement of users in the research process was effective in fostering awareness and interest in the research. Besides the active development of these concepts, this research also indicates that identification of potential users and broad input into the research are important aspects of early involvement. These three aspects of early involvement--fostering awareness and interest, identification of potential users, and broad range of input into the research--can all be addressed by researchers.

Building relationships between users and researchers was effective in fostering all three aspects of trust and credibility examined here. Confidence in the results, technical quality of the research, and balance of the presentation were all promoted by the two-way interaction between S&PP and potential users. Besides fostering trust and credibility, the interaction betwen S&PP and potential users was perceived as improving the quality of the research. As illustrated by S&PP, building a continuing relationship with users is actionable by researchers.

A third guidepost reoccurring in this chapter is responsiveness. The chapter identified three aspects of this theme which are important to utilization. First, there is responsiveness to users needs on the research. Second, there is responsiveness to users comments on the research. Third, there is responsivenss to opportunities to disseminate useful research to the policy community. As illustrated here, the S&PP strategy succeeded at being responsive at all three levels.

A final guidepost suggested here is communciation linkages. The need for these linkages appears at three levels. First, linkages are needed to identify potential users who might find interaction with S&PP useful to them. Second, concise packaging is needed to facilitate communications between users and researchers. Finally, there is a

need for frequent meetings between users and researchers. As noted in Chapter V, S&PP was effective to some extent in packaging its research. On the other two points, user and researcher suggestions on how researchers can improve communication linkages with users were presented.

To accept such an active orientation to one's research is not without risks. The final chapter of this research will attempt to put this orientation in perspective, and discuss some of the risks researchers must consider in taking a more active role in the utilization of their research.

FOOTNOTES

[1]See Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978; Ballard, Steven C., Brosz, Allyn R., and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8: 951-957 (Summer 1980); Ballard, Steven C., and Larry B. Parker. "Discussing Truth With Power: The Importance of Participatory Research." Paper delivered at the annual meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980; Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in PolicyMaking. Ann Arbor, MI: University of Michigan, Institute for Social Research, June 1978; Kash, Don E. "Observations on interdisciplinary studies and government roles," in R. A. Scribner and R. A. Chalk (eds.) Adapting Science to Social Needs. Washington, D.C.: American Association for the Advancement of Science, pp. 147-178; 1977; Patton, Michael Q., Utilization-Focused Evaluation, 1978; and White, Irvin L., "An Interdisciplinary Approach to Applied Policy Analysis," Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978.

[2]See Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978; Ballard, Steven C., Brosz, Allyn R., and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8: 951-957 (Summer 1980); Ballard, Steven C., and Larry B. Parker. "Discussing Truth With Power: The Importance of Participatory Research: Paper delivered at the annual meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980; and, Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in Policy-Making. Ann Arbor, MI: University of Michigan, Institute for Social Research, June 1978.

[3]See Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resources Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978; Balard, Steven C., Allyn R. Brosz, and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8: 951-957 (Summer 1980); Ballard, Steven C., and Larry B. Parker. "Discussing Truth With Power: The Importance of Participatory Research." Paper delivered at the annual meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980; Kash, Don E. "Observations on interdisciplinary studies and governments roles," in R. A. Scribner and R. A. Chalk (eds.) Adapting Science to Social Needs. Washington, D.C.; American Association for the Advancement of Science, pp. 147-178, 1977; and White, Irvin L., "An Interdisciplinary Approach to Applied Policy Analysis." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton, New York, August 31-September 3, 1978.

[4]Patton, Michael Q. Utilization-Focused Evaluation, Beverly Hills: Sage Publication, 1978.

[5]Kash, Don E. "Observations on Interdisciplinary Studies and Government Roles," in R.A. Scribner and R.A. Chalk (eds.) Adapting Science to Social Needs. Washington, D.C. American Association for the Advancement of Science, pp. 147-179, 1977.

[6]Kash, Don E., et al. Energy Under the Oceans. Norman: University of Oklahoma Press, 1973.

[7]Patton, Michael Q. Utilization-Focused Evaluation, Beverly Hills: Sage Publication, 1978.

[8]See Ballard, Steven C., and Larry B. Parker. "Discussing Truth With Power: The Importance of Participatory Research." Paper delivered at the Annual Meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980; Kash, Don E. "Observation on interdisciplinary studies and government roles," in R. A. Scribner and R. A. Chalk (eds.) Adapting Science to Social Needs. Washington, D.C.: American Association for the Advancement of Science, pp. 147-178, 1977; and Patton, Michael Q., Utilization-Focused Evaluation, Beverly Hills: Sage Publications, 1978.

[9]See Ballard, Steven C., and Larry B. Parker. "Discussing Truth With Power: The Importance of Participatory Research." Paper delivered at the Annual Meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mixico, April 25-28, 1980; Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in PolicyMaking. Ann Arbor, MI: University of Michigan, Institute for Social Research, June 1978; and, Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge, Ann Arbor: Institute for Social Research, 1969.

[10]See Ballard, Steven C., and Larry B. Parker. "Discussing Truth With Power: The Importance of Participatory Research." Paper delivered at the Annual Meeting of the Western Social Science Association, Hilton Inn, Albuquerque, New Mexico, April 25-28, 1980; Berg, Mark R., Factors Affecting Utilization of Technology Assessment in PolicyMaking. Ann Arbor, MI: University of Michigan, Institute for Social Research, June 1978; and, Kash, Don E. "Observation on interdisciplinary studies and government roles," in R. A. Scribner and R. A. Chalk (eds.) Adapting Science to Social Needs. Washington, D.C.: American Association for the Advancement of Science, pp. 147-178, 1977.

[11]White, Irvin L., "An Interdisciplinary Approach to Applied Policy Analysis." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton, New York, August 31-September 3, 1978.

[12]See Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of A Technology Assessment of Western Energy Resources Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Social research has become an important component of the social sciences. This new role for social scientists raises several questions: "What is utilization?" "What can the social researcher do to be a change agent--i.e., to enhance utilization?" and, "How actively should researchers pursue this role of change agent?" Although no consensus exists on these questions, three themes dominate the literature on the subject. First, as noted by Caplan and Patton,[1] the literature is generally based on a narrow definition of utilization as direct change in policy resulting from social research. Second, suggestions for improving the utilization of social research have focused on institutional or educational reforms for users, and improving the quality of research for researchers.[2] Finally, the researcher's role in this process has generally been viewed passively; that the research will "speak for itself" and the major variables which control utilization are outside the proper boundaries of the research process.[3]

This research indicates that these themes in the literature are misrepresentations of the applied research and policymaking processes. This final chapter summarizes the results of this research, and expands on their implications for the applied researcher.

I. Defining Utilization

Much of the literature on utilization is based on an engineering model of utilization -- that is, a model suggesting that knowledge will have a direct application to decision-making. As outlined in Chapter II, this model is based on research problems that are well-defined, and for which there is an optimal solution. Because the question is answerable, there is little need for discussion between users and researchers during the actual research. Also, since the solution is an optimal one, there is no need for utilization activity -- the "truth" will speak for itself. The definition of utilization becomes clear: the direct use of the solution generated. The measurement of that use is considered equally as direct.

Few problems presented social researchers meet the criteria for engineering use because of the different perspectives one can take on social issues. This was generally the case with issues raised by Energy From the West. For example, water availability in the Colorado River basin for energy development has been approached from engineering, hydrological, economic, historical and

political perspectives. To assess potential utilization in these situations requires different conceptualizations of the relationship between knowledge and decisionmaking. In particular, researchers need to understand the interrelationships between knowledge generation, knowledge dissemination, and knowledge utilization: to focus on the entire research process.

To focus on the entire research process, this research developed three "perspectives" of that process based on the diverse types of questions social researchers are asked to address. The first perspective was the engineering view of utilization as outlined above. The second perspective was the intelligence view of utilization as providing a knowledge base for decision-making. The third perspective was the enlightenment view of utilization as providing insight and understanding of the problem area to the user. As would be expected with an area as broad as western energy development, the engineering perspective provided only a partial view of utilization. Rather, the two other perspectives, enlightenment and intelligence utilization, which reflect the uncertainty and lack of consensus involved in social research, provided more understanding of the potential utilization of Energy From the West, and the factors which influenced that potential.

This result requires researchers to recognize the complexity and lack of a single "truth" involved in their

work. Such a recognition suggests a different conceptualization of the utilization process -- one that recognizes how important the various user-researcher interactions during the entire research process are. Such an approach stresses the need for user-researcher linkages. But how do researchers build such linkages? Building these linkages requires an active role by the researcher. This research has attempted to provide insight into the nature of this role by examining the effectiveness of utilization concepts as discussed in the literature, and means of promoting them.

II. Promoting Utilization

The vehicle for addressing utilization was a technology assessment of western energy development conducted by the Science and Public Policy Program. During this research, S&PP attempted to foster awareness, interest, trust, and credibility of its research. This was done through four mechanisms: (1) advisory committee, (2) stakeholder review, (3) personal interaction, and, (4) presentation and packaging of research products. These mechanisms combined to structure a "participatory research strategy" -- designed to integrate utilization and the research process by fostering interaction between knowledge users and producers.

To determine the effectiveness of this strategy, the literature on barriers to utilization was surveyed. From

this survey, the five categories of barriers were identified: (1) individual, (2) interpersonal, (3) organizational, (4) technical, and, (5) time. These barriers were observed to have an important impact on the utilization of Energy From the West by influencing: (1) awareness and interest, (2) trust and credibility, (3) presentation, (4) organizational interests, (5) new information provided users, and, (6) timing of the report. These six factors were observed to form the basis of user attitudes towards Energy From the West. Based on this analysis, the effectiveness of S&PP's interaction strategies were then tested to determine whether they enhanced these factors with users. The results of these two analyses are discussed below.

Awareness and interest, interpersonal factors affecting utilization, are generally taken for granted by researchers. However, this is not an accurate assumption -- whether or not users are aware and interested in a research effort depends on whether or not an ongoing, interactive process has been established, not merely receipt of a final report. This research has shown that interaction must continue throughout the entire research process; it is inadequate to provide such opportunities only at the beginning of the research or when final report is complete.

This point was reinforced by analysis of the relationship between interaction, awareness, and interest. Interaction effectively fostered awareness and interest throughout the

entire research process. Building awareness and interest distinguished Energy From the West from other similiar studies users received. Merely sending a final report does not sufficiently motivate users to comprehensively survey the report.

Much controversy has exised in the literature about the concepts of trust and credibility. Some authors, like Freeman and Rivlin,[4] believe improving the technical quality of research will improve utilization. However, as noted by Berg,[5] user evaluation of research quality depends on whether they agree with the research result. This suggests that users' perception of the quality and balance of a research product may be more important than a technical evaluation of the report's quality.

This research indicates technical quality and user perception of the balance of Energy From the West were both important to utilization, particularly regarding enlightenment and intelligence utilization. Both users and researchers indicated that interaction between them was a two-way communication; a communication they felt improved the credibility of the research. This linkage with the user community helped build the "personal factor" that Patton[6] states is so necessary for utilization.

Presentation and packaging strategies for research products are a category of utilization barriers which are generally ignored by researchers. As noted by Ballard and Hall:[7]

> Although it seems obvious that reports written in an easily readible and understandable form will greatly increase the interest and awareness of potential users, this point appears often to be overlooked, even for those engaged in applied research.

This research found presentation to be a significant influence on the potential utilization of Energy From the West for all three types of utilization. This finding differs from those of Berg[8] who found presentation to be a significant but minor influence on utilization. These two results may differ because of the approaches taken by the two studies. This research is a case study of a very large technology assessment: presentation was important for users to extract the desired information from the documents. The Berg study was a longitudinal study of several studies, differing in length, funding, and conduct. The need for summaries in these studies to extract critical information for users may have been less than in Energy From the West. Some presentation strategies used by researchers may have been ineffectual. The result found by Berg may reflect an average of a variety of presentation techniques -- some successful, some not.

New information for users strongly influenced the potential use of Energy From the West. This finding

agrees with Berg. However, as noted throughout this research, there are several possible motivations behind particular responses by users. One, users may be motivated according to whether they agree with the perspective presented by the study. If they did not, they may not consider the information useful. Second, users may consider their knowledge of the issues to be greater than that of the report. Third, users may have specialized in one particular area which the report does not cover in depth.

However, by interacting with users, S&PP set up a mutual learning process regarding the first possible explanation discussed above. Hence, the issue becomes one of who influenced whom. Also, by interacting with users, S&PP helped prevent the other two possible explanations from becoming serious barriers to utilization. The result was that interaction had a significant impact on user's perception of the information provided by Energy From the West.

Organizational interests are a utilization barrier that dominates the literature. It is generally considered a dominate force on utilization of research, and it is used by some researchers as a primary reason to explain why their research is not used.[9] This study corroborates the idea that organizational factors are important to utilization -- S&PP's participatory research strategies did not completely eliminate organizational barriers.

However, this research shows researchers are not helpless regarding organizational barriers to use. By interacting with various interest groups involved in western energy development, the research team was alerted to major "red flags" in the subject matter and presentation. Given the positive response to the report from an organizational perspective, S&PP responded to these red flags sufficiently to affect users who did not interact with S&PP.

The final factor influencing utilization of Energy From the West was the timing of the report. In some senses, timing is generally beyond the control of researchers. That is, the researchers cannot anticipate all of the external events which may affect when the research is most needed. However, this study shows that interaction with users does provide researchers with opportunities to exploit favorable circumstances when they occur. Users live in a political environment. By building linkages to this community, researchers become aware of situations where their research may be of maximum usefulness.

III. Doing Participatory Research

A. Guideposts

This research identifies four guideposts for doing participatory research in order to promote utilization. They are: (1) early involvement; (2) continuing relationships; (3) responsiveness; and (4) facilitating communication

between users and researchers. As initially identified by Kash and White,[10] categorized by Ballard and Hall,[11] and confirmed by this research, early involvement of users in the research process was important to Energy From the West in three ways. First, early involvement begins the process of fostering awareness and interest in the research. Second, early involvement assists in identifying potential users to the research. Third, early involvement assists in providing a broad range of input into the research from the beginning and preventing bias in the research.

These three aspects of early involvement -- fostering awareness/interest, identification of users, and, broad range of input into the research -- can all be promoted by researchers. Technology assessment is a broadly focused research effort. Because of this, it is vital that researchers recognize the importance of involving a wide range of users at the earliest possible moment in the research process. With the wide audience that S&PP was trying to reach, S&PP had a vital interest in identifying potential users as early as possible in the research process to help ensure the final product would be useful.

A second guidepost categorized by Ballard and Hall and confirmed by this research is that relationships between users and researchers must continue throughout the entire research process. Building continuing relationships was

effective in fostering all three aspects of trust and credibility -- technical quality of the research, confidence in the research results, and, balance of the presentation. Clearly, early involvement of users assisted in building these relationships.

In addition to promoting trust and credibility in the research, the two-way relationship helped to improve the quality of the research from the perspectives of both the users and the researchers. As demonstrated by S&PP, during Energy From the West and in earlier research projects, continuing relationships between users and researchers is an area where the researcher can take an active role. Establishing trust and credibility of users helped to demonstrate that S&PP did not have a biased approach to western energy development, despite being located in a pro-development state. Also, since the project was funded by the Environmental Protection Agency -- an agency generally distrusted in the western states, S&PP needed to establish their independence from the sponsoring agency. The findings of this research strongly suggest that S&PP succeeded in building trust credibility in their research by developing continuing relationships between themselves and potential users.

A third guidepost to doing participatory research is responsiveness to user needs. As assessed in this research, responsiveness occurs at three levels. At one

level, there is responsiveness to users needs at the formulation stage of the research design. By seeking user input in designing a project, researchers increase user interest in the project, and begin to build relationships with them.

On another level, responsiveness involves being receptive to suggestions and comments by users on products and drafts produced during the research. Such responsiveness can improve the trust and credibility users have in the research. Also, by employing a wide range of interests in reviewing products, responsiveness at this level can help prevent the introduction of bias into the research.

On a third level, responsiveness involves understanding when information is needed by users. Researchers have no direct control over political events which make their research more or less desirable by the policy community. However, by being responsive to users' needs when situations present themselves, researchers can improve the likelihood that their research will be used.

A final guidepost identified in this research is facilitating communication between users and researchers. The need to facilitate communication between users and researchers occurs at three levels. First, there is a need for communications links to better identify relevant users who might find interaction with the research team

useful. Second, research products need to be prepared in such a way to facilitate communication between users and researchers. As noted earlier, this study indicates that presentation significantly influenced the potential utilization of Energy From the West. Presentation concerns include the preparation of summary documents, use of charts, graphics, and other packaging and presentation techniques. Finally, the third level emphasizes the need for face-to-face meetings between users and researchers. Such personal contact can assist in building relationships between the participants in the research process.

B. Questions for the Applied Researcher

All of the guideposts identified above -- early involvement, continuing relationships, responsiveness, and, facilitating communications -- require an active role for applied researchers in the course of their research. To accept such an active orientation to one's research is not without risks. While there are probably no definitive "answers" to the risks involved, they should be made explicit.

1. Questions Concerning Early Involvement of Users

This research has stressed the importance of fostering awareness and interest, identifying potential users and involving a wide range of interests as early as possible in the research process. However, the beginning of a research project is a risky time for researchers to perform this task.

They know least about the subject area, the participants, the institutional arrangements, and the wide range of interests involved in the subject matter. They may be just building a relationship with their sponsor concerning various aspects of the project. This situation presents several problems to researchers regarding early involvement of users. These include the following:

1. Identifying key users early in the research. Because researchers may know little of the policy system, they may tend to delay contacts with key users until they are more confident of their own knowledge. This may prevent key users from having the kind of input early in the research process necessary to influence the research.

2. Assessing user comment. Because researchers are developing substantive knowledge of a subject area at the beginning of a project, they may be swayed to a particular perspective on an issue, biasing the research.

3. Selecting representatives of interest groups. In selecting representatives of various interest groups, researchers may be influenced by a user's title or organization, rather than substantive knowledge or usefulness.

4. Using users to legitimate research. There is a temptation to appoint prominent persons as advisors or reviewers of a research product to increase credibility.

2. Questions Concerning Continuing Relationships with Users.

This research has emphasized the importance of building continuing relationships in order to increase: (1) the technical quality of the research; (2) confidence of users in the research; and, (3) balance of the research's presentation. However, building trust and credibility through continuing

relationships with users is a two-way street. Because of this, researchers may become susceptible to several influences that naturally occur in interpersonal relationships to the detriment of the research. Among the problems continuing relationship can present are the following:

1. Susceptibility to Organizational Pressures. Building trust between users and researchers early in the research may provide users with leverage later in the research to press for changes in the research results to restrict findings detrimental to their organization's interest.

2. Selective Listening. Over time, the personalities of some users may clash with researchers, interfering with an objective assessment of the users comments.

3. Questions Concerning Responsiveness to Users

During the discussion of S&PP's utilization strategy in Chapter VI, the importance of researcher responsiveness to user comments and needs was emphasized several times. However, as was also noted, responsiveness presents several problems for the researcher. These problems are as follows:

1. Control of Research. Being responsive to user needs for information involves losing some control over the research agenda.

2. Control Over Conduct of Research. Being too responsive to user comments can imperil researchers' control over the conduct of their research and its conclusions.

3. Responding Without Credible Information. In order to influence policymaking, researchers may be tempted to provide findings before they have the research evidence to confirm or deny them.

4. Questions Concerning Facilitating Communications With Users

Finally, this research notes the importance of facilitating communications with users to better identify users and increase interaction. However, conscientious effort to facilitate communication with users requires valuable time. In conducting such efforts, the researcher faces several problems. Among those are the following:

1. Time Constraints. Presentation, trips, and designing summaries require considerable amounts of time; time which could be spent on research. The researcher must balance these demands on their time.

2. Rigor Versus Conciseness. In writing summaries, less precise language and detail must be used to avoid jargon or length. The researcher must balance the need for brevity with that for accuracy.

C. Balancing the Costs and Benefits of Participatory Research

Based on this research and the author's experiences during the Energy From the West project, some observations on these questions can be made. First, although these questions can be characterized as problems for researchers, they are also opportunities for researchers: for creativity, for interaction with users and colleagues, and for building consensus on the research. Products of such opportunities during the Energy From the West included interdisciplinary papers and articles, participation and presentations at professional conferences, and direct exchange with key policy-makers on particular issue-areas and the research results.

An example of seizing such an opportunity was discussed in Chapter VI on the President's energy speech of July 1979. In this speech, the President recommended rapid development of western coal and oil shale resources. Response to this situation presented four difficulties: (1) technical changes necessary because of differences between S&PP scenario of future western development and the administration's scenario; (2) the need for a quick response to the situation; (3) need to develop an effective presentation strategy; and, (4) lining up audiences for the presentations. Through a series of interdisciplinary meetings and discussions between individual researchers, the relevant technical information was synthesized and a presentation strategy agreed upon. At the same time, through discussions with the sponsor and other contacts the research group had developed during Energy From the West, several audiences were scheduled for the presentations. The result was a timely and effective response to the situation.

Second, S&PP's four mechanisms provide researchers with a breadth of perspectives to assist them in avoiding bias or favoritism. Comments by the advisory committee are balanced by personal interaction with other users and by stakeholder reviews of research products. As noted earlier, users generally did not distinguish between the various utilization mechanisms used by S&PP but discussed their entire experience with the project. Researchers

should also consider the entire interactive experience and not focus on one mechanism. The differing mechanisms provided users with different types of forums in which to discuss their opinions with S&PP. This increased the diversity of perspective received by S&PP.

The need for multiple forums for user comment can be illustrated by the Advisory Committee. As discussed in Chapter III, the Advisory Committee consisted of seventeen members representing various competing interests. The object of this diversity was to provide a balance on the committee. However, not surprisingly, some members of he committee were more forceful in expounding their views than others. For example, during a review session on the water analysis, one committee member remained quiet during much of the discussion despite urgings by the research team. Recognizing this, the research team discussed her opinions with her separately through personal interaction; a forum more suitable to her temperament. From these discussions, the team received valuable insight which would have been lost otherwise.

Third, although this research sampled only users in decisionmaking positions, S&PP did not restrict its interaction to only stakeholders. Private research groups, and university research groups were included in the utilization strategy. These potential users brought a more detached

assessment to S&PP's products. This linkage with the academic and research communities assisted S&PP in both assessing users comments and providing channels to other potential users and sources of information.

S&PP also presented its results at professional conferences. By approaching the academic community with its research, the research was subject to another form of quality control -- professional review. As noted by Ballard, Brosz, and Parker,[12] university-based social research is judged by scientific as well as practical criteria. Such an assessment is critical to maintaining credibility in the scientific research community. It provides one more means of dealing with the responsiveness questions identified earlier.

Fourth, the interdisciplinary nature of the research team provided the team with an additional capacity to assess and filter user comments and needs. The team, included social scientists, engineers and physical scientists. This mixture assisted S&PP in preventing disciplinary bias. As the research continued, this disciplinary expertise was supplemented by the substantive knowledge the team gained through its research.

These observations should not be construed to be solutions to all the questions presented. Rather, they indicate means of addressing some of them. Some of the other questions, such as control over the research agenda are value judgments researchers make before they begin

engaging in social research. Finally, some questions, such as how much time to spend on utilization activities and how to identify users early in the process, are judgmental in nature, reflecting the philosophy of the research group.

As noted earlier, university-based research is judged by practical and scientific criteria. In assessing how well a research project has resolved the questions identified here, both criteria must be employed. A research product which meets one criteria but not the other is incomplete. However, the dichotomy between these two criteria can be misleading as the two values can reinforce each other. Scientific credibility makes successful attacks on the scientific validity of a research finding more difficult. Practical considerations make attacks on the substance of a research finding more difficult. It is the ability of a social research product to withstand attacks from both of these vantage points that is perhaps the ultimate criteria for judging how well a research project has resolved the questions identified here.

IV. Implementing Participatory Research

To implement a participatory research strategy, S&PP developed four communication and utilization mechanisms. As summarized in Chapter I of this research, they were:

> Advisory Committee. Formed within a few months of the project's beginning, the advisory committee reviewed the team's research throughout

the three year period, and provided useful feedback to the team on the purpose and scope of the project.

Stakeholder Review. Periodically, the team sent out drafts of its reports to a diverse group of parties-at-interest, even before the team was completely satisfied with them. While perhaps contrary to accepted scientific norms, the procedure facilitated participation because stakeholders had input into the research before the issues became "set in concrete."

Personal Interaction. By visiting impact areas, attending conferences and workshops, and establishing verbal and written contacts with participants in the system, the team interacted with the system, and learned about the people, activities, and institutions which influenced the functioning of the system.

Packaging/Presentation. Using non-technical language and short, well-illustrated summaries, the team attempted to make its research findings as understandable as possible. Also, the team made many slide presentations of their findings to interested parties to raise the level of understanding, and to receive useful feedback.

In discussing barriers and improvements to S&PP's utilization strategy, both users and researchers discuss general problems and improvements involving interaction, not specific suggestions about individual mechanisms. Both users and researchers felt the greatest barriers to interaction between them were time and logistics. For the Energy From the West project, this problem was exacerbated by S&PP's location in Oklahoma. Many of the potential users of the study either worked in Washington, D.C., including the sponsors of the project, or in various parts of the study area of which Oklahoma was not a part.

Another problem encountered was the difficulty of identifying relevant policymakers within relevant organizations. Researchers did not always know who to contact within an organization, and sometimes, organizations did not know who to contact within their own organizations. In the case of Energy From the West, the identification of potential users was an ad hoc process. The difficulties of such a process was exacerbated by the geographic isolation of S&PP from users.

A final problem regarded the size and presentation of the research products. First, the shear size and scope of Energy From the West made some products very time-consuming to review. Second, some researchers noted most of the potential users were narrowly-focused specialists in energy -- not generalists. Given the breadth of Energy From the West, it was not surprising that users concentrated on their own small areas of expertise, and ignored the rest of the report. This made cross-interaction between users difficult.

Users and researchers identified three areas for improvement of S&PP utilization strategy. The first was to better identify users early in the research. From this research, the following recommendations are given to improve identification of users:

1. Exploit the various interagency research notification systems.
2. Encourage users to use their informal channels to inform others about the research.
3. Maintain current file of users.

Although half the users sampled for this research learned about Energy From the West from S&PP, over twenty percent of the users learned about the project through organizational channels. This is only an indication of government attempts to improve interagency notification of energy-related research. Such notification systems could become vital to energy-related users and researchers if current attempts to dismantle the Department of Energy and parcel out its functions to other agencies like the Department of Interior, the Department of Defense, and the Department of Housing and Urban Development are successful. Researchers should work with sponsors so all relevant agencies are notified of the research and informed that the researchers are interested in user feedback on the research.

To supplement the official organization channels, researchers should tap the informal, often cross-agency, contacts users have with other colleagues. Sixteen percent of the users sampled for this research learned about S&PP through colleagues. By asking users for the names of colleagues with some interest in the project's subject matter; and then following it up, researchers can increase the diversity of their contacts and catch users in agencies and offices which official notification system may miss.

Finally, as noted in this research, about 15 percent of S&PP user file was found to be useless; users having retired,

moved to other agencies, or left government. A periodic and systematic renewal of the user list is necessary for several reasons. First, if researchers really value the comments of users, they should be willing to keep track of their whereabouts. Also, if users change agencies, a different set of organizational pressures will influence their comments. Researchers should be aware of such changes. Second, if users leave an agency, researchers should know who replaced them at the agency to start building new relationships. Third, given the fluid nature of energy policy, the interest of individuals and agencies may change over time. Shifts in organizational structure and emphasis are factors important to researchers; both in terms of users contacts and the utilization of their products. Finally, periodic renewal of the user lists can help the researchers in implementing the second recommendation -- exploiting users informal channels of communications with other colleagues.

The second area identified by users and researchers for improvement of S&PP's utilization strategy was more concise writing by S&PP to make the review process less burdensome. From this research, the following recommendations are given to improve the review process:

1. Draft reports should be sent out in a form which encourages comments.

2. Researchers should identify sections of the drafts which might be of particular importance to individual users.

3. Summaries or reading guides should accompany drafts to assist users in reviewing the drafts.

During Energy From the West, S&PP generally sent out draft reports in published form, printed by the government. The same format was also used for the final reports. This similarity, combined with the time lag between drafts, confused some users who commented about the project having too many different reports. Also, the rather polished appearance of the drafts discouraged some users from marking them up with comments. Some users may have assumed the draft products were designed like some environmental impact statements where the final report is mostly a summary of the draft report. The printing made the draft reports appear too final, not like the progress reports they were.

The recommendation is to present drafts as drafts, not finished products. Stapled sheets would not only emphasis the preliminary nature of the draft but make it easier for users to make marginal comments. Also, users could put out those sections of the report they found particularly interesting for special attention. This ability to easily subdivide a report for review could be particularly important for organizations where there is some specialization. People concerned with growth management could review the growth management section and so forth.

In line with meeting users needs, researchers should identify sections of the drafts which might be particularly important to individual users. This task requires researchers to survey users to discover their particular interest. Such a survey could be combined with efforts to identify users and update mailing lists as suggested earlier. Such information would also be a reference source for researchers in gathering information about particular aspects of a research question.

Finally, summaries or reading guides should accompany drafts of reports. There are several reasons for this. Some users do not have the time to review a particular draft sent to them by researchers. However, as noted in Chapter III, one purpose of sending drafts to users is to inform them of the progress of the research effort. Summaries would provide a quick means of accomplishing this. Also, summaries or reading guides to drafts would assist users in finding information of particular interest to them while providing a feel for the larger scope of the project.

The third area identified by users and researchers for improvement was increasing the frequency of contacts between users and researchers. Comments by users and researchers suggest the following recommendation:

> Researchers should attempt to release drafts at regular intervals.

As noted by users and Chapter III, meetings and drafts from S&PP occurred at irregular intervals. Although part of

this is due to the nature of the research process, some is due to problems involved in getting drafts printed and bound. By implementing the last category of recommendations, the amount of time necessary to reproduce drafts can be decreased, lessening delays in distributing drafts to users. Also, if sponsors will allow researchers to print drafts, rather than going through the time consuming process of preparing and sending drafts to an outside printer, the lag time could be decreased more.

V. Being Humble But Hopeful

Although this research cites examples of actual use, this research does not prove utilization of Energy From the West. As noted in Chapter IV, measuring the impact of one study over a short period would be difficult, if not impossible. The guideposts suggested by this research improve the possibility of utilization by enhancing users' attitudes towards use; they do not guarantee use. Given this, and the problems an active researcher role in the utilization process entails, a final question this research asks is: Is it worth it? For whom?

Certainly, Energy From the West brought significant rewards for the researchers involved. Besides the substantive knowledge the research team received during the project, the researchers have benefitted professionally from papers and articles written from the study. Many of the researchers

have received energy related jobs in government or private industry based partially on the knowledge they received during Energy From the West. Obviously, this diffusion of professional papers and careers is a form of utilization; professional associations, government, and private industry are benefitting from knowledge produced by the Energy From the West project. Through articles and presentations, the research team has advanced the state of the art of applied research. This contribution of knowledge to the field stands above the professional rewards received by individual researchers.

As noted by users sampled in this research, the strength of Energy From the West is its broad scope. The energy policy community has begun recognizing the need to understand the broader issues involved in energy development. As recently noted by Roger Glassey, former Assistant Administrator of the Energy Information Administration (EIA) for applied analysis:[13]

> I believe we are much better served by focusing our attention on broader issues at higher levels of aggregation rather than continuing to pursue the will-o-the-wisp of ever finer detail in analytical questions.
>
> So how do we set our long-term goals? Well, simply by trying to understand better what are the long-term issues. ...An issue represents a long-term value conflict with the society, or within the body politic, that is not going to go away quickly just by a technological fix or a brilliant policy stroke.

This need for a broad perspective on energy questions is echoed by Congressional sources. As stated by a staff member of the Senate Committee on Energy and Natural Resources, energy problems:[14]

> ...are more involved in some of the things which are fundamentally unquantifiable, which are not going to be much clarified by the traditional kind of parameteric modeling. The best that energy information, I think, can do for us is to help us dimly perceive how some of these uncontrollable external events are going to affect us. That means we need accurate data and we probably need a lot of it and we're probably going to be short on ways of making it all fit together in a neat theory. I do not think we should worry about that. We'll have to find people--there'll be some smart people come along just like there are in physics and chemistry who will show us the connection between these data, and they probably will not use a computer to do it.

Science and Public Policy was successful in providing users with the "big picture" on western energy development. The receptivity of users to this information is reflected by their positive attitudes towards enlightenment and intelligence use of the study. Whether enough users read or will read the study to say that the study was "worth it" is indeterminable.

The impact of Energy From the West on society is also indeterminable. However, society has an inherent interest in knowledge. As noted by Madison:

> A popular government without popular information or the means of acquiring it, it is but a prologue to a farce or a tragedy or perhaps both. Knowledge will forever govern ignorance; and a people who mean to be their own governors, must arm themselves with the power knowledge gives.[15]

This need for information has increased with the coming of the technological society. As discussed in Chapter III, the society needs information on the potential unanticipated impact of the introduction or expansion of technology. By conducting a broadly scoped project on western energy development, the research team has identified the breadth of the impacts from western energy development and the interconnection between impacts. To the extent such information assists the region in alleviating some of these impacts, the region and the country as a whole benefits.

Social research is a humble enterprise -- in any given situation a variety of uncontrollable factors may overwhelm the best-laid plans of the social researcher. However, within these constraints, this research indicates that researchers can do much to improve the chances for utilization of their research. Social research need not be resigned to non-use or misuse. As indicated here, there are multiple uses of research including direct application, improving the quality of discussion, and better definition of the research question.

In deciding to do social research, researchers and society have decided that contributing to the decision-making and policymaking activities of the government is a valuable pursuit. Such a value judgment should not bother researchers,

for all important choices in research are value judgments. As noted by Weiss:

> ...Explicitly or implicitly, value considerations guide the selection of topics to be studied, variables to be analyzed, and the areas of human behavior to be modeled in. that most honorable an abstruse of academic pursuits, theory construction. Basic research is no more immune from value choices than research in the fields adjacent to policymaking.[16]

A decision to contribute to the policymaking activities of government is also an obligation. Society has decided it can no longer afford the cost, either in monetary, environmental or human terms, of ignorance in making decisions about many policy issues. The costs of the unanticipated consequences caused by uninformed decisions are too great. Even today, society is still trying to alleviate the unanticipated impacts of yesterday's industrial society. Some examples resulting from coal resource development include: (1) acid rain from the burning of coal; (2) scarred landscape and erosion from strip mining; (3) acid runoff from abandoned mines; and, (4) the human dislocation involved as contraction occurs in eastern coal fields. Recognizing the potentially serious impacts occurring from the development or expansion of technology, the Congress has created a separate agency, the Office of Technology Assessment, solely for assessing potential impacts of technology development.

Researchers need a similar commitment to social research. As noted by Kochen,[17] social research provides a means of assessing

the impact of policies without the enormous costs of trial and error. But to make this contribution requires researchers to do quality research and to get their research used. Researchers have an obligation to promote the utilization of their research. This research shows that researchers can successfully accomplish this task. To this end, early involvement, continuing relationships with users, responsiveness to user needs, and facilitating communications between users and researchers are critical for researchers in promoting utilization and making their contribution to the policymaking process.

FOOTNOTES

[1]Patton, Michael Quinn. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978; and, Caplan, Nathan, A. Morrison, and R.J. Stambaugh. The Use of Social Science in Policy Decisions at the National Level. Ann Arbor: Institute for Social Research, University of Michigan, 1975.

[2]See Bernstein, Ilene N., and Howard Freeman. Academic and Entrepreneurial Research. New York: Russell Sage Foundation, 1975; and, Rivlin, Alice M. Systematic Thinking for Social Action. Washington, D.C.: Brookings Institute, 1970.

[3]See Weiss, Carol H. Using Social Research in Public Making. Lexington, MA: Lexington Books, 1977.

[4]Bernstein, Ilene N., and Howard Freeman. Academic and Entrepreneurial Research. New York: Russell Sage Foundation, 1975; and, Rivlin, Alice M. Systematic Thinking for Social Action. Washington, D.C.: Brookings Institute, 1970.

[5]Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in PolicyMaking. Ann Arbor: Institute for Social Research, University of Michigan, June 1978.

[6]Patton, Michael Quinn. Utilization-Focused Evaluation. Beverly Hills: Sage Publications, 1978.

[7]Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1978.

[8]Berg, Mark R., et al. Factors Affecting Utilization of Technology Assessment in PolicyMaking. Ann Arbor: Institute for Social Research, University of Michigan, June 1978.

[9]See Havelock, Ronald G. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor: Institute for Social Research, 1969.

[10]See Chapter III for development of these concepts.

[11]Ballard, Steven C., and Timothy A. Hall. "Integrating Applied Policy Analysis and Political Science: A Report of a Technology Assessment of Western Energy Resource Development." Paper delivered at the 1978 Annual Meeting of the American Political Science Association, New York Hilton Hotel, New York, August 31-September 3, 1972.

[12]Ballard, Steven C., Allyn R. Brosz, and Larry B. Parker. "Social Science and Social Policy: Roles of the Applied Researcher." Policy Studies Journal 8:951-987 (Summer 1980).

[13]Congressional Research Service. Energy Information: A Workshop on Current Progress and Problems. Washington D.C.: Govt. Print. Off., 1980. p. 51.

[14]Ibid., p. 56.

[15]Cited in Environmental Protection Agency v. Mink, 410 U.S. 73 Justice Douglas's dissent. (1971).

[16]Weiss, Carol H. Using Social Research in Public Making. Lexington, MA: Lexington Books, 1977.

[17]Kochen, Manfred ed. Information for Action: From Knowledge to Wisdom. New York: Academic Press, 1975.

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APPENDIX A

1. How did you first become aware of the Energy From the West study?

   01. Science and Public Policy (S&PP)
   02. Friends or Colleagues
   03. Conferences
   04. Professional/Trade journals
   05. Slide Presentation
   06. Organizational Channels
   07. Literature Review
   08. National Technical Information Service (NTIS)
   88. Other (specify)_____
   99. Don't Know

2. A number of reports have been published as a part of the Energy From the West study. For each of the following reports, have you: read most or all, skimmed or scanned, are aware of but haven't looked at, or not aware of the report.

	Read most or all	Skimmed/ scanned	Aware of but haven't looked at	Not aware of	Don't know
First-Year Work Plan (March 1976)	1	2	3	4	9
Progress Report (4 vols.) (September 1977)	1	2	3	4	9
Executive Summary to Progress Report (September 1977)	1	2	3	4	9
Work Plan for Completing TA of Western Energy Development (Feb. 1978)	1	2	3	4	9
Draft Policy Analysis Report (March 1978)	1	2	3	4	9
Energy Resource Development Systems Report (6 vols.) (March 1979)	1	2	3	4	9
Impact Analysis Report (2 vols.) (March 1979)	1	2	3	4	9
Policy Analysis Report (March 1979)	1	2	3	4	9
Project Summary (July 1979)	1	2	3	4	9

3. In general, how familiar are you with the purpose of the Energy From the West study?

Very	Somewhat		Not very	Not at all	Don't
1. Familiar	2. Familiar	3. Uncertain	4. Familiar	5. Familiar	9. Know

4. In general, how familiar are you with the results of the study?

Very	Somewhat		Not very	Not at all	Don't
1. Familiar	2. Familiar	3. Uncertain	4. Familiar	5. Familiar	9. Know

5. Did you have any direct interaction with the producers of this technology assessment--The Science and Public Policy Program--during this project? By interaction, I mean such things as serving on the Advisory Committee, reviewing draft reports such as the Draft Policy Analysis Report, or having personal interaction with members of S&PP to express your views and opinions on parts of the research.

1. Advisory Committee 2. Reviewed Drafts 3. Personal Interaction 4. None

GO TO QUESTION 7

6. Do you think that the study would have been more useful to you if you had had some interaction with the producers prior to completion of the research?

1. NO 2. YES 3. Don't Know

GO TO QUESTION 14 GO TO QUESTION 12

7. How receptive do you feel S&PP was to your input into the project?

Very	Somewhat		Not very	Not at all	Don't
1. Receptive	2. Receptive	3. Uncertain	4. Receptive	5. Receptive	9. Know

8. In general, how satisfied are you with S&PP's responses to your comments?

Very	Somewhat		Not very	Not at all	Don't
1. Satisfied	2. Satisfied	3. Uncertain	4. Satisfied	5. Satisfied	9. Krow

9. Overall, to what extent do you think your interaction with the research team influenced the research?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

10. Overall, to what extent do you think your interaction with the research team increased the likelihood that you will use information generated from the Energy From the West study?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

11. Why do you say that?

1. _____

_____

2. _____

_____

12. Speaking in general, what do you think are the major obstacles to effective interaction between producers of applied research, and users of such reports, such as yourself?

1. _____

_____

2._____

3._____

13. Do you have any recommendations for researchers to help break down these barriers?

1._____

2._____

3._____

14. I am interested in your opinion of the research team's efforts to produce a high quality report. From a technical standpoint, by which I mean such things as methodologies employed, data sources used, and procedures followed during the research, how satisfied are you with the performance of the research team during this project?

Very	Somewhat		Not very	Not at all	Don't
1. Satisfied	2. Satisfied	3. Uncertain	4. Satisfied	5. Satisfied	9. Know

15. What, specifically, leads you to say this?

1._____

2._____

16. From the viewpoint of presenting a balanced perspective on the competing values and interests involved in western energy development, how satisfied are you with the performance of the research team during this project?

Very	Somewhat		Not very	Not at all	Don't
1. Satisfied	2. Satisfied	3. Uncertain	4. Satisfied	5. Satisfied	9. Know

17. Any particular reason?

1._____

2._____

18. Have you referred others to the Energy From the West study?

1. YES 2. NO 3. Don't Know

GO TO QUESTION 20

19. About how many?

1._____ → GO TO QUESTION 22

20. How likely are you to refer others to Energy From the West?

Not at all Likely	Not very Likely	Uncertain	Somewhat Likely	Very Likely	Don't Know
1.	2.	3.	4.	5.	9.

GO TO QUESTION 22

21. Why is that?

1._____

_____

2._____

_____

22. I am also interested in S&PP's dissemination efforts. In general, how important are presentation concerns, such as language, format, and length to you in deciding to read a report?

Very Important	Somewhat Important	Uncertain	Not very Important	Not at all Important	Don't Know
1.	2.	3.	4.	5.	9.

23. What, in particular, is important to you?

1._____

_____

2._____

_____

24. How effectively do you think S&PP presented its Energy From the West study to you?

Very Effectively	Somewhat Effectively	Uncer-tain	Not very Effectively	Not at all Effectively	Don't Know
1.	2.	3.	4.	5.	9.

25. Why do you say that?

1._____

_____

2._____

_____

26. I am also concerned with the potential impact of the Energy From the West study on users like yourself. To what extent did you need information on western energy development at the time you requested information on Energy From the West?

Great Extent	Some Extent	Uncertain	Slight Extent	Not at All	Don't Know
1.	2.	3.	4.	5.	9.

27. Overall, to what extent do you think the study provided you with new information?

Great Extent	Some Extent	Uncertain	Slight Extent	Not at All	Don't Know
1.	2.	3.	4.	5.	9.

28. From the perspective of your organization, how important are the issues discussed in Energy From the West to your organization?

Very	Somewhat		Not very	Not at all	Don't
1. Important	2. Important	3. Uncertain	4. Important	5. Important	9. Know

29. From the perspective of your organization, how helpful is the study's treatment of the issues to the organization's interests?

Very	Somewhat		Not very	Not at all	Don't
1. Helpful	2. Helpful	3. Neutral	4. Helpful	5. Helpful	9. Know

30. To what extent do you think the timing of the issuance of the report's conclusions will affect the likelihood that you will use it?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

GO TO QUESTION 32

31. Will that effect be positive or negative?

1. Positive 2. Negative 3. Uncertain

32. To what extent do you think the time it took to produce this study--three years--has adversely affected the likelihood that it will be used?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

33. To what extent do you think the comprehensive nature of the study, covering as many states, resources, and issue-areas as it does, has adversely affected the likelihood that it will be used?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

34. To what extent do you think that Energy From the West has affected your general perspective on issues surrounding western energy development?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

GO TO QUESTION 36

35. In what way?

1. _____

_____

2. _____

_____

36. To what extent do you think the study will be useful in promoting discussion about the various tradeoffs involved in western energy development?

Great	Some		Slight	Not at	Don't
1. Extent	2. Extent	3. Uncertain	4. Extent	5. All	9. Know

37. To what extent do you think the Energy From the West study is useful in defining policy options and alternatives available for various aspects of western energy development?

1. Great Extent	2. Some Extent	3. Uncertain	4. Slight Extent	5. Not at All	9. Don't Know

38. Why do you say that?

1. _____

_____

2. _____

_____

39. To what extent do you think Energy From the West will influence the choice of specific policies or courses of action in these areas of western energy development?

1. Great Extent	2. Some Extent	3. Uncertain	4. Slight Extent	5. Not at All	9. Don't Know

40. Why do you say that?

1. _____

_____

2. _____

_____

41. Just a little background information and the questionnaire is completed. What is the highest level of formal education which you have completed?

01. High School
02. College (no Degree)
03. Associate degree (field)_____
04. BA or BS (field)_____
05. MA or MS (field_____
06. PhD (field)_____
07. JD, LLB
08. Other (specify)_____

42. How long have you been employed at your present organization?

_____Years _____Months

43. What is your position in that organization?_____

Please feel free to attach any other comments you have on the Energy From the West study to this questionnaire. Thank you for your participation in this survey.

APPENDIX B

INDICATORS OF COLLABORATIVE RELATIONSHIP[a]

I. User Indicators

A. How receptive do you feel S&PP was to your input into the project?

B. In general, how satisfied are you with S&PP's responses to your comments?

C. Overall, to what extent do you think your interaction with the research influenced the research?

D. Overall, to what extent do you think your interaction with the research team increased the likelihood that you will use information generated from the Energy From the West study?

E. Why do you say that? (open-ended follow-up question to D)

II. Producers Indicators

A. During the Energy From the West study, Science and Public Policy engaged in a number of activities to enhance the utilization of its reports by promoting interaction between themselves and potential users. One of these activities was the advisory committee. How many meetings of the committee did you attend?

B. How receptive do you feel S&PP was to the comments and opinions of the advisory committee?

C. In general, how satisfied are you with S&PP's responses to the comments of the advisory committee?

D. In general, to what extent do you think the advisory committee helped to increase the likelihood that the study will be used?

E. Why do you say that? (open-ended follow-up question to D.)

F. How receptive do you feel S&PP was to the comments and opinions of user-reviewers?

G. In general, how satisfied are you with S&PP's responses to the comments of the user-reviewers?

H. In general, to what extent do you think the user-review help to increase the likelihood that the study will be used?

I. Why do you say that? (open-ended follow-up question to H.)

J. In general, how satisfied are you with the amount of personal interaction the team had with potential users during the Energy From the West study?

K. What was the purpose of S&PP's interaction with users? (open-ended question)

L. What do you think was the impact on the project from these contacts with potential users?

M. In general, to what extent do you think personal interaction with users helped to increase the likelihood that the study will be used?

N. Why do you say that? (open-ended follow-up question to M)

[a]Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX C

INDICATORS OF AWARENESS/INTEREST[a]

I. User Indicators

A. How did you first become aware of the Energy From the West study? (open-ended question)

B. A number of reports have been published as a part of the Energy From the West study. For each of the following reports, have you: read most or all, skimmed or scanned, are aware of but haven't looked at, or not aware of the report.

1. First-Year Work Plan.

2. Progress Report.

3. Executive summary to Progress Report

4. Work Plan for Completing Technology Assessment of Western Energy Development.

5. Draft Policy Analysis Report.

6. Energy Resource Development Systems Report.

7. Impact Analysis Report.

8. Policy Analysis Report.

C. In general, how familiar are you with the results of the Energy From the West study?

D. In general, how familiar are you with the purpose of the study?

E. Did you have any direct interaction with the producers of this technology assessment--The Science and Public Policy Program--during this project? By interaction, I mean such things as serving on the Advisory Committee, reviewing draft reports such as the Draft Policy Analysis Report, or having personal interaction with members of S&PP to express your view and opinions on parts of the research?

F. Do you think that the study would have been more useful to you if you had had some interaction with the producers prior to completion of the research? (follow-up question to a negative response to question E)

[a] Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX D

INDICATORS OF TRUST/CREDIBILITY[a]

I. User Indicators

A. I am interested in your opinion of the research team's efforts to produce a high quality report. From a technical standpoint, by which I mean such things as methodologies employed, data sources used, and procedures followed during the research, how satisfied are you with the performance of the research team during this project?

B. What, specifically, leads you to say this? (open-ended follow-up question to A)

C. From the viewpoint of presenting a balanced perpective on the competing values and interests involved in western energy development, how satisfied are you with the performance of the research team during this project?

D. Any particular reason? (open-ended follow-up question to C)

E. Have you referred others to the Energy From the West study?

F. About how many? (follow-up question to a positive response to question E)

G. How likely are you to refer others to Energy From the West?

H. Why is that? (open-ended follow-up question to G)

II. Producer Indicators

A. Overall, to what extent do you think the advisory committee helped in increasing the technical quality of the study? By technical quality, I mean such things as methodologies employed, data sources used, and procedures followed during the research.

B. Overall, to what extent do you think the advisory committee helped in providing a balanced perspective on competing values and interests involved in western energy development?

C. Overall, to what extent do you think the user reviews helped in increasing the technical quality of the study? By technical quality, I mean such things as methodologies employed, data sources used, and procedures followed during the research.

D. Overall, to what extent do you think the user reviews helped in providing a balanced perspective on the competing values and interests involved in western energy development?

E. What do you think was the impact on the project from these contacts with potential users?

F. Overall, to what extent do you think personal interaction with users helped in increasing the technical quality of the study? By technical quality, I mean such things as methodologies employed, data sources used, and procedures followed during the research.

G. Overall, to what extent do you think personal interaction with users helped in providing a balanced perspective on the competing values and interests involved in western energy development?

[a]Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX E

INDICATORS OF UTILIZATION [a]

I. User Indicators (Enlightenment Utilization)

A. To what extent do you think that Energy From the West has affected your general perspective on issues surrounding western energy development?

B. In what way? (follow-up question to positive response to A)

C. To what extent do you think the study will be useful in promoting discussion about the various tradeoffs involved in western energy development?

II. User Indicators (Intelligence Utilization)

A. To what extent do you think the Energy From the West study is useful in defining policy options and alternative available for various aspects of western energy development?

B. Why do you say that? (open-ended follow-up question to A)

III. User Indicators (Engineering Utilization)

A. To what extent do you think Energy From the West will influence the choice of specific policies or of courses of action in these areas of western energy development?

B. Why do you say that? (open-ended follow-up question)

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[a]Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX F

INDICATORS OF INDIVIDUAL BARRIERS[a]

I. User Indicators

A. To what extent did you need information on western energy development at the time you requested information on Energy From the West?

B. Overall, to what extent do you think the study provided you with new information?

C. To what extent do you think the timing of the issuance of the report's conclusions will affect the likelihood that you will use it?

D. Will that effect be positive or negative? (follow-up question to a positive response to C)

E. What is the highest level of formal education which you have completed? Field?

II. Producer Indicators

A. How long have you been with the Science and Public Policy Program?

B. How long did you work on the Energy From the West project?

C. What is your disciplinary background?

D. Do you have any future interests in this kind of program?

E. Any particular reason? (open-ended follow-up question to D)

[a]Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX G

INDICATORS OF ORGANIZATIONAL BARRIERS[a]

I. User Indicators

A. From the perspective of your organization, how important are the issues discussed in Energy From the West to your organization?

B. From the perspective of your organization, how helpful is the study's treatment of the issues to the organization's interests?

C. How long have you been employed at your present organization?

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[a]Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX H

INDICATORS OF TECHNICAL BARRIERS[a]

I. User Indicators

A. In general, how important are presentation concerns, such as language, format, and length to you in deciding to read a report?

B. What, in particular, is important to you?

C. How effectively do you think S&PP presented its Energy From the West study to you?

D. Why do you say that? (open-ended follow-up question to C)

E. To what extent do you think the comprehensive nature of the study, covering as many states, resources, and issue-areas as it does, has adversely affected the likelihood that it will be used?

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[a] Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.

APPENDIX I

INDICATORS OF TIME BARRIERS[a]

I. User Indicators

A. Percentage of user turnover in sample

B. To what extent do you think the time it took to produce this study -- three years -- has adversely affected the likelihood that it will be used?

II. Producer Indicators

A. Percentage of researcher turnover over the duration of the project.

[a] Unless noted otherwise, all responses were rank ordered on a five point scale. See Appendix A for the actual instrument sent users.