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DECENTRALIZED ENERGY PLANNING AND CONSENSUS IN ENERGY POLICY

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ABSTRACT

This paper explores the following three propositions and their relationships: (1) that, in our pluralistic policymaking environment, we cannot solve our nation's energy problems unless we can reach agreement among a diverse group of interested parties about specific actions; (2) that, short of a manifest emergency, such a consensus is difficult to reach unless the scale of the decisionmaking unit is relatively small; and therefore (3) that one of the keys to an effective energy policy in the United States is to rely heavily on local and regional energy planning and decisionmaking.

First, the paper reviews our problem of irresolution and its roots, and it summaries the policy options for resolving it. Then it explores one of those options, decentralized planning, in a little more detail. Finally, it offers some speculations about the viability of a decentralized approach to energy planning.

Background

Our energy crisis is a social crisis, not a technological one. It is a crisis of irresolution, of dissensus. We are having a great deal of trouble coming to agreement among ourselves about what to do to solve our energy problems, at least whenever our decisions seem likely to involve costs as well as benefits. In the meantime, the problems go unsolved, and our vulnerability and our frustration increase.

To some extent dissensus has always been a part of the American scene, but it is a salient issue in energy policy largely because of a fundamental kind of social change in the past several decades--a change that has broadened participation in energy policy decisions, so that major actions now require a broad consensus (or at least acquiescence) among interested groups and parties. The difficulty is that our decisionmaking structures, designed for a simpler time, are not working effectively under the new conditions.

Policy Options for Increasing the Effectiveness of Energy Decisionmaking

In our newly pluralistic system, there are a variety of ways to improve our capability to arrive at decisions consensually. Some are technology-focused: technology choices that provoke less disagreement and technology improvements that make certain options more acceptable. Others are social action focused: information that reduces disagreements about facts, incentives for groups or individuals to agree to a course of action, policies that give a particular body the right to decide or to bound the range of options, or changes in procedures or institutional

roles and responsibilities. Worth special attention right now are these approaches that help us to reach agreement more quickly than "business as usual" even though there is not a broad consensus that we have a national emergency. Among these is one that both experience and theory tell us is especially promising.

Scale and Consensus-Building

More often than not, new participants in the decisionmaking process have found that government is their entry point; and the unit or jurisdiction to which most people have ready access is usually small. One result has been a shift in the balance of power in our federal system away from functional subdivisions toward areal subdivisions--smaller scales.

Social science theory indicates that such an apparent connection between participation and scale may in fact be very real. One line of reasoning, for example, argues that agreement is facilitated by (and often requires) direct, face-to-face human interaction. But time is limited, each case of interaction takes time, movement also takes time (reducing the time available for interaction); and consequently there are likely to be limits to the social and spatial scale within which consensus or accommodation can be reached, short of an unmistakable threat. If we want to do a better job of meeting our national needs for energy, maybe we should focus more of our attention on the sizes of the social units that can make decisions about how to meet their own needs. The paper provides some information about what this implied, both in the scale of units and the scale of energy needs.

The Pros and Cons of a Decentralized Approach

The advantages of a decentralized approach to energy planning and decisionmaking, in addition to the more general benefits of citizen participation, are indeed attractive. They may include the stimulation of greater innovativeness, the fuller use of regional and local resources, added resiliency in our energy system, and much broader public involvement in weighing the tradeoffs among energy, economic, environmental, and other objectives.

But there are disadvantages as well. They may include inefficiency and unnecessary expense due to excessive local self-sufficiency, a lack of concern about meeting the needs of the nation at large, conflicts between neighboring units, a strain on the pool of specialized personnel and other resources, problematic changes in institutional roles and relationships, special problems with applying the approach to the transportation sector, and possible exploitation by powerful groups in some localities.

As a result, it appears that a decentralized approach can only work if many of the possible disadvantages are reduced. As a starting point, the paper suggests a number of policy directions that would complement decentralized energy decisionmaking. It is stressed that local self-determination need not mean local self-sufficiency, that inter-area linkages would be essential, and that utilities would

probably need to have a role in both the process of decentralization and the future that follows it.

Conclusion

It appears to be possible to design a workable decentralized approach to energy decisions that would go a long way toward resolving our problem with energy policy irresolution. One of the strongest reasons for taking this option seriously is that it is beginning to happen already, largely because of local initiative (the paper lists a number of examples). All that is needed is to encourage and support this kind of local action. But we need to get going quickly if we are to have the chance to show that participation and pluralism can be positive contributors to energy policy rather than impediments to getting anything done.

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BACKGROUND

Our energy crisis is a social crisis, not a technological one (Wilbanks, 1980). We do not lack technologies and resources that can provide us with desired quantities of energy in familiar forms. We have, or almost certainly can develop, technologies to meet a wide range of conditions for resource use, environmental protection, and human safety. Yet, in the six years since the 1973-74 oil embargo, our national vulnerability because of our dependence on oil imports has increased, the likelihood of serious energy shortages in the near future has increased, our frustration with energy prices has increased, the probability of conflict and catastrophe in the less developed countries because of a scarcity of cheap energy has increased. It is hard to interpret this as evidence that we are making progress in solving our energy problems.

If the reasons for this situation are not technological, we need to examine the possibility that they might be social, economic, and institutional. Why is it that we are irresolute? Why do we find dissensus about so many important

energy policy decisions? Clearly, we are having a great deal of trouble coming to agreement among ourselves about what to do, at least whenever our decisions are going to involve costs as well as benefits (which is increasingly the case). Once we reach a broad consensus among a wide range of participants in energy policymaking--whatever we agree--we can usually make it work. But without that consensus, we are unlikely to be able to make, or at least to sustain and implement, the specific decisions that enable us to meet our energy goals.

To some extent, dissensus has always been a part of the American scene, a corollary of our democratic ideals. But a fundamental kind of sociopolitical change in the past several decades has made it a more salient issue in energy policy. As recently as two decades ago, it was generally assumed that major decisions in the United States could be grouped into distinct categories, in each of which a limited number of groups had a right to participate--usually those with direct economic, regulatory, or technical roles. For instance, it was quite clear who made oil policy decisions and utility policy decisions and national defense decisions. As long as the participants were agreed, an action could be taken. By the end of the 1950's, in fact, the ability of these decisionmaking consortia, often made up of big business and big government, was so unbridled that President Eisenhower felt it necessary to warn the country about the power of a "military-industrial complex."

But a number of important events during the 1960's, including civil rights struggles, Vietnam, and the Santa Barbara oil spill, convinced many people that decisions being made within the traditional frameworks were affecting individuals and groups outside those frameworks. As a result, the demand grew for broader participation in decision-making, ranging from pressures for consumer representation on corporate boards of directors to student participation in promotion decisions for university professors. The "environmental movement" was the most visible indicator of this change, but it involved more than environmental interests alone.

As a result, energy policy decisions now involve a wide range of groups and interests as parties to the decisions, and it takes a broad consensus (or at least acquiescence) among the parties to take major actions (Kash and others, 1976;

Schurr and others, 1979). This change is probably irreversible, and it is in many respects the way a democratic process is supposed to work. But it does leave us with a serious problem. As Lewis Branscomb (1978) has suggested, our decisionmaking structures--designed for a different time and a different set of conditions--have broken down under the current conditions, and we do not have a new structure to replace them. Without it, our old structures turn uncertainties into disagreements, and disagreements into antagonisms, and prospects for action fade away time after time.

POLICY OPTIONS FOR INCREASING THE EFFECTIVENESS OF ENERGY DECISIONMAKING

In this pluralistic system, there are a variety of ways to improve our capability to arrive at decisions consensually. Although all of the options concern both technology and society, they can be separated into those where the alternatives are technology-focused ("technological fixes:" Weinberg, 1966) or social-action-focused ("social fixes).

Technological fixes

As ways to make our decisionmaking more effective, the technology-oriented approaches include two classes of options:

(1) Technology choices. Obviously, consensus is easier to reach when a proposed technology provokes less disagreement. One way to reduce impediments to resolute decisionmaking is to choose technology/resource/site/institution combinations that are easier to agree upon, even if engineering cost estimates indicate that they are more expensive. The reasoning here may be circular, but the point is a powerful one: if decisiveness has social value, it may be worth paying a price--in terms of selecting technologies that would otherwise be suboptimal--in order to get it.

(2) Technology improvements. A classic approach to accommodation is R&D to mitigate undesirable characteristics or impacts of a technology; environmental control technologies are an example. Another kind of technology improvement is R&D to enlarge the range of choices: of resources, technologies, scales of

technologies, etc. Both of these approaches can be used to increase the number of choices that are considered to be acceptable, which makes the "technology choice" alternative more feasible. But the challenge is to orient a part of the R&D process toward an objective of acceptability (a social judgment) rather than risk reduction (a scientific judgment); this requires better information about human attitudes than is usually available.

Social fixes

There are four general types of non-technological approaches to making decisions more effective: information, incentives, legitimacy, and institutional changes.

(1) Information. A central reason for irresolution is uncertainty about technology characteristics, impacts, demand, and institutional roles and responsibilities. Some of these uncertainties are irreducible, but accommodation might be facilitated by generating and disseminating reliable and credible information in the other cases (Kash and others, 1976). When disagreements are based on different opinions about the facts of a matter, good information about the facts should reduce the disagreements. And even when a conflict is based not on questions of fact but on differences in the values and priorities of participants in decisionmaking, an agreement on the facts can help to focus the accommodation process on the essential issues. Examples of the information approach include demonstrating new energy technologies at commercial scale before widespread utilization, establishing a national energy facility siting schedule, providing financial support for participants in decisionmaking who have limited resources, and creating an information network (i.e., an extension service) that reaches to local level.

(2) Incentives. Another way to get broad agreement about particular decisions is to offer compensation to individuals or groups that would otherwise prefer something else--in other words, compensating a party for accepting adverse impacts, risks, or other costs, or offsetting the costs by subsidies or other incentives. Incentive structures can serve to redistribute the costs and benefits of energy policies or decisions so that they are more equitable, and they are

indeed powerful tools in working toward a consensus. Examples include subsidizing the price of electricity to consumers who live close to power plants (making the price considerably cheaper than it would otherwise be), making more use of severance taxes, providing specific assistance for adversely impacted groups or areas, and such familiar alternatives as tax credits, loan guarantees, and government purchase agreements.

(3) Legitimacy. A very different approach to making decisions is to give a body a special right to decide. Familiar examples include the use of arbitration to settle labor disputes and the role of the federal court system in deciding constitutional questions. In the former case, the parties agree to let an external person or group make an independent judgment and to accept that judgment (e.g., a "science court"). In the latter case, the body with final decisionmaking authority is defined by law. Legitimacy generally takes the form either of pre-emptive decisionmaking (I will decide) or regulation to narrow the range of acceptable decisions (you can decide, but only from a finite range of options). Examples include the use of existing federal or state powers (e.g., eminent domain or establishing import fees), environmental and health protection regulations, price controls or rationing, and an Energy Mobilization Board.

(4) Institutional changes. Finally, it is sometimes possible to facilitate consensus-building either by changing the rules of the game or by changing the roles and responsibilities of institutions involved in the energy supply/use system. Procedural reforms are usually designed to streamline decisionmaking processes that are unnesessarily cumbersome or that cause delays by waiting too long to consult all the interested parties. Other institutional changes are generally aimed at decisionmaking structures that (at least in the eyes of some parties) have not kept up with the times, have become impediments to consensus-building, and/or are failing to do their jobs properly. Clearly, a change in the system for supplying and using energy could have a much larger long-term effect than a change in a single specific energy decision. Examples of procedural changes include one-stop siting decisions, reinterpretation of the EIS requirement, and increased stress on the early identification of alternatives to proposed

actions. Examples of changes in institutional roles include divestiture, establishment of new institutions (e.g., an Energy Security Corporation, SERI), increasing the responsibility of utilities for energy audits and other conservation programs, and increasing the responsibility of localities for energy planning (e.g., 208 planning for water resources in the U.S., community heating plans in Sweden).

Each of these six classes of options is attractive in some ways, for some purposes, but unattractive for others. For instance, they differ substantially in their effects under conditions of more or less urgency. Some options that are often preferred when a crisis is not upon us (e.g., information options) are of little value in an emergency. Others that are very effective in an emergency (e.g., pre-emptive decisionmaking) are unacceptable under less urgent conditions. Consequently, an energy strategy might need to distinguish between "normal" policies and "emergency" policies. Normal policies work slower, are more consensual in nature. Emergency policies work quickly, substitute consensus about the emergency for consensus about the energy decision, and (usually) have some provision for re-evaluation when the emergency goes away. In between might lie certain policies for accelerated (as contrasted with "business as usual") solutions to problems, emphasizing incentives, technology choices, and institutional changes.

It is this last category, I believe, that should be getting particular attention right now: ways to reach agreement more quickly than usual when there is not a wide-ranging consensus that we have a national emergency.

SCALE AND CONSENSUS-BUILDING

Both experience and theory indicate that there is a relationship between scale and the feasibility of decisionmaking by consensus. For instance, as the demand for participation has grown in the past twenty years, people who were outside the traditional decisionmaking frameworks have found more often than not that their only channel for entering the process is through government: by

voting for or against candidates, by getting legislators to take actions that would give people a way to use the courts or formal hearings to get involved, etc. And the government unit or jurisdiction to which most people have ready access is relatively small: a ward, a city, an election unit, at most a state. One result has been that the balance of power in our federal system has shifted, at least to some degree, away from functional subdivisions toward areal subdivisions--in other words, units defined more by scale than by function, where a person's right to participate (in a sense, his or her share of ownership) is determined by citizenship rather than by wealth.

This apparent connection between participation and scale is consistent with social science theory. As an illustration, consider the following line of reasoning.* The large and well-tested literature on the diffusion of innovations tells us that the most important influences on most decisions are personal communications--not newspapers or television but face-to-face contacts (Rogers and Shoemaker, 1971; Roberts and Frohman, 1978; Sommers and Clark, 1977). Agreement is facilitated by direct human interaction; in fact where different points of view must be reconciled or where risks are perceived to be considerable, human interaction is often a requirement.

Building on this body of research, Torsten Hägerstrand and his colleagues in Sweden have shown that there is a kind of "choreography" to human interaction (reviewed by Pred, 1977). It is shaped by the fact that both time and space limit what we can do. For example, Hägerstrand's theory of "time-geography" identifies capability constraints on interaction: there is only so much time in a day, movement is always time-consuming, etc. And it also identifies coupling constraints: if I am interacting here, I cannot also be interacting there, and a certain amount of time is required for any instance of interaction.

These kinds of constraints put bounds on what is possible in consensus-building, at least to the extent that it depends on personal interaction. Because

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*Others include Mumford and others on city size, the political science literature on federalism, Fisher and Etzioni on "fractionation" as an approach to conflict resolution, the work of ecologists and anthropologists (notably Roy Rappaport) on characteristics of stable systems, and the work of economists and management scientists on organizational efficiency (e.g., Radner, 1975).

time is limited and each case of interaction takes time, only so much interaction can take place. And because movement takes time, the more and farther we move, the less time is available for interaction.

These concepts lead us to the notion that, in a pluralistic social and political system, there may be limits to the social and spatial scale within which consensus or accommodation can be reached, short of an unmistakable threat.* Maybe, as Hazel Henderson has suggested (1978), a lot of our indecision about energy questions is because we are trying to deal with options whose impacts spread beyond the range that our decisionmaking structures can handle. Maybe if we want to do a better job of meeting our national needs for energy, we should focus more of our attention on the sizes of the social units that can make decisions about how to meet their own needs. Regardless how good a technology or other policy alternative may look to us energy analysts, if--as a society--we cannot agree to use it, then it is not helping us to solve our energy problems.

ENERGY NEEDS AT A LOCAL SCALE

Suppose that, for the sake of argument, we accept the principle hypothesized above. What sizes of units are we talking about, and how large (or how small) are their energy needs? Both of these are research questions yet to be answered.

Regarding the former question, the various literatures suggest a variety of thresholds, from several thousand to several hundred thousand people and from a neighborhood to a multicounty region. Based on these literatures, however, it seems safe to speculate that the maximum scale for consensual decisionmaking is

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*In the city-states of ancient Greece, each citizen felt duty-bound to take part in the decisions of the state. There, it is reported that it was considered simply unacceptable to live more than a day's walk from the center of the city. Farther away, one could not fulfill the duties of citizenship. In other words, there was a clear relationship between the geographic scale of decisionmaking and the ability of the democratic process to work.

no greater than a several-county area, with the geographic scale becoming more limited as population density rises.*

Regarding the energy needs of areas of this size, the data are extremely limited. The smallest areas for which comprehensive estimates are available are BEA areas, a Department of Commerce definition of functional economic regions in the U.S. (Figure 1).** There are 173 of these regions, a dozen or so counties each. To get a very rough sense of the magnitude of electricity requirements for small areas, I calculated from end use estimates in 1975 (ORNL, 1980) the needed electricity generating capacity for each of a 20 percent sample of BEA areas. I then divided each capacity figure into three parts (50, 30, 20) and five parts (50, 20, 10, 10, 10). The first gave a crude set of estimates for 4-6 county areas, the second a set of estimates for 2-4 county areas. Both sets probably underestimate the variance that would appear in actual measurements. Figures 2 and 3 show the results.

Without exaggerating the importance of such ad hoc calculations, I think we can draw two conclusions from the figures: (1) many of the needs are small; in Figure 2, 40 percent are smaller than 500 MW(e) of capacity--about half the size of a standard new power plant; but (2) some of the needs are large; in Figure 2, about one-quarter are larger than 1200 MW(e) of capacity--larger than one standard new power plant. This indicates that meeting local energy needs with local supply

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*Yugoslavia is one example of a very decentralized approach to governmental decisionmaking. There, many of the responsibilities of government are in the hands of largely self-governing opštine, or communes. In this very fluid system, where boundaries can be revised annually, the number of communes has stabilized within a range between 500 and 516, which means that this unique living laboratory has found the right size for most of its units. In 1977, 494 of the 512 communes had an area of less than 1200 square kilometers (1200 square kilometers is about the size of a square 21 miles to a side). More than half had an area of less than 500 square kilometers. This does not necessarily indicate what the size of such areas would be in the U.S.; but it shows that, in the Yugoslav context, their experiment has led them to adopt quite small decisionmaking units.

**Both Brookhaven National Laboratory and Oak Ridge National Laboratory are capable of producing estimates at the county level, but the likelihood of error at this level of detail is so great that the numbers are considered reliable only when they are aggregated at a regional scale.

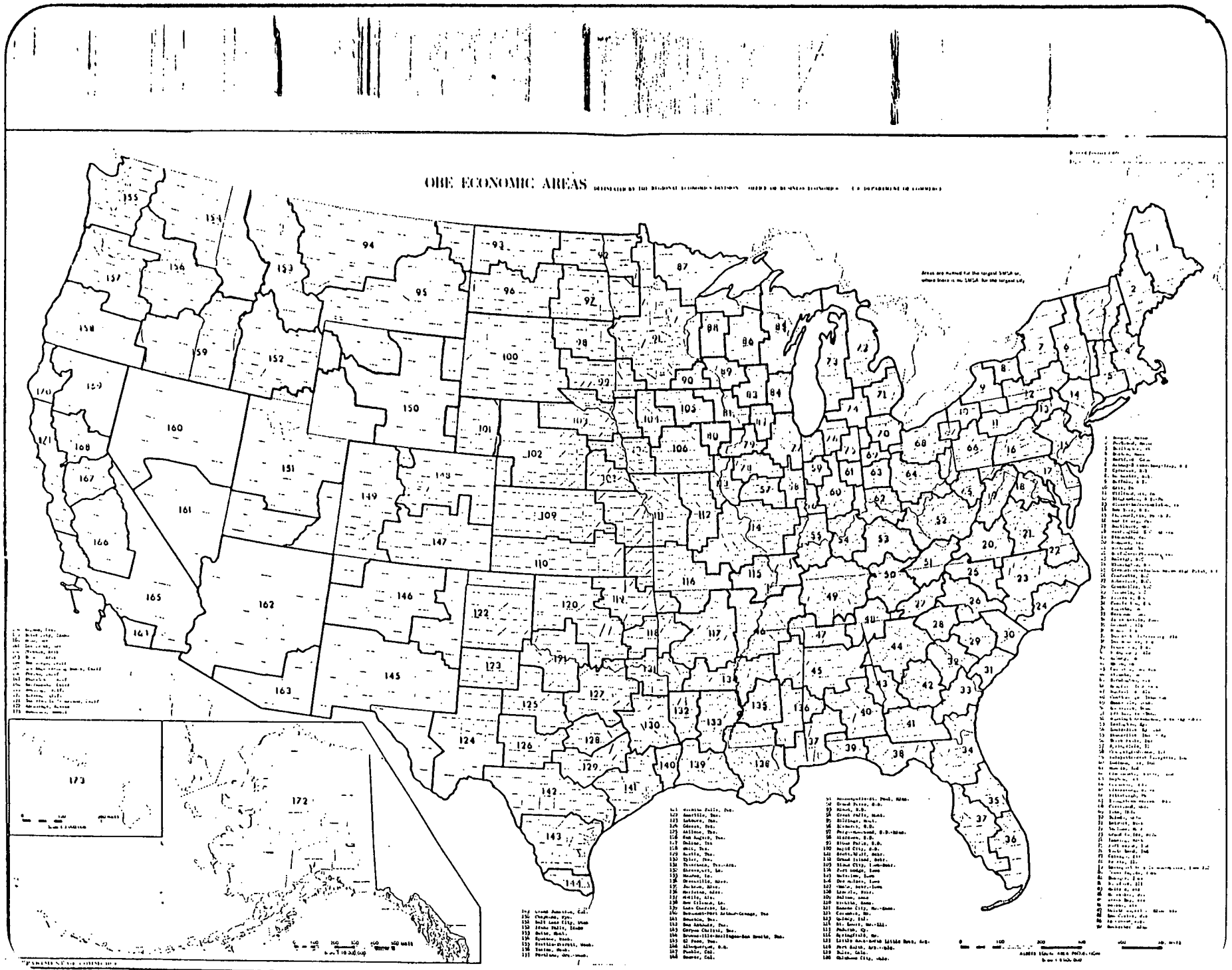
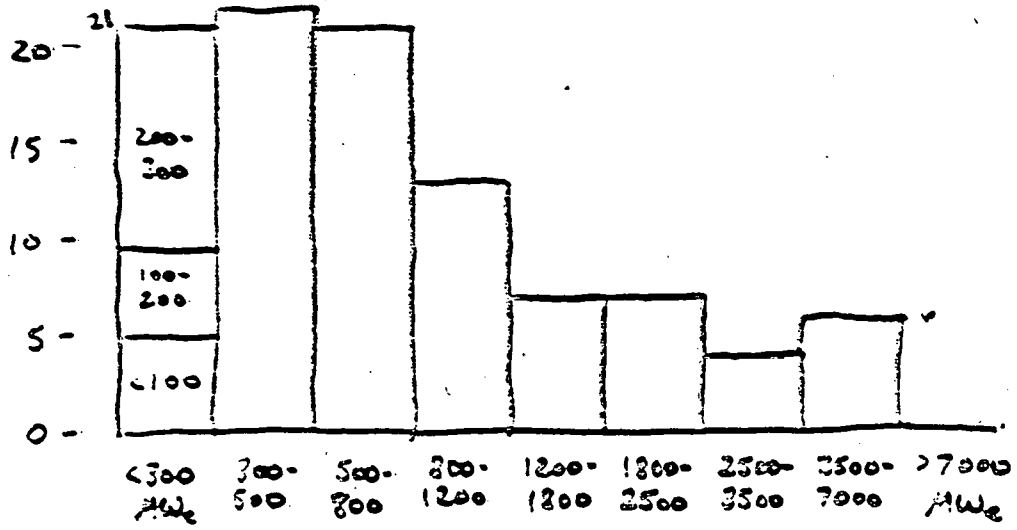


Figure 1

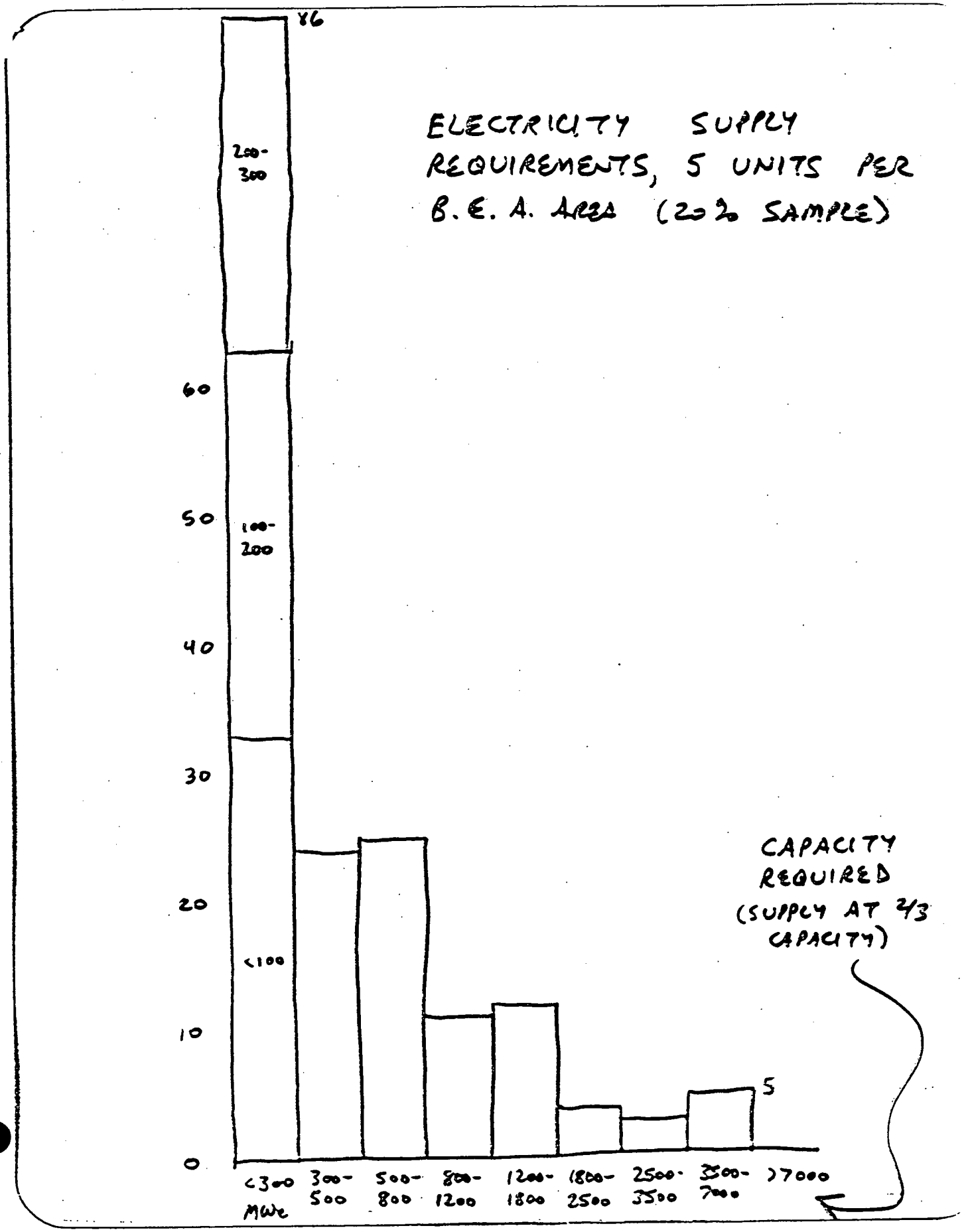
Figure 2

ELECTRICITY SUPPLY REQUIREMENTS, 3 UNITS PER B.E.A. AREA (20 % SAMPLE OF AREAS)



CAPACITY REQUIREMENT (SUPPLY AT 2/3 CAPACITY)

Figure 3


ELECTRICITY SUPPLY REQUIREMENTS, 5 UNITS PER B.E.A. AREA (20% SAMPLE)
86
200-300
100-200
<100
60
50
40
30
20
10
0
5
CAPACITY REQUIRED (SUPPLY AT 2/3 CAPACITY)
<300 MWe
300-500
500-800
800-1200
1200-1800
1800-2500
2500-3500
3500-7000
>7000

facilities would call for a variety of sizes of facilities: city-sized facilities for cities, town-sized for towns, and village-sized for villages. The issue is more one of geography than of facility size alone. For instance, a recent study of centralized power (Messing, Friesema, and Morell, 1978) suggested that a large facility in a dense area of need is a "compatible" facility, while a large facility in a sparse area of need is not. Table 1 takes a U.S. average relationship between installed capacity and population served, relates it to 1970 data on population density near coal-fired power plants, and estimates the size of area that the power plant serves. In some areas, it is small, compatible with localized decisionmaking. In others, the situation is different.*

THE PROS AND CONS OF A DECENTRALIZED APPROACH

Besides helping us to be more decisive without turning back the clock on participation, a decentralized approach could have other effects as we well, some attractive but some adverse. Because these possible ancillary effects will shape our use of this policy option, it is useful to summarize the principal ones.

Pros (in addition to the more general benefits of citizen participation)

(1) A decentralized approach might stimulate innovativeness. Some observers of the Chinese approach to economic development, for example, see evidence that motivating and mobilizing the energy and resourcefulness of people at the grass roots can substitute for certain presumed benefits of organizational neatness, complexity, and specialization (e.g., Lindblom, 1975). Perhaps as localities seek solutions to their own particular problems, they will come up with fresh new ideas (including new technology inventions: Berg,).

(2) It would encourage the use of regional and local resources; solar energy, geothermal energy, and low-head hydroelectric energy (for example) are

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*Note also the conclusion of the National Coal Policy Project that facilities using coal to produce energy should be located in the vicinity of those who will use the energy. Those who would benefit should be the ones to evaluate the tradeoffs and decide what action they prefer.

Table 1. Compatibility of Coal-Fired Power Plants

Plant	Capacity in MW(e)	Radius of Compatibility Circle
Essex, N. J.	702	0.6
New Boston, MA	718	2.5
Northport, NY	1177	8.7
East Lake, OH	1290	15.0
Allen, NC	1155	26.3
Baldwin, IL	1894	37.4
Wabash River, IN	962	48.4
Joppa, IL	1100	63.4
Huntington, UT	446*	93.0
Four Corners, NM	2270	100+ (12%)

*From Messing, Friesema and Morell.

more likely to develop quickly as regional options than as national ones, because resource endowments vary between places--and so do energy needs and the prices of energy alternatives.

(3) It might add stability and resiliency to our energy system by adding diversity, reducing our reliance on any single resource, technology, or source area.

(4) It would give many more people in the U.S. some actual experience with weighing the tradeoffs among energy, economic, environmental, and other objectives.* When a local area makes a decision about how to meet its needs, it cannot rely on someone else to balance the benefits and costs. As a side-effect, this might increase substantially the degree to which the American population is well-informed about energy issues and options.

Cons

(1) Self-sufficiency (if this is how decentralization is interpreted) is usually expensive and inefficient, for reasons that are thoroughly documented in the international trade literature (e.g., Kindleberger and Lindert, 1978). For example, a recent British study estimated that an "autarchic" single house in the United Kingdom, meeting its space and water heating needs with solar energy, would have seasonal heat storage costs of 11,000 pounds; a week's supply of hot water alone could cost about 300 pounds (Williams, 1980). In some areas, a small energy supply/use system which stands alone, providing its own storage and backup capabilities, and tries to maintain our accustomed level of comfort and convenience would be very expensive indeed. Besides a higher average price for energy, an attempt to reach a high level of small-area self-sufficiency could eventually lead to the migration of people and economic activity from high price areas to lower price areas.

(2) The narrow viewpoints of individual localities might, as a group, fail to meet some of the needs of the country at large. For instance, many localities could use coal only if it were mined somewhere else; and the national need for unspoiled scenic areas would restrict the options available to some places.

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*There are some indications that local energy planning results in greater attention to energy conservation potentials: Davis, Seattle, etc.

(3) Initiatives by one locality, reflecting a consensus among its citizens, might have impacts on a neighboring area that its people find objectionable. This, of course, is a classic externality problem and could increase conflicts between localities, even though conflicts within them have been reduced. The result might be a time-consuming need for coordination.

(4) A decentralized approach can place a strain on the pool of personnel and other resources. It calls both for competent managers for many decision-making units and for many people to participate in making the local decisions. And it requires that areas be able to generate the resources necessary to meet their needs.

(5) Such an approach would require changes in institutional roles and relationships. It could not succeed without local decisionmaking entities, presumably with powers to collect and disburse money; in many localities, the alternatives for this, at least at present, are very limited. In addition, it probably could not succeed without the cooperation of existing energy institutions, such as the gas and electric utilities--which is complicated by the fact that their roles might have to change in some respects. This issue often arises in exploring the relationship of small-scale electricity production to a regional electric utility, for instance.

(6) Energy is not one commodity but many. One can conceive of a decentralized approach to heating, cooling, and perhaps electricity supply and mechanical work. But a transportation sector which relies on liquid fuels is a more complex problem (e.g., Lawrence Berkeley Laboratory, 1978).

(7) A decentralized approach could lead to local exploitation and inequities. Historically, decentralized decisionmaking has tended to increase the power of rich and well organized groups in society; centralization has often been the response to a need to limit the power of an exploitative minority.

MAKING A DECENTRALIZED APPROACH WORK

In spite of the attractiveness of a decentralized approach (or in Illich's terms a "convivial" approach) to energy planning and decisionmaking, it seems

clear that it will not work unless many of the possible disadvantages are reduced. The concept of decentralization must be interpreted with care, and it must be associated with a set of complementary policies and approaches. It would be foolhardy at this point to attempt a comprehensive and balanced list of such conditions, but the following might be a place to start:

(1) We need to distinguish between a decentralized energy supply/use system (in the sense of a high degree of local self-sufficiency) and a decentralized approach to decisionmaking--an emphasis on local self-determination. The latter leaves it to each unit to decide whether to meet its own needs or to take care of them by contracting with someone else. As a national policy, local self-sufficiency does not make sense, but local self-determination is a realistic option.

(2) As implied above, a decentralized approach would only work if local facilities are interlinked, so that local supply systems are backed up by a larger system. This, of course, does not mean that every component part must have direct external links, but there needs to be a way to substitute externally derived energy for internally derived energy.

(3) More generally, there need to be structures whereby one area can meet another's needs. In principle, it would be possible to establish effective inter-area markets for energy goods and services (electric power supply is a highly imperfect example of this), in which localities can buy and sell according to what makes sense for them. Coal and uranium producing areas would sell, poorly endowed regions would buy, areas whose options are constrained (e.g., by environmental quality conditions) would buy, areas willing to trade off certain impacts for jobs and income would sell, etc. Private enterprise need not be replaced by local public enterprise, but local public entities would play a role in deciding what energy facilities would be sited locally and what conditions would be established for energy use.

(4) There must be a mechanism for resolving conflicts between localities. This could turn out to be one of the major energy policy roles of federal and state governments.

(5) There would have to be local decisionmaking units, playing whatever management role is involved. Standard governing units, such as cities or counties, are one option; another is special purpose districts, like the way many of our home areas handle water supply. Models for this include rural electric cooperatives and community development corporations.*

(6) We cannot effectively decentralize energy decisions in the U.S., at least not without wrenching political impacts, unless the utilities have an important role in both the process and the future that follows it.** Perhaps the key is to recognize that the localized decisionmaking units will have to represent one level in a hierarchy of units and to see the utilities as the building-block institutions for the next higher level. In this role, a utility could serve as a partner, working jointly with a locality to meet its needs, and even sharing in the ownership of the facilities. Or it could play mainly a coordinating role, focused on linkages and larger system planning. It could even work pretty much as it does now, simply decentralizing the planning within its service area to develop individual plans for different parts of the area, involving local people as intensively as possible in the planning process for their area. Utilities believe above all in delivering service, and if this is the only effective way to do it, I think there is a chance many of them could adapt to such an approach.

CONCLUSION

In such ways, it appears to be possible to design a workable decentralized approach to energy decisions that goes a long way toward resolving our problem with energy policy irresolution. One of the strongest reasons for taking this option seriously is that, as a result of local initiative, it is beginning to happen already. Generally, no single idea or policy or action makes much of a

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*There are already a lot of small institutions around the U.S. providing electricity to their localities.

**Note the agreement of Denis Hayes to this point (1980).

difference by itself. But when a number of things start working in the same direction, reinforcing each other, important changes can occur.

To illustrate, California, New York, and other states have made major investments in energy R&D to meet their own needs, saying that the profile of federal energy R&D is not quite right for them. Chemical industries (and others) are looking to industrial cogeneration as a way to meet more of their energy needs internally. The U.S. Congress has talked actively about such things as requiring regional energy plans to be prepared every other year, requiring states that generate radioactive wastes to dispose of their own, establishing community energy grants, etc. Even more interesting, communities are moving ahead on their own, well ahead of federal policy. In 1975 Davis, California, adopted a building code that promotes energy efficiency in new houses and promotes the passive use of solar energy. They are also doing some things to encourage transportation energy conservation. In 1976, Seattle decided that it was cheaper to spend money conserving electricity than to spend it on two new power plants; in the first year, electricity demand dropped 7.7% from the previous year. Springfield, Vermont, is trying to set up a municipal utility to develop the hydroelectric energy potential of existing low-head dams on the Black River nearby. San Diego and Santa Clara, California, are encouraging the use of solar energy. Trenton, New Jersey, is looking at large-scale cogeneration. St. Paul, Minnesota, is considering district heating systems. Boise, Idaho, has developed local geothermal resources in connection with a downtown redevelopment project. Dade County, Florida, is putting in the biggest facility in the country to recover energy from wastes. Memphis, Tennessee, is proposing a coal gasification facility. Montgomery County, Maryland, has implemented an extensive energy conservation program; and Salem, Oregon, has proposed one. In Greenville, North Carolina, a municipal utility is taking the lead in encouraging energy conservation. In Philadelphia and at least 21 other cities and towns, communities are assessing the potential of solar energy options, and an effort will soon begin to conduct such assessments for a number of Native American communities. And this is just the beginning of the list.

All that is needed, I suspect, is to recognize these early experiments as a key to solving our nation's energy problems and to urge other places to follow the examples of these pioneers. At the federal level, we can provide more incentives for community energy planning, remove legal and regulatory barriers to community action, make information and technical help available, and maybe assist in local institution-building where a new organization of some kind is needed to get things done. Local political processes will take it from there, as leaders (and would-be leaders) compete to show that their programs are in the best interests of the voters.

But we need to get going quickly if we are to have the chance to show that participation and pluralism can be positive contributors to energy policy rather than impediments to getting anything done. The time is nearly upon us when, if we have failed to solve our energy problems, we will be faced with a choice between stability and freedom, including the freedom to participate. Many observers believe that, confronted with such a choice, our country will choose stability, at the expense of irreparable harm to our political institutions. If we want to avoid this kind of future, and all that it implies, we must find a pluralistic, consensual way of getting things done now.

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