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Organizational Dynamics and Energy Policy

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ABSTRACT

Organization theory posits the idea of an organizational identity, a pattern of decision-making shaped by organization and management practices. The rise of the administrative state, as a function of the quest for efficiency in the production of material goods, has created an overarching organizational identity for government actions. This paper will develop a theory of the policy-making choices inherent to an administrative state and argue that the resulting organizational identity strongly encourages policy makers to consider what Lutzenhiser has identified as “the physical-technical-economic model (PTEM)” (Lutzenhiser 1993, 248) as the preeminent method of decision making. I will show the historical developments that lead me to conclude this, consider what these developments mean for citizens in such a society, and consider the effect of these developments on the organizational dynamics of energy policy actors.

Introduction

When people make decisions, they do not do so in a vacuum. People operate in a socio-cultural context, and that context provides boundaries within which to make choices. A trivial example of this would be the choice of clothing to wear at one’s job. One must choose among styles that are acceptable in one’s particular workplace. Were I to come to work in shorts and sandals, I would fail to fit in. To be appropriately dressed, I must choose among the formal clothes in my closet, ignoring the other styles I may own. Furthermore, that style of dress is specific to a cultural context. Wearing jeans and a T-shirt may be perfectly acceptable at work in Berkeley, but may not be acceptable on Capitol Hill. The decision is therefore bounded by the social milieu in which I operate.

In this paper, I will argue the existence of a social milieu that is the result of technological industrialism and the administrative state. This social context creates boundary conditions for policy decisions. Policy ideas that result from considerations outside these boundaries are deemed unworthy of discussion and discarded. I will develop (in broad outlines) a history of social thought that has led to these boundaries. This history will begin with a discussion of the philosophy of objectivity, arguing that this philosophy differed significantly from earlier theories of humanity’s role in the natural world. This philosophical shift ultimately results in a definition of social progress as exclusively driven by technological development. Developments outside of the technological sphere ceased to represent the progress of humankind. I will then examine the impact of this efficient production paradigm on environmental policies. While others have identified the existence of a decision-making preference in energy policy; e.g., (Lutzenhiser 1993), I will argue that this preference is a direct result of this historical paradigm of efficient production of goods as the means of social improvement. Actors operating in such a paradigm are constrained from considering certain policy methods as viable. I will argue the need to challenge those current boundaries with new systems of decision-making. I will then present some examples of the ineffectiveness of current energy policies as a result of this dominant organizational paradigm. Finally, I will offer some examples of research opportunities that would arise if new decision-making frameworks were used, arguing that these new areas of research could improve the overall effectiveness of energy policy design and implementation.

Objectivity and the Rise of Modern Science

The first aspect to the development of any decision-making framework involves epistemology. What can we define as knowable? Currently, objectivity is a valued approach to decision making. Objectivist science, developing from Descartes, puts forth the notion that scientists can examine nature objectively by examining individual elements of nature and then grouping those elements together into a rational whole. In his formative work *Discourse on Method*, Descartes developed an idea of immutable truths upon which he founded general laws of nature. His famous *cogito ergo sum* led to the fundamental distinction between the rational being and its surroundings. Because the ego could remove itself from the natural world and examine what it found in the world rationally, it could discern simple natural truths. Until this time, Aristotelian logic held humanity as fundamentally intertwined with nature. Cartesian logic allowed humanity to exist apart from nature. As the objectivist philosophy became prevalent, nature would lose standing and become secondary to humanity's desires.

Francis Bacon gave the notion of shaping nature to human preference further force. While Descartes provided the theoretical underpinnings for a philosophy of science, Bacon provided the development of a method of scientific practice. The procedural, inductive method of science developed by Bacon was driven by a desire for science to develop means of altering nature to provide wealth. Bacon would advocate that the knowledge gained by such a system of natural examination could be turned toward the development of society. As he wrote in *The New Organon*, Bacon believed that science would provide a means of technological development that, in turn, would provide for the improvement of society. Hall writes in his description of the formation of modern science, "[Bacon] has thus been depicted as the first philosopher to appreciate the potentialities of science as the servant of industrial progress." (Hall 1956, 165) While Hall goes on to argue that Bacon's place in history is more complex than this common depiction, it is clear that Bacon's empiricism, combined with his position of significant influence in English political life, greatly furthered the adoption of scientific practice as a means of technological development toward social ends. In the work of Descartes and Bacon, we have the development of a science that separates humanity from nature, and turns toward controlling nature. The combination of Bacon and Descartes therefore brings the notion of an objective rationale to the service of society.

This new scientific method was quite effective, and by giving an alternative explanation to those proposed by the Aristotelian worldview, brought people to see advance ahead, in the control of present and future philosophers and scientists. The successes of natural science led directly to the growth of sociology as a science dedicated to developing the underlying principles of social order. Sociology used the same kinds of mechanistic, objectivist principles as a means of carrying out its research. Humanity itself, then, became something to be analyzed with scientific rigor, and the hope of sociologists was to identify those basic tenets of social order that would lead to progress. For if the natural laws of social organization could be known, humanity could conform itself more fully to them, and human progress would be assured.

Saint-Simon, as an influential member of this sociological school, saw the fall of feudalistic Europe as a time of change. Old regimes were falling, social order was disintegrating, and it was the duty of the sociologist to determine and champion the "true" social order founded on the principals of natural laws. Furthermore, social order necessarily proceeded from society accepting these values of scientific reasoning as a means of organization. As Taylor writes in the introduction to his translation of Saint-Simon's writings, "The task facing nineteenth-century Europe, Saint-Simon asserted, was one of social reconstruction. And social reconstruction could not possibly be achieved until a new moral

code based on scientific reasoning was formulated and accepted as valid by the majority of the people." (Saint-Simon 1975, 35) By associating the development of society with scientific principles and material welfare, Saint-Simon formulated a notion of government that was scientific and dedicated to the provision of material goods for its citizens. Thus the scientists, who could provide the "moral well-being" through their reasoning, and the industrialists, who could provide for material wealth, were the governing agents in Saint-Simon's perfect society.

Efficiency & Organization

As Saint-Simon brought material as well as moral happiness into the notion of a perfect society, the production of material wealth became a function of sound government. The development of society could be measured by the degree to which material wealth was accruing to its citizens. The progress of technology, as a means by which material wealth could be produced, was therefore crucial to social welfare. From this proposition, it is only a short step to argue that any improvement in technological output is an improvement in social development. While that step is a logical fallacy, the step became widely adopted. Rosenberg, for example, defined technological progress in terms of production efficiency, writing, "It is possible ... to consider technological progress as any improvement in the relationship between inputs and outputs." (Rosenberg 1972, 1) Societal improvement is logically linked with technological progress, and technological progress can be considered as improvement in the efficiency by which the production of material wealth is achieved.

Production efficiency was enhanced through the industrial process via the subdivision of tasks. As Marshall notes in his consideration of industrial organization, "The first condition of an efficient organization of industry is that it should keep everyone employed at such work as his abilities and training fit him to do well..." (Marshall 1938, 250) The organization of industry is therefore an essential point in the efficiency by which the production of goods is established. A properly organized industry will be an efficient one. Galbraith, in his work on the industrial state, notes that industry must apply organized knowledge to production, and that this can only take place through the subdivision of tasks, as noted above. He goes on to point out the logical consequences that result from this task subdivision process. Chief among them is the consequence that planning is necessary for production to proceed correctly. Galbraith writes, "Tasks must be performed so that they are right not for the present but for that time in the future when ... the whole job is completed. ... So conditions at the time of completion of the whole task must be foreseen, as must developments along the way. And steps must be taken to prevent, offset, or otherwise neutralize the effect of adverse developments and to ensure that what is ultimately foreseen eventuates in fact." (Galbraith 1967, 15)

The organization of production must therefore look to the future and discern its shape to come. This discernment is based upon knowledge of the myriad methods by which technological production is taking place. No single person, though, can know all that needs to be known about that process, due to the specialization of knowledge required for efficient production, and decision-making power devolves to a group. "It is not to individuals but to organizations that power in the business enterprise and power in the society have passed." (Galbraith 1967, 54-55)

Bell then argues that the organizational values of business; i.e., the values that govern the production process, become social values:

The basic values of society have been focused on business institutions, the largest rewards have been found in business, and the strongest power has been held by the business community, although today that power is to some extent shared within the factory by the trade union, and regulated within the society by the political order. In the most

general ways, however, the major decisions affecting the day to day life of the citizen—the kinds of work available, the location of plants, investments decisions on new products, the distribution of tax burdens, occupational mobility—have been made by business, and latterly by government, which gives major priority to the welfare of business. (Bell 1967, 30)

Theories of public administration have reflected these same biases toward organizational efficiency. Herbert Simon, widely regarded today as one of the founders of modern administrative theory, argued, "In the design of administrative organizations, as in their operation, over-all efficiency must be the guiding criterion." (Simon 1997 (1945), 42-43) Simon argues similarly to Galbraith that groups are the necessary unit of decision-making, as the individual cannot undertake the entire rational analytical process alone, writing, "The rational individual is, and must be, an organized and institutionalized individual." (Simon 1997 (1945), 111) Simon then follows a similar line to Bell in arguing that the values of the organization must become overarching, writing "Administrative man accepts the organizational goals as the value premises of his decision.... What is perhaps most remarkable and unique about administrative man is that the organizational influences ... induce in him a habit pattern of doing whatever things are appropriate to carry out in cooperation with others the organization's goals." (Simon, et al. 1950, 82)

Government is influenced through the process of organized, specialized knowledge being brought to bear on problems of efficient resource allocation. Eventually, such organization comes to be incorporated into the governing system itself. As Denhardt writes in his review of public administration theory:

Within the context of technical rationality, Simon's exposition of the rational model is classic. If we accept efficiency as the ultimate criterion for evaluating public agencies, and if we accept the cognitive view of human beings as mechanistically responding to their environment by seeking greater utilities, then the conclusions of the rational model seem nearly inevitable. And, as has repeatedly been noted, a general acceptance of these assumptions has marked the recent history of public administration theory. (Denhardt 1993, 92-93)

Methods by which efficiency in the allocation of resources is predicted then become dominant in governmental decision making. Government, it can be implied, has moved to decision making about technological output, as this has become an accepted measure of social progress. This is the fundamental conclusion of the logic outlined above. The values of objectivity, rationality, and efficiency in the decision making process are necessary for society to move toward the Saint-Simonian goal of moral and material happiness, made possible through technological improvement. Morality, equality, participation in the governing process—these things are left unconsidered.

Economics, the Individual, and the Environment

Turning to an examination of economics as a descriptor of individual behavior, Adam Smith's "invisible hand" argues that individuals will act with objective rationality to further their own self-interest. Following the same reduction/clustering objectivist philosophy outlined above, Smith argued that the accumulation of individual benefits would result in the overall improvement of the common good. However, Garrett Hardin popularized the realization of "the tragedy of the commons," in which the rational individual will fail to act in a socially beneficial way in a situation of limited resources. The "tragedy of the commons" occurs because an individual who seeks to maximize individual gain in

access to a public limited resource will overwhelm the resource limits. Because the incremental gain to the individual is high, while the effect of the resource depletion is spread across all those with similar access to the resource (and therefore incrementally low to the individual), the individual will always choose to deplete the public resource.

Ophuls, in his recounting of the historic development of the economic system, explains why this should be so. Smith's "invisible hand" was dependent upon an always-available excess of resources. As Ophuls writes, "Smith's *The Wealth of Nations* (1776) is therefore a manifesto for the attainment of political liberty through the economic exploitation of the found wealth of the Great Frontier." (Ophuls 1977, 144-45) But, as Ophuls concludes, "In short, resources that were once so abundant ... have now become ecologically scarce. Unless they are somehow regulated and protected in the common interest, the inevitable human outcome will be the mutual ecological ruin that ... Hardin ... has called the 'tragedy of the commons.'" (Ophuls 1977, 147)

We see, then, that the environmental arena is one in which government regulation is particularly necessary, due to the existing micro-economic conditions that are caused by ecological scarcity. It makes no sense for the individual to choose to consume less energy, for example, because the benefit of that energy consumption is immediately felt by the individual, while the pollution caused by the generation of that energy is borne by society. Policies must be developed to constrain individuals from actions that injure society as a whole. We have seen above that government decision making is driven by macro-economic considerations of efficiency.

Shifting focus to the individual policy maker within government, we can see these socio-organizational forces at work. It is important to note that the forces described above are not at work on some theoretical entity of "government" or "society," but on individual actors. This holds true at the level of individual policy makers within government agencies. These individuals must select certain plans of action as elements of their daily functions, and they must choose to propose and support some plans of action and not others. The administrative theories of Simon, discussed above, indicate that individuals will conform their decision-making to maintain the rationale of efficiency. Craig et al. have done research on the values these individual environmental policy makers hold. Extensive interviews of policy makers in the European Community showed that economic criteria, rather than personal environmental values, were the only things to be considered in the formulation of governmental response to environmental degradation. A British Treasury official is quoted as stating, "We try to give good economic advice rather than taking a bias on nature. We're not attempting to build any of our values into that at all." (Craig, et al. 1993, 139) The researchers were particularly struck by the difference between individual policy makers' environmental values and the lack of any such values in policy documents. (Craig, et al. 1993, 141) This schism between the personal belief and the policy maker's choice is not a surprising occurrence if one follows the rationale of objective policy creation that I have outlined.

Energy Policy Today

By their very nature, then, governmental organizations operate within this organizational culture created by the administrative state. By the arguments above, actors within these agencies will be strongly affected to consider only those choices that fall within the decision space of administrative efficiency and rationality. Therefore, policies that are based upon the theory of the utility maximizing individual are those policies that are contemplated for adoption.

We can see this bias in governmental policies dealing with energy consumption. Lutzenhiser, in his review of the role of human social behavior in energy analysis, argues:

a physical-technical-economic model (PTM) of consumption

dominates energy analysis.... The research reviewed here ... suggests that policy analysis based on the PTEM approach exaggerates the importance of energy prices and technological solutions, while underestimating the importance of social action and non-economic influences. (Lutzenhiser 1993, 248-49)

This domination of energy policy by the PTEM model is not surprising given the social and organizational context in which policy analysis has developed. Because efficient production of material goods has been equated to social progress, policy frameworks that support this goal are much more likely to have been used to analyze energy issues.

Moreover, as Lutzenhiser points out, policies that result from the PTEM often are ineffective in achieving energy efficiency or other environmental improvements when they attempt to shape the decisions of citizens. Why is that? Precisely because the rationale based upon objective decision making is inadequate to describe the actions of citizens. Just as Hardin recognized the flaw in Smith's logic of the "invisible hand," so too must it be acknowledged that Hardin's logic was flawed by accepting at face value another of Smith's hypotheses—that of the rational self-maximizing individual. As Sagoff has written:

Not all of us think of ourselves primarily as consumers. ...Our environmental goals—cleaner air and water, the presence of wilderness and wildlife, and the like—are not to be construed, then, simply as personal wants or preferences; they are not to be interests to be priced by markets or by cost-benefit analysis, but are views or beliefs.... These goals stem from our character as a people, which is not something we choose, ... but something we recognize, something we are. (Sagoff 1988, 27-28)

Stirling argues that such deeper values are incalculable by economic analysis. He argues that policy makers can no longer attempt to use "rational" methods for policy formation, writing, "Rather than making spurious claims to objectivity, policy makers should acknowledge that calculation is subordinate to judgment." (Stirling 1993, 102) The dominant decision-making criteria used in policy development are inadequate to address the polity's concerns of environmental welfare. As Byrne concludes in his discussion of another policy-making framework, cost-benefit analysis, "In sum, the advocacy of cost-benefit analysis as a mode of governance is based on ... flawed premises: first, that the basic dilemma of modern governance is how to arrive at rational definitions and ultimately solutions of complex social problems...." (Byrne 1987, 89)

This flaw occurs because of the dependence upon this theory of efficiency as the goal of society and the use of objective, rational, technical expertise as a means by which decision making should be accomplished. It is, in fact, the development of the industrial state that has led to environmental degradation, and through such degradation, the flaws inherent in the objectivist mindset have become strikingly apparent. Government is, as I have implied, filled with individuals who hold personal beliefs and values that are not economically motivated, yet the structure of the current governmental system does not allow these beliefs to be validated in government policies. This paradox of government values that are not held by its citizens cannot survive.

As Mohan has suggested, this recognition of the paradoxical nature of the current system results from the inability of current government structures to conceive of the citizen as anything other than a rational, self-maximizing seeker of utility. However, clearly there are other elements to the individual besides such characteristics. Mohan sums up the necessity for a move beyond this conception, a movement toward what he terms a "post-material" society. He writes, "Post-materialism

is fundamentally premised on the failings of the self-serving, shortsighted, and counterproductive philosophies of the twentieth century, which could not provide us with a paradigm of the unified person.” (Mohan 1992, 8)

Such a post-materialist society must necessarily emerge from the current environmental crises, as it is the impetus of these problems that makes obvious (a) the responsibility of the current ideologies for those crises, and (b) their inherent inability to alleviate them. Post-materialism will therefore have to depend upon a new conception of decision making in which decisions are reached through political consensus on various shared social values, not the singular value of efficient production of technology. Several authors, among them Stirling and Merchant, have reached similar conclusions. Stirling writes, “The complexities of nature and human society are better represented by a number of decision making criteria. Such criteria are far more effectively identified and prioritized through wide political debate....” (Stirling 1993, 102) Merchant argues, “Western society is once more beginning to appreciate the environmental values of the premechanical ‘world we have lost.’ Today the ecological consequences of exploitative attitudes toward the four elements ... are beginning to be fully recognized. ...[H]olistic presumptions about nature are being revived in ecology's promise that everything is connected to everything else and in its emphasis on the primacy of the interactive processes in nature.” (Merchant 1980, 99)

We may therefore be on the way toward developing a new politics, one that can encompass these needs for inclusion and the recognition of interconnection. There seems to be a growing public recognition that the current prevalent decision-making structure is flawed, particularly when dealing with energy/environmental issues. A recent editorial in the New York Times on the value of biodiversity identified need to move beyond these old structures, arguing “...biodiversity is a basic reordering of the metaphor by which we understand the structure of life, from an ancient but still forceful hierarchical model, in which humans take precedence on earth, to a more accurate and more equitable model of biological coexistence.” (1998) Further identification of the inherent failures of the current system, combined with increased inspection into new modes of policy formation and implementation, may well help avert the ecological threat that has brought us to this recognition.

What are some examples of these new modes of policy formulation and implementation? It is clear that one aspect of these modes must be the recognition, examination, and abolition of the *a priori* assumptions built into the current organizational systems of our federal funding agencies. While public administration and organization theory in practice is still dominated by the rational “administrative man” approach, such organizational systems are recognized as seriously flawed in most current public administration/management literature. Newer theories; e.g., those propounded by the organizational humanist school, recognize the need to incorporate other values besides rationality and efficiency in the policy formulation process. Echoing some of Stirling’s arguments, Redford argues that more representation and debate is necessary in the policy formation and implementation process. As Denhardt summarizes his work, “it is assumed that individual claims can best be promoted through the involvement of all persons in the decision-making process and that participation is not only an instrumental value, helpful in attaining other ends, but is essential to the development of democratic citizenship.” (Denhardt 1993, 143)

Next Steps

In sum, the dominant paradigm in energy policy analysis incorporates methods derived solely from technical and economic criteria. This paradigm is shaping policies in ways that ignore important aspects of energy consumption. What then would be different if this paradigm were to change? What specific policies exhibit this approach now? How can we change them to be more effective?

Lutzenhiser identifies seven areas of human factor research that have application in energy analysis. The dominant model of policy formation, to a great degree, ignores these areas. They are: “behavior and variability in consumption, public opinion and conservation attitudes, price and information, billing and rates, consumer knowledge and the social contexts of consumption, micro-behavioral studies of actor-building-technology systems, and the macro-social organization of energy use.” (Lutzenhiser 1993, 248) Each of these areas provides an example for differences that could be realized in a different organizational structure.

For example, the U. S. Environmental Protection Agency’s Energy Star Building Label program currently gives little regard to the variability of consumption due to occupant behavior. The program is designed to encourage energy consumption reduction (and as a result, pollution reduction) in the commercial sector by rating the energy efficiency of commercial buildings and labeling buildings that meet a certain efficiency level. This efficiency level is determined by measurements of the building’s components; e.g., chiller efficiencies, insulation levels, lighting system efficiencies, etc. However, as Lutzenhiser notes, studies of household consumption have showed that “nearly identical units ... have reported large (e.g., 200-300%) variations in energy use.” (Lutzenhiser 1993, 249) We are therefore pursuing a policy in which energy consumption fluctuation of two orders of magnitude can still be considered efficient in the EPA labeling scheme, as EPA only takes building component information into account when awarding the label. If the ultimate goal is reduced energy use, then the people within the building must be considered. An energy policy framework that incorporates analysis of the ways people operate buildings is necessary to meet effectively our consumption reduction goals. It does a disservice to offer an efficient building without providing for its efficient operation. One can easily imagine the situation in which an inefficient building with efficient occupants would outperform an Energy Star labeled building with consumptive occupants. In the latter case, not only would the policy be ineffective, it would also be misleading to the building tenants.

The second category of public opinion, attitudes, and behavior can also be exemplified through another aspect of the labeling program. As structured, the Energy Star Building Label will provide information for building owners and occupants. It is assumed that the label will affect potential occupant preferences in the building real estate market. Labeled buildings will be more attractive to potential tenants. Owners will want to get their building labeled to attract these tenants. The effect of the building label, however, need not stop there. (Stern and Oskamp 1987) argues that attitude/behavior processes are embedded in larger social systems. The work environment, one such system, is an area that has been little studied for its effect on worker attitudes and behaviors toward energy use; however, one example is a study of recycling practices in the workplace. That study showed significant changes in consumption behaviors of the workers at home. (Berger and Kanetkar 1995) The Energy Star Label program, therefore, presents the potential to affect not only office building efficiency and tenant choice, but also the energy consumption attitudes (and therefore behaviors) of the labeled building’s occupants in other settings. This interactive effect is not something that can be easily captured, nor readily conceptualized, by the technical/economic systems-orientation of common energy policy. It is, however, a significant opportunity for widespread energy consumption change. The analysis of such possible consumption effects as a result of the Energy Star Building Label is a virtual *tabula rasa*. We are faced with an outstanding research opportunity into the interactive effects of this policy once we recognize the need to incorporate the attitudes and behaviors of workers into the policy analysis process.

Much has been made in the energy literature of price signals to consumers. Is there or is there not an “efficiency gap?” In large part, this discussion has assumed that people are well informed about the cost of the energy they consume. Studies of several information mechanisms have shown that this

is incorrect. The FTC Appliance Label, for example, is assumed to provide customers with the information needed to make a rational life cycle cost calculation. du Pont's recent study of consumer understanding of the appliance label, however, showed that a number of customers interpreted the label information incorrectly, leading them to choose the more expensive, more consumptive appliance. (du Pont 1998) Similar problems of misinterpretation or incomprehension exist with utility bills. One study of store owners in a New Jersey mall found that not one of the store managers surveyed could identify or explain the demand charge on their bill. (Komor and Kempton 1991) My research on the ways commercial and industrial customers use their energy bills shows widespread misunderstanding of bill items. Utility commission-mandated itemization of charges, for example, provided as an attempt to give the consumer more information, usually confuse and frustrate the consumer rather than inform. Moreover, the energy bill gives no information about how much less energy the consumer could use. All they receive is a consumption figure. Without a frame of reference, that figure is of minimized use. From these and other studies, it seems clear that information alone is not enough to create policies that provide effective consumption signals. Information must be tailored to be comprehensible and useful to the consumer. The current paradigm recognizes this dimly, if at all. Incorporating the consumer into policy formulation and analysis, rather than using largely *a priori* energy policy analyst assumptions about what the "average consumer" finds useful, would result in energy information policies that were more effective. This requires some relaxation of the "organizational efficiency" assumption of the technocratic expert having the best knowledge to make policy decisions.

The technical orientation of energy policy has been shown to be somewhat lacking in another EPA program, Energy Star Office Equipment. It was assumed that making copiers and printers more efficient was primarily an engineering problem. The Energy Star Office Equipment program encouraged manufacturers to overcome this engineering issue by providing a consumption benchmark for copiers and printers. However, the interaction of the user with the technology was not well considered before program implementation. The result was user dissatisfaction with the efficiency features in the Energy Star equipment, resulting in the disabling of those features in a large number of circumstances. Had the actions of the consumer been considered as an integrated element of the energy consumption of these products, the program would likely have been more effective in meeting its primary goal, reducing energy use of office equipment. This problem is not a new one in energy policy. Technical problems with the introduction of other efficient technologies—e.g., electronic ballasts that failed, fluorescent lights that gave off an unpleasant color, compact fluorescent bulbs that didn't fit light fixtures, low-power computers that crashed, etc.—have led to slowed adoption of the technologies into the marketplace and consumer suspicion of other efficiency technologies. Including the actor in the technology would therefore be beneficial to providing more effective energy reduction policies through technology innovation.

Finally, it should be recognized that the specialization of knowledge inherent in large-scale organizations creates special problems of energy efficiency information dissemination and implementation. The creation of new organizational management strategies to address the flaws inherent in the current structure can also work to reduce the barriers to energy efficiency and environmental sustainability. There are a number of management approaches to changing organizational culture to improve institutional effectiveness. There are now management strategies being advocated to help "green the business"; i.e., make businesses more environmentally friendly. We should recognize that organizational research to address and overcome the institutional shortcomings of the current policymaking structure can also serve to overcome barriers to energy efficiency. As Lutzenhiser argues, "The available research ... suggests that a simple rational model of

energy use and conservation decision-making applies no better to organizations than it does in the residential sector.” (Lutzenhiser 1993, 276) In research to address this issue, we may also be able to create new models of energy policy organization that can remove the current barriers of the dominant paradigm.

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