

Barriers to thinking new about energy

Laura Nader

Anthropologists study the past and the present; we don't normally study societies that don't exist, let alone invent them. Until about five years ago, I specialized in studying legal systems cross-culturally. Now I also look at questions about energy, science and expertise, the work place of scientists, and the freedom of science. How did an anthropologist get involved in energy issues?

A few years ago, some people at NASA asked me to attend a conference in Monterey, California, on potable energy systems. My immediate response was that they had the wrong Nader. The man at the other end of the line said, "You are the anthropologist? We want an anthropologist at this conference." So I went down to Monterey for five extraordinary days with different groups of professionals, mainly scientists and engineers. We talked about different "scenarios" for the future. (I hadn't even heard the word scenario at that time.) We were to think freely about these different scenarios for the future, but it became quite clear that there were already boundaries around those scenarios. You were to think freely—within those boundaries. When you went beyond them, someone would tell you, "You're off the track." Finally I told one fellow that we didn't know where the track was; that was why we were there.

At the closing session, I told these people what I thought, as an anthropologist, listening to them. I sketched why I had gone into science—for anthropology is a science as well as a humanity. One reason why I'd gone into science was that I was curious; I believed that scientists encouraged curiosity. In Monterey I had found that, in fact, curiosity and the freedom to roam mentally were curbed among physical scientists and engineers.

The group itself was very limited—all but three were men; all of us were white; and aside from two social scientists and two lawyers, the rest were engineers and physicists.

The most striking observation was



the number of taboos. Solar was never mentioned by anybody other than myself, literally not mentioned. The possibility of dropping nuclear power as a future alternative wasn't even discussed. The social and political consequences of nuclear power were not discussed. Nobody used the word "safety." These were all taboo areas. The fact that we were making decisions that closed off options to the next generations was considered irrelevant.

None of these and other central issues were talked about. Every time I raised them people would say things like, "You remind me of my son." That gave hope. They were at least raising their children right.

After my talk an engineer smiled at me and said "Professor Nader, I would like to explain why we don't talk about safety; we don't talk about safety because it's built into the design." As an anthropologist I found that statement interesting enough to write down.

A man from Texas said, "I've been on a lot of big work projects all my life. Nuclear's no different. Anytime you're building something, you lose some people. It's just a big crap game, and this is the biggest crap game of them all. You toss the dice and hope you hit seven."

My eyes were opened further at a lecture about breeder reactors at the Lawrence Berkeley Laboratory that I attended with my husband. The same sort of group was there—mostly white, mostly male, and mostly scientists and engineers. The man who introduced the speakers said, "Since breeder reactors are the way we're going to go, we've brought two people from Atomic International to discuss the question."

In the first place, who says that breeder reactors are the way we're going to go? There was no discussion of that question either before or after the talk.

The first question came from a young man in the front row, who said, "I find it incredible that you've talked for a whole hour about the breeder reactor and never raised the question of public safety." I said to my husband, "That man does not work in this laboratory." (He didn't, either. He was John Holdren, a professor on the campus.) Several questions followed, but the only ones about public safety came from young graduate students. Not a single worker at the laboratory asked about public safety.

For the first time, I began to question how the work organization affects how scientists and engineers think. There are certain pressures, at that laboratory and others like it, that encourage people to think similarly—that, in fact, punish deviant thinking. In science, new ideas come from oddball thinking and freedom of expression. After that, I kept my eye on the work place of the scientist and engineer.

I was soon involved in the CONAES (Committee on Nuclear and Alternative Energy Systems) project at the National Academy of Sciences. The CONAES was divided into the Synthesis Panel, the Supply Panel, the Demand Panel and the Risk Panel. I was a resource chairperson for the Synthesis Panel. My group was to describe what

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life would be like in the year 2010 under different levels of energy expenditure. We were going to go from 70 quads to 70 quads, from 70 to 110 quads, from 70 to 175 quads and so forth on to 2010.

I was intrigued by how people were working on the project. In the first place, I'd never done any work with the future. As I've said, anthropologists study the past and the present; we don't study societies that don't exist, nor do we invent them. I soon learned that our humility was probably misplaced in this project, because economists don't mind inventing all kinds of societies. When what they invent often happens, invention becomes self-fulfilling prophecy, much to many people's horror.

I noticed the earlier patterns in this group: a good deal of standardized thinking; lack of respect for diversity; absolute taboo on the word "solar." Their memos discussed nuclear, coal and non-nuclear. Non-nuclear was solar.

I asked the co-chairman, "How come nobody ever uses the word 'solar' around here? I've been on board six months and nobody's used the word 'solar'." He looked at me, rather surprised. "I don't know. Solar's been an orphan child." Somebody else piped up. "Solar? Solar's not very intellectually challenging." Somebody else said, "What's solar? A bunch of mirrors."

Some things said off the tops of people's heads have much deeper meaning, as any social scientist could understand. The first observation was, "It's an orphan child." The president of the American Chemical Society in 1900 predicted that the US would be running on solar by the 1970's. When did it become an orphan child? Did it have anything to do with World War II, the nuclear developments, militaristic interests, and so forth? What are the reasons for that? One could write a paper just on that observation.

The other observation: "Solar's not very intellectually challenging." What is intellectually challenging to these people? They seem to relish something complicated, hazardous, difficult and risky, something that requires high technology and big money. They seem to have a real attraction to that sort of thing. I'm not a psychologist, but I came as close to psychologizing during the CONAES study as I ever have.

I had on my resource team two physicists, a computer technologist, one sociologist, an economist, an engineer—not many social scientists. They were a diverse group, willing to experiment with different futures. We started out with the idea that energy demand was

not going to expand by 2010; it would stay at 70 quads. The challenge was, could you go from 70 to 70 without changing amenities, in such a way that people wouldn't be disturbed or disrupted in their lives. The value system, essentially, wouldn't change.

One economist reported that it was impossible to go from 70 to 70. We asked him, "Have you concluded that it's impossible because you're using growth models?"

What do people think is possible? Why are people so tightly constrained? Perceptions of the past, the future, and the present are intimately tied to what one feels is possible, and what one is optimistic or pessimistic about.

Our 70-to-70 scenario is fairly easy to carry out, with little disruption in people's lives. Essentially what we focused on was technical efficiency. Cars get more miles to the gallon, refrigerators give the same service but use less

electricity. We had gimmicks that people could use to turn on and off their gas or oil in the house; lots of little things that added to a fair amount of saving with very little change.

Going from 70 to 70 was easy, because there's so much waste in the system, so we decided not to go from 70 to 110 as directed, but down to 50 instead. We got some interesting reaction to that scenario. Who ever heard of going down without going backward?

Many people misunderstand the direction of change and the ways societies change. In the 50-quad scenario, most of the responses to problems are bottom up. The reason that people can't understand that scenario is because professionals in this country tend to think top down. Even where this does not happen, where there is ample evidence of the direction of bottom-up change, people in power believe that change comes from the top down.

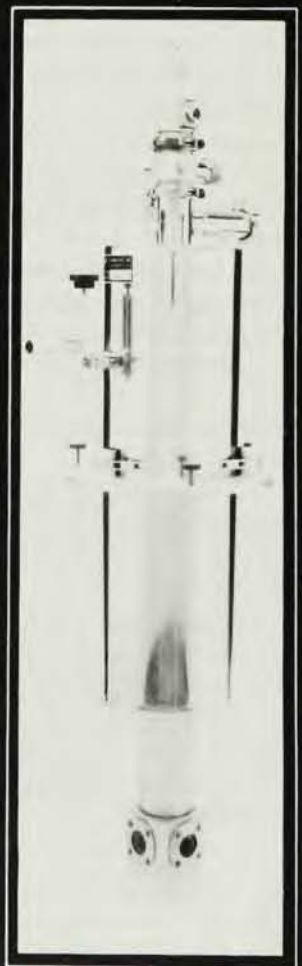
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tors, for example, are not top-down changes. They are individual decisions made in households all around the country. The invention of the car was a dramatic change that started as a small industry and diffused.

Our 50-quad society was a bottom-up change scenario. We made it that way on purpose. It was not a utopia; it was an exercise to make people think a little differently. We may not even want to live in such a society but we wanted to juggle people's thinking about what is possible. We wanted to point out, first, that it is possible to have a high-technology, low energy society, and second, that change can come from more than one direction.

While we were working, no matter what we sent to Washington, we would be asked for more tables and less prose. We finally got an exasperated note that said, "More tables, less prose. These guys don't read." We know there's a literacy problem among the young, but less recognized is another serious problem in this country: managers and planners do not read and they do not write. They hire people to do it for them.

For people who want it all in tables, I ask: "How do you talk about freedom in tables? How do you talk about democracy in a table? How do you talk about most of the things we care about in a table?" We compromised: we used both prose and tables. It's probably one of the few reports that can be read by the tax-paying public.

The CONAES project was the hardest field work I'd ever done. I've worked among Indians in southern Mexico, Shiite Moslems in southern Lebanon, and in a variety of places in this country. This was, by far, the most difficult work. I think it's important to understand why.

People in technical areas work with objects or with numbers. They don't work with human beings. When you have people who never work with humans thinking about our future, sometimes humans are treated like objects.

The kinds of statements that I heard at CONAES might not seem strange to you, but I want to repeat them because they are very strange. In the Risk Panel, a well-known risk specialist, in reporting his conclusions, said, "Fifty thousand people die in car accidents every year. We know how to build cars so that doesn't happen. There are X number of people who die in dam breaks, from household accidents, and from various other accidents. We know how to prevent those deaths. If we prevented those deaths, then we could afford to have a nuclear disaster." I understood why, when I came home from this work, I would head for

the shower before I would greet my children. That kind of thinking is truly polluting.

The absence of diversity leads to serious problems. To start with, male professionals in this country are very macho. I don't say that facetiously. I really did not envy the men of that committee. I'd never watched men operate in groups like that, because although anthropology is still predominantly male, it's very heavily coed.

Something happens to same-sex groups, they vie with one another. You can see this in the non-human primate literature as well. Same-sex groups are very competitive. In this case, big is better. Hazardous is interesting and intriguing. I learned recently in Los Angeles that conservation is considered feminine. Isn't that interesting? That must make nuclear a very masculine endeavor.

After the CONAES study, I worked on yet another study. The DOE gave some money to University of California groups to do a study of what's called soft energy paths (Amory Lovins's term) in California. Can we go to soft energy paths, soft meaning non-nuclear, meaning decentralized, meaning solar usually? We began a similar kind of futures exercise that we were doing with CONAES.

Again and again I saw people's methodologies getting in the way. They were using old methodologies that were appropriate to other problems like growth modeling, to see what it was going to be like with less in the year 2010. They were tripping all over their methods and coming out with fancy computer statements that had little credibility. Shamans would evoke more confidence.

As an anthropologist I find this wedding to numbers fascinating. The belief is so strong, it's like numerology, the belief that numbers in themselves are useful. Numbers are useful, of course, but not in and of themselves. In a controversy, when one side gets a numbers man and the other side gets another numbers man and the two sides fight with numbers, and count coup, numbers have lost their utility. Both studies suffered from this belief that numbers in and of themselves add strength to an analysis of the future.

At one point in the CONAES study, I visited a breeder-reactor group meeting at EPRI. At that time, I worried about losing my objectivity, so I took a professional linguist with me. We heard things like this: Jack says to Bill, "Bill I like your numbers, they agreed with mine." Bill beams and says, "How about Jim? Has Jim generated any numbers yet?" Jack says, "No. Why don't you send your numbers over to him before he gets his ego involved with generating his own." I couldn't

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have made up these lines.

In a way I'm glad that there's humor in this, because there is so little humor in the whole energy question. But I don't want the humor to mask the importance of such observations or their consequences.

In the California soft-paths study, we took a look at two kinds of change: top down and bottom up. We looked at the mandated solar code; that was top down. We looked at the possibilities of distributed energy, which was bottom up. People could create their own wind and electrical systems and then feed it into the grid.

I found myself looking at work patterns again. The code we looked at dealt with encouraging solar energy use, natural gas, insulation, glazing and so forth. The people who wrote the code, I think, were inadequately aware of the human component. However, it became quite clear, in talking to the different people involved with this code, that certain people will determine if that kind of a mandate works or doesn't work.

We interviewed a wide range of people from different interest groups: bankers, contractors, architects, building inspectors, lawyers and realtors. Each type of worker belonged to a particular subculture of work, with an organization and value all to itself. They each had almost unique ways of looking at building codes. It was extremely difficult for anybody we interviewed, except members of the general public, to see the whole picture. Everybody saw the picture that impinged on their individual self-interest.

As a group, architects react critically to codes. They see them as a hindrance to their creativity, particularly if they mean more paperwork. Building inspectors, who are already overworked and understaffed, worry about even more work. Realtors are doing well as they are, so why should they endorse codes? Government bureaucrats are straitjacketed by the organization, and only able to work their mandates, even if the solution to their problem might lie outside that mandate, as narrowly defined. The utility planners had a similar difficulty. They found it hard to think of utilities as generators or sellers, rather than as buyers, of energy.

None of our material on workers is new data, but look at the meaning of such data for transitions we're coming into now. Realize that these very difficult times are not different because of any natural resource scarcity but because of such facts as self-interested workers who aren't rewarded for deviating or changing. They're rewarded for doing things the way they've always

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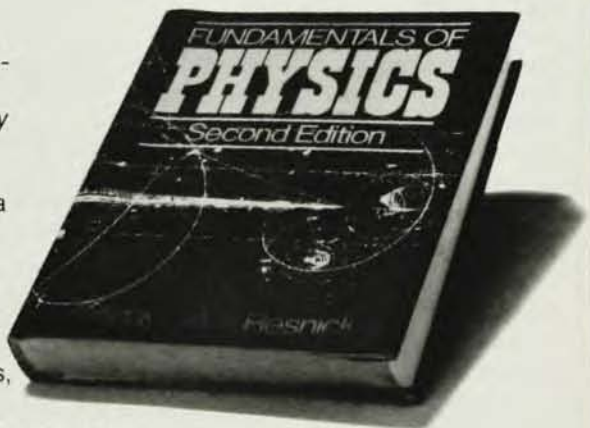
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If I were an anthropologist from New Guinea, observing the energy efforts of the past several years, I would note a wide gap between what leadership says and what it does in this country. I would note that the government had no serious interest in solar. All the solar conferences the government is sponsoring, I would see as rituals of reconciliation. In the absence of true innovation and change, we have one conference after another. Because of the way American leaders are handling the problem, I may theorize that the society is having a nervous breakdown instead of an energy crisis. I would be struck by the presence of solutions in the absence of will. One conservation researcher at the Lawrence Lab cut electricity use over 40 percent in a major building without anybody noticing. Yet most of our federal structures have not begun serious conservation.

Conservation isn't sexy. It's not hazardous; it's not risky: it's obvious. We have gotten to the point in our society where we can no longer entertain obvious solutions.

This is where anthropologists come in. The coming era will require practical, general, earthy types of thinkers who understand problems and conflicting value systems. We need people who can look at mundane and straightforward problems, people who will not choose complicated solutions when simple ones are available.

The energy problem is not a technological problem. It's a social problem. We must build technologies that recognize human frailty. If there's one thing that social science has documented, it's that people make mistakes. They're going to continue to make mistakes. Build that into the technology, and accept and reject technologies on that basis.

You must look at the concept of progress and decide whether, in fact, simple progress is what we have now. Anything we do we label as progress. We must decide whether progress as a concept should be reserved for something that improves the quality of life.

The toughest problem will be getting professionals to look inside themselves, to see what their mind-set problems are. What is it about my anthropological training that makes me see things in a certain way? What is it about your technical training that makes you see certain things and not others? No one is comfortable exploring these questions about themselves, but it's part of the job that has to be done.

Based on an address delivered at the MITRE Corporation, McLean, Virginia on 6 November 1979.