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THE TRANSFER OF INFORMATION FROM RESEARCHER TO CONSUMER: CHOOSING THE APPROPRIATE MEDIA

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THE TRANSFER OF INFORMATION FROM RESEARCHER TO CONSUMER: CHOOSING THE APPROPRIATE MEDIA

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ABSTRACT

The adoption of solar technologies in the marketplace will not come about simply because solar energy has many advantages to offer. As with all innovations, it must be "sold" through a variety of media, not just to the ultimate user but to several target audiences. For many reasons, not the least of which is cost, those seeking to speed the diffusion of the solar innovation must be sure of the objectivity, timeliness, comprehensiveness, and clarity of their messages before commencing the task of disseminating them.

1. INTRODUCTION

It is almost a truism that solar energy is good, the "right energy stuff," so plentiful that the only way to waste it is not to use it. Paradoxically, the most frequently asked question is "If solar is so great, where is it?" The question is reasonable, and hard to answer. Twenty-five years ago, Russian scientist Valentin Baum spoke to the obvious merit of solar energy:

> Just imagine for a moment that mankind had based his power industry on solar radiation, not fuel, and then the proposal to use different kinds of fuel was put forward. Probably there would have been very many objections. One could imagine that one of the most important arguments in defense of solar energy would be formulated as follows: Solar radiation is a "noble" form of energy and it was under its influence that life originated and continues to develop on Earth, therefore its use, no matter on what scale, could represent no danger or inconvenience for either the flora or fauna of the world. The use of any other kind of fuel would inevitably be connected with the poisoning of the atmosphere, water and land. Fuel should be used only where there are no other possibilities of obtaining energy, and in the sunny regions of the world the energy of the Sun should be used (1).

We inherited the other side of the energy coin, unfortunately, and with human inertia we resist even the most beneficent change for the security of accustomed things. Innovation comes hard; it always has. This fact is amply documented in a paper titled "Innovation and Evaluation" (2) by Frederick Mosteller, the recently retired president of the American Association for the Advancement of Science. Dr. Mosteller's field is not energy but health. However, the transfer of information is everywhere basically the same—and apparently always has been. Indeed, Mosteller's first case history is that of Daniel in the Old Testament. Daniel, Shadrach, Meshach, and Abednego sought to convince King Nebuchadnezzar that a diet of peas and beans was more nutritious that the rich, meat-heavy menu of the court. Unhampered by a need for sampling or for t-tests, Daniel succeeded. Seen in this historic light, our comparable task is something like prevailing on the White House culinary staff to adopt solar cookery.

2. THE UNIQUENESS OF SOLAR INNOVATION

It has been stated that the demand for energy information is rising almost as fast as the cost of energy. The statement is much more than a clever catch phrase, and the demands on us as communicators of solar energy information accurately reflect the severity of the energy problem. However, our seeming popularity tends to mask the real situation, which is not nearly as easily handled as we would like.

Life is not as simple as it was in Biblical times, for reasons that go beyond just our prodigal use of energy. Today, large populations with divorce life styles necessitate complicating factors like t-tests and sampling techniques and make the innovative task increasingly difficult. We also have a much more complex package to sell than a diet of pulses. The case for the uniqueness of solar energy is sound—there is but one sun. But what a multitude of technologies and applications its broad spectrum has generated, in addition to life itself. Compare the marketing of a passive solar residence with the promotion of the trillion-dollar Solar Power Satellite (SPS). Relate the tax incentives for domestic solar water heaters to the dissemination of information about a new photoelectrochemical breakthrough. For "innovator," read university, corporate lab, U.S. Department of Energy (DOE), Solar Energy Research Institute (SERI), and state energy offices. For "end-user," visualize a dozen—or a hundred—varied consumers of solar energy information.

Lincoln Moses, the first Administrator of the Energy Information Administration, reduced the field of energy information to the succinct goals of decreasing "clamor," increasing consensus, and focusing debate on energy policy. He listed five necessary criteria: 1) objectivity, 2) timeliness, 3) comprehensiveness, 4) clarity, and 5) dissemination (3). Too often we slight the first four in our haste to get on with the fifth.

Consider too the fact that solar energy is perceived in some quarters not as the benign panacea extolled by Professor Baum but as a direct competitor in the marketplace. The orbiting SPS for example, is seen by the fusion fraternity as competition for research dollars. Some in the oil industry might like to see solar's role limited to providing low-grade heat to drive secondary or tertiary petroleum-recovery facilities. One man's little ray of sunshine is thus another's interloping Btu.

Rogers and Shoemaker (4) have an interesting section in their book on the role of the "power elite" in the adoption or rejection of innovations. It is interesting to interpret their remarks in light of a fossil and nuclear power elite, a context the authors of course did not have in mind when the book was written (see Figure 1.)

The environment in which we must transfer information, then, is as broad as the solar spectrum but unfortunately not as energetic. Instead, it tends to be inertial. Our task is to turn the colossal energy glacier from its path without melting it along the way.

3. THE APPROPRIATE MEDIA

The transfer of information is at once utterly simple and frustratingly complex. The basic process is well described by Rogers and Shoemaker.

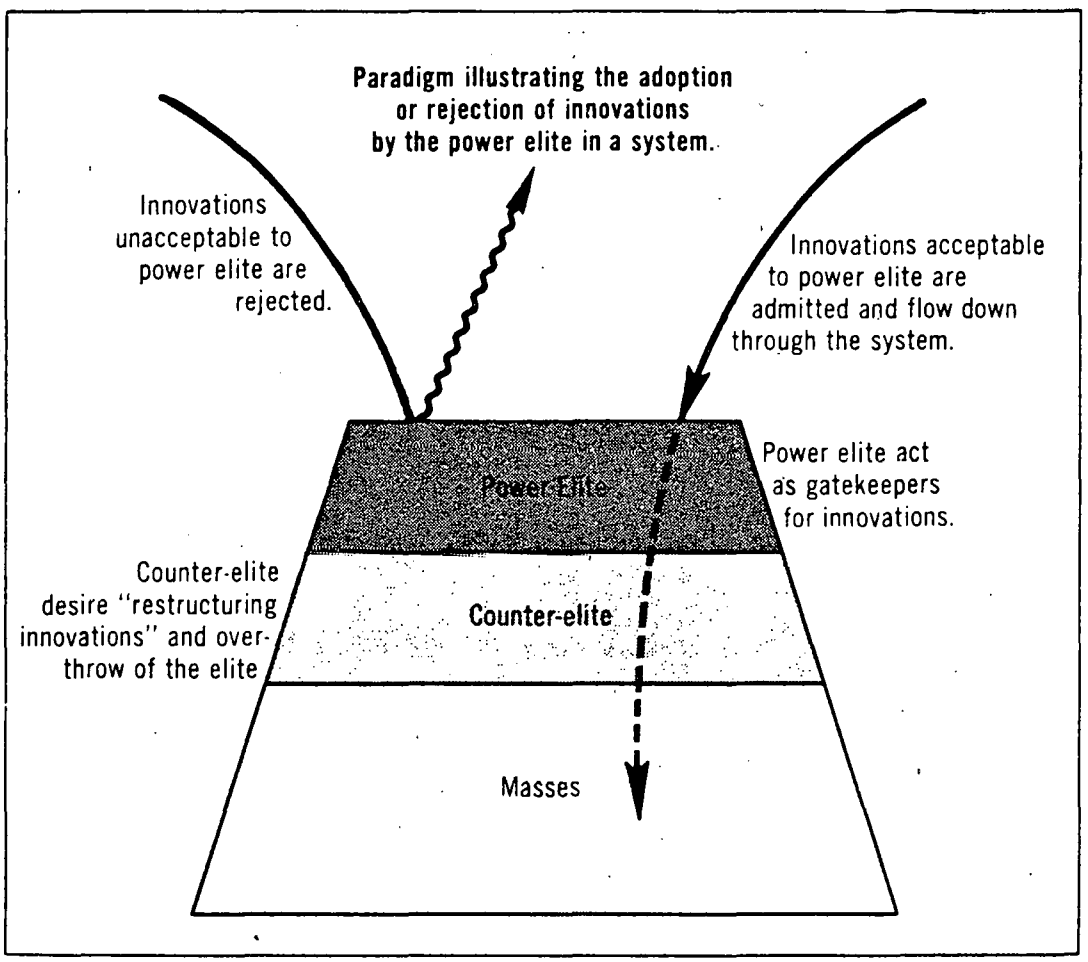

Figure 1. Adoption or Rejection of Innovations

The essence of the diffusion process is the human interaction by which one person communicates a new idea to one or several other persons. At its most elementary level, the diffusion process consists of (1) a new idea, (2) individual A who has knowledge of the innovation, (3) individual B who is not yet aware of the new idea, and (4) some sort of communication channel connecting the two individuals. The nature of the social relationships between A and B determines the conditions under which A will or will not tell B about the innovation, and further, it influences the effect that the telling has on individual B.

The communication channel by which the new idea reaches B is also important in determining B's decision to adopt or reject the innovation. Usually the choice of communication channel lies with A, the source, and should be made in light of (1) the purpose of the communication act, and (2) the audience to whom the message is being sent. If A wishes simply to inform B about the innovation, mass media channels are often the most rapid and efficient, especially if the number of Bs in the audience is large. On the other hand, if A's objective is to persuade B to form a favorable attitude toward the innovation, an interpersonal channel is more effective.

Therefore, the source should choose between mass media and interpersonal channels on the basis of the receiver's stage in the innovation-decision process, whether at the knowledge or persuasion stage . . . (4).

It is sometimes easier to define a descriptive like "appropriate" by offering instead an example of inappropriateness. The following quotation is taken verbatim from an airline inflight magazine:

Scientific Breakthroughs from Our Mailbox

Good news from the Solar Energy Research Institute. A contract for $15,300 has been issued to researchers at USC to "examine the electrodeposition of silicon from aqueous solutions and complex fluorides and evaluate potential of the methods for producing amorphous silicon thin films for photovoltaic cells." This will include, for those of you who care about such things, "determination of the feasibility of codepositing n- and p-type dopants for eventual p-n junction of Schottky barrier formation." Thanks, Energy Department, for keeping us up-to-date on this. We'll sleep better tonight (5).

Actually, this was an appropriate medium only from the viewpoint of the magazine's filler editor and from the viewpoint of his titillated readers. The quote most certainly did not produce the result desired by SERI's Public Information Office. Context is crucial to the transfer process. A brief explanation of the benefits of a photovoltaic roof that sells electricity to the local utility would have been more to the point. Fortunately there are many different media for the transfer of information. With a little thought you can probably add to the by no means exhaustive list in Table 1.

Simplifying, however, there are only three broad mechanisms of information transfer: seeing, hearing, and doing. We see, we hear, we do. One mechanism is reinforced (or inhibited) by another. Communicators can reach more people faster with radio and television. Print is generally more tangible, lasting, and credible. In general, the spoken word is more transitory, more subjective than what we see or read. The entire process of transferring solar energy information from researcher to consumer involves an intricate branching network with many critical interfaces, using all the great variety of media. Yet the process, when broken down, is more amenable to sharpshooting techniques than brute force broadsides.

One important communication medium is sadly lacking in the solar effort. In recent history we have observed the very successful "Apollo Project" and the nuclear power program. In both cases there was initial strong and vocal commitment from the Presidents of our country and their administrations. NASA and the Office of Public Affairs (OPA) implemented brilliantly effective "sales campaigns."

Table 1. List of Typical Media

Advertising	Computer Networks	Manuals	Seminars
Articles	Conferences	Maps	Slide Presentations
Billboards	Data Bases	Newsletters	Solar Index
Brochures	Demonstrations	Newspapers	Speeches
Books	Design Tools	Pamphlets	Stamps
Bulletins	Directories	Posters	Telephone "Hotlines"
Bumper Stickers	Exhibits	Press Releases	TV Programming
Cartoons	Films	Radio Programming	Word of Mouth
Case Studies	Handbooks	Reports	Workshops

For a time it looked as if the previous administration would accord its "20% by 2000" solar goal the status of a real mission. We desperately need such a program; a "Project Phoebus" that will not just put a few men on the moon but bring the Sun to Earth for the benefit of all 4 billion humans. Without such a commitment, the task will be far more difficult.

4. THE SOLAR INFORMATION COMMUNICATOR AND HIS TARGETS

The legendary tasks of selling iceboxes to Eskimos and coal to Newcastle are eased somewhat in that in each case the product to be sold and the target consumer are singular. The American melting pot postulated by early writers has not come about, however, and Herman Kahn has categorized us instead as a lower-case "mosaic society" composed of a multitude of tiles, each with an identity of its own. Because the Sun shines on us all, the audience for solar information is pluralistic in the extreme.

For example, in solar energy we are attempting to sell new methods for the "electrodeposition of silicon from aqueous solutions" to manufacturers of photovoltaic cells; negotiated easements to homeowners as a means of guaranteeing solar access; and a freeze-protection system for solar water heaters to consumers who may well be turned off by the need of freeze protection. For "seller," we must substitute scientist, engineer, administrator, code official, bureaucrat, Congressman, inventor, etc. For "coal" or "icebox" subsititute passive residence, flat-plate collector, analysis, survey, report, tax credit, building envelope concept, photoelectrochemical cell, and so on. And for "Eskimo" or "Newcastle," say homeowner, student, city manager, manufacturer, lender, installer, insurance man, realtor, and appliance dealer among others.

The best-categorized target audience description I am familiar with is that used by SERI (6). This approach identifies four principal target audiences for solar information. The composition and characteristics of each audience are outlined in Table 2. With several dozen media choices and four major target audiences each divisible again into further categories, the possible permutations are numerous. Thus, the optimal matching of medium to audience is not a simple task.

5. THE NEED FOR ECONOMY/EFFICIENCY

Even the most prodigal advertiser is constrained in his approach by the fact that the intended recipient of his message has been conditioned by years of subjection to a constant barrage of media. McLuhan long ago pointed out that the medium actually had become the message (massage) or vice versa. Audiences have accommodated, consciously or unconsciously, to the ambient sensory dim, but they are wary of what does penetrate their defensive screens. So the communicator must use discrimination in his media approach.

Those who would communicate the solar word have additional constraints. On the one hand, solar energy is a complex assortment of technologies and applications. The variety of target audiences adds to the difficulty of effective communication. Further exacerbating the problem is the limited budget available to spread the word.

It would seem that Fortune's 500 would have no problems selling solar products, yet Exxon, Grumman, and Owens-Illinois are among those who have had problems in the marketplace. If the giants cannot sell solar products, how can the Davids like American Solar King, which bought out Exxon's solar collector business? These companies will succeed only by being shrewd in their media planning and penurious in their spending. More than other communicators, solar people must be lean and efficient in implementing the diffusion of information.

Another sticking point exists. While there is seemingly a huge reservoir of media goodwill toward solar energy, the real situation is somewhat less propitious. At a DOE conference on

Table 2. Target Audiences for Solar Communication

Researchers	Commercializers	Influencers	End Users
Technology Generation →	Technology Commercialization →	Technology Application →	Technology Utilization
Organizations and individuals directly involved in generating solar research and performance data and design tools	Organization and individuals involved in designing, building, manufacturing market distributing, installing and servicing solar products and systems	Organizations and individuals influencing solar commercialization through zoning, legislation financing, appraisal, citizen advocacy, education, and building codes	Organizations and individuals, from public and private sectors, who are now or may become adopters of solar technology

Conservation and Solar Energy outreach programs held late last year, the then head of the Office of Public Affairs assured participants of something they had long suspected: that the American public overwhelmingly approves of solar energy. At the same conference, an official of the Advertising Council later informed a workshop on Public Service Announcements that although the Advertising Council was busily producing television, radio, and print Public Service Announcements on conservation for DOE, it had done nothing on solar energy—and would not be doing anything in the future. Solar energy, the official said, was too controversial.

Even assuming that the Ad Council relents and adds its weight to selling solar technologies, it is one thing to convince the public that solar energy is "good" (people already believe that in the abstract) but something much more difficult to convince them to add a solar water heater or buy a passive solar home. It is also increasingly evident that the new administration is less than bullish on solar energy. Information dissemination in particular has been targeted for very deep cuts.

These problems painfully magnify the need to pinpoint the appropriate media and to make it as cost-effective as the energy-efficient devices and appliances that are gaining favor in the marketplace. It is impossible to say here just which medium matches which communicator and audience. At this point, I will reiterate the wisdom of Lincoln Moses's hierarchy of criteria:

1. Objectivity
2. Timeliness
3. Comprehensiveness
4. Clarity

And only then:

5. Dissemination.

It may also be helpful to consider the following results described by Dr. Mosteller from a British study of 29 innovations:

> The main finding was that no variable seems to distinguish successful from unsuccessful innovations. Beyond this, their detailed findings can be summarized as follows: Successful innovators better understand user needs; pay more attention to marketing; develop more efficiently, but not necessarily faster; make better use of outside technology and advice; have responsible individuals with greater seniority and authority (mostly the business innovator rather than the technical innovator) (2).

6. SUMMARY

A recent advertisement in a learned journal describes a "Powerful New Multidisiplinary Information Service for Innovators." The National Technical Information Service offers a biweekly newsletter that allows "a scan of 2000 new reports in 20 minutes." A concerned journal editorial writer finds some consolation in the belief that crises stimulate innovation. If he is correct, as he would seem to be, our society should now be inundated with innovations.

Such concern is well intended, for we are a long way from attaining an optimum technological steady state. But the problem we are addressing at this symposium is not the creating of innovations, it is selling those innovations.

This paper began with a reference to "Innovation and Evaluation" in the journal Science (2). We left Daniel and his friends of fiery furnace fame attempting to sell King Nebuchadnezzar on the nutritional efficacy of pulses. That dietary battle still rages of course. I want to end with another such innovation covered in the paper. In 1601, Englishman James Lancaster demonstrated as conclusively as was possible that lemon juice prevented and even cured scurvy. The East India Company, which was losing thousands of seamen to the disease, could not have cared less, and scurvy continued to exact its toll.

In 1747, physician James Lind (who is generally credited with the innovation) again demonstrated that citrus prevented scurvy. However, not until about 50 years later, after Lind was dead, with thousands of scurvy victims, did the British Navy adopt the lime-juice supplement that gave its sailors the nickname "Limey." The British Board of Trade procrastinated until 1865 before putting James Lancaster's 1601 "innovation" to use. Here was a lag of 264 years in adopting a brilliant, much-needed treatment.

Nevertheless, this was rapid adoption compared with the solar energy experience. For Socrates described passive solar heating practice in specific detail. Archimedes operated a military solar furnace in 214 B.C. And Salomon de Caux pumped water with solar energy in 1615, soon after Lancaster cured scurvy. Surely our time is about to come.

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